

Work Number: PHL-1943.14

Project Manual for:

PASSENGER BOARDING BRIDGE REPLACEMENTS - PHASE III



Prepared by:

**City of Philadelphia
Department of Aviation
Capital Development Group**

WSP USA Inc.
1700 Market Street,
Philadelphia, PA 19103

Bid Number: 6648

Bid Opening Date: SEPTEMBER 4, 2025

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PROJECT MANUAL

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CITY OF PHILADELPHIA
DEPARTMENT OF AVIATION

DESCRIPTION OF WORK

THE SCOPE OF THIS PROJECT INCLUDES REMOVAL AND REPLACEMENT OF SIX (6) EXISTING PASSENGER BOARDING BRIDGES (PBB) AT TERMINAL D AND ONE (1) EXISTING PBB AT TERMINAL E AT PHILADELPHIA INTERNATIONAL AIRPORT. ADDITIONAL ITEMS OF WORK INCLUDE BUT ARE NOT LIMITED TO: REMOVAL OF GATE D12 FROM SERVICE INCLUDING DISPOSAL OF THE D12 PBB, NEW FIXED WALKWAYS AT GATES D11 AND E2, FOUNDATION RENOVATIONS, ACCESS AND SECURITY SYSTEM UPGRADES, NEW GPU AT GATE E2, REPLACEMENT POTABLE WATER CABINETS AND LINE STRIPING UPGRADES AT ALL GATES IN TERMINAL D AND AT GATE E2 IN TERMINAL E.

A NON-MANDATORY, VIRTUAL PRE-BID MEETING IS SCHEDULED FOR **AUGUST 12, 2025** ON MICROSOFT TEAMS AT **1:30PM** AND CAN BE ACCESSED VIA THE FOLLLOWING LINK:

https://teams.microsoft.com/l/meetup-join/19%3ameeting_N2UzMjc0MzktNWQ0Zi00NzQ1LTgyNzgtY2NjOTM4MWFmZGI1%40threadd.v2/0?context=%7b%22Tid%22%3a%22182f890-6790-42ac-ab97-58afd4eb2b6d%22%2c%22Oid%22%3a%22bfa01119-843c-40c0-be33-1f6d6e68502b%22%7d

ANY/ALL REQUESTS FOR INFORMATION FROM BIDDERS MUST BE SUBMITTED IN WRITING ON THE “Q & A” TAB WITHIN PRE-QUALIFICATION SOLICITATION **B2624858** ON WWW.PHLCONTRACTS.PHILA.GOV NO LATER THAN **AUGUST 19, 2025**.

QUOTES ARE TO BE SUBMITTED BEFORE 10:30AM EST ON **SEPTEMBER 4, 2025** ON WWW.PHLCONTRACTS.PHILA.GOV.

AN OPENING OF THE SEALED QUOTES WILL BE PUBLICLY CONDUCTED VIRTUALLY VIA ZOOM.

NOTICE: NO QUOTE WILL BE ACCEPTED UNLESS THE PRE-QUALIFICATION QUESTIONNAIRE WITH ALL QUESTIONS FULLY ANSWERED IS SUBMITTED WITHIN THE PRE-QUALIFICATION SOLICITATION **B2624858** ON WWW.PHLCONTRACTS.PHILA.GOV ON OR BEFORE **AUGUST 19, 2025**.

THE PROCUREMENT COMMISSIONER RESERVES THE RIGHT TO REJECT THE BID.

To the Procurement Commissioner:

.....hereby proposes to furnish all the labor, materials and equipment and incidentals, perform the whole of the work, and submit to all conditions, as represented, intended and implied, both particularly and generally, by the Plans, Special Specifications, Standard Specifications, Standard Details, Standard Contract Requirements, Form of Agreement, the Ordinance authorizing the work and this bid at the prices herein stated, and agrees that each item bid shall be complete in itself, and the City may increase or diminish the amount of work there under, or omit the item without invalidating the unit price bid for it or any other item, on the following terms to wit:

ITEM NO.	APPROX. QUANT	ITEM DESCRIPTION	TOTAL AMOUNT BID FOR ITEM Dollars|Cents	
1	Lump Sum	<u>GATE D2 PBB REPLACEMENT - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the contract scope of work at Gate D2 as shown and described in the plans, specifications and herein, for the lump sum of:		
2	Lump Sum	<u>GATE D4 PBB REPLACEMENT - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the contract scope of work at Gate D4 as shown and described in the plans, specifications and herein, for the lump sum of:		
3	Lump Sum	<u>GATE D6 PBB REPLACEMENT - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the contract scope of work at Gate D6 as shown and described in the plans, specifications and herein, for the lump sum of:		
4	Lump Sum	<u>GATE D8 PBB REPLACEMENT - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the contract scope of work at Gate D8 as shown and described in the plans, specifications and herein, for the lump sum of:		
5	Lump Sum	<u>GATE D10 PBB REPLACEMENT - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the contract scope of work at Gate D10 as shown and described in the plans, specifications and herein, for the lump sum of:		
6	Lump Sum	<u>GATE D11 PBB REPLACEMENT & NEW FIXED WALKWAY - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the contract scope of work at Gate D11 as shown and described in the plans, specifications and herein, for the lump sum of:		
7	Lump Sum	<u>GATE D12 PBB & GATE REMOVAL - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the contract scope of work at Gate D12 as shown and described in the plans, specifications and herein, for the lump sum of:		
8	Lump Sum	<u>GATE E2 PBB REPLACEMENT & NEW FIXED WALKWAY - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the contract scope of work at Gate E2 as shown and described in the plans, specifications and herein, for the lump sum of:		

**PHILADELPHIA INTERNATIONAL AIRPORT
REPLACEMENT OF PASSENGER BOARDING BRIDGES – PHASE III**

**BID 6648
PHL-1943.14**

ITEM NO.	APPROX. QUANT	ITEM DESCRIPTION	TOTAL AMOUNT BID FOR ITEM Dollars|Cents	
9	Lump Sum	<u>LINE STRIPING AT ALL D GATES AND GATE E2 - BID PRICE:</u> For furnishing all materials, labor, equipment, and incidentals for the completion of the line striping scope of work as shown and described in the plans, specifications and herein, for the lump sum of:		
10	Allowance	<u>ALLOWANCE FOR SPARE CRITICAL PARTS:</u> The work covered by this item allowance shall include the cost of all work required to provide spare/critical parts related to the new PBB AND GPU units as outlined within the project contract documents. <u>One Hundred Thousand Dollars and Zero Cents</u> All costs paid to the Contractor against this allowance must be substantiated with priced proposals and approved by DOA prior to billing as set forth in Section 01 21 00 - Allowances	\$100,000	00
11	Allowance	<u>ALLOWANCE FOR ONSITE O&M TRAINING:</u> The work covered by this item allowance shall include the cost of all work required to provide training for Airline's gate operators and maintenance staff related to the new PBB & GPU equipment as outlined within the project contract documents. <u>Seventy-Five Thousand Dollars and Zero Cents</u> All costs paid to the Contractor against this allowance must be substantiated with priced proposals and approved by DOA prior to billing as set forth in Section 01 21 00 - Allowances	\$75,000	00
12	Allowance	<u>ALLOWANCE FOR PROGRAMMING & DOOR TESTING:</u> The work covered by this item allowance shall include the cost of all work required to complete programming and testing of doors in relation to the contract scope of work as outlined within the project contract documents. <u>Twenty-Five Thousand Dollars and Zero Cents</u> All costs paid to the Contractor against this allowance must be substantiated with priced proposals and approved by DOA prior to billing as set forth in Section 01 21 00 - Allowances	\$25,000	00
13	Allowance	<u>ADDITIONAL CORRECTIVE WORK ALLOWANCE:</u> For providing all labor, materials, and appurtenances for work items identified by the Engineer and after review, approval and authorization by the Engineer, complete. The total sum of all such items shall not exceed the allotted sum of: <u>One Hundred Thousand Dollars and Zero Cents</u> All costs paid to the Contractor against this allowance must be substantiated with priced proposals and approved by DOA prior to billing as set forth in Section 01 21 00 - Allowances	\$100,000	00
		TOTAL BASE BID PRICE: The total of items 1 through 13.		

THE CITY OF PHILADELPHIA LOCAL BUSINESS ENTITY (“LBE”) DETERMINATION FORM

In accordance with Chapter 17-109 of The Philadelphia Code relating to Local Bidding Preferences and the Regulations promulgated thereto, this opportunity/bid may be subject to a local bid preference.¹ This form is required to be uploaded to PHLContracts by the Seller along with all required supporting documentation described herein in order to be eligible for any LBE preference available.

This form does not replace the LBE certification process or the annual affidavit requirements for an LBE and is not itself an application for LBE certification. Seller must be certified as an LBE at the time of the bid opening to receive the preference. For more information regarding obtaining and maintaining LBE certification please visit: <http://www.phila.gov/bids>, and follow the “Local Preference” link.²

I) Contract Incorporation

This LBE Determination Form, the certifications contained herein, and all supporting documentation shall be considered incorporated into any contract resulting from this opportunity/bid if an LBE preference is awarded to Seller. Following Seller’s submission of the required materials, the Procurement Department, in its sole discretion, shall make the final determination as to whether the LBE preference is applied to Seller’s bid.

II) Definitions

For the purposes of this LBE Determination Form and certification, capitalized terms shall have the following meanings:

“Majority of Any Work” means 51% of the overall work performed on the contract resulting from this opportunity/bid, as determined by the proportionate dollar cost for the work compared to the total dollar value of the contract.

III) Certification

Seller hereby makes the following certification in connection with the grant of any local bidding preference:

- A) Throughout the entirety of the contract, Seller or Seller’s LBE certified subcontractor(s) will perform the Majority of Any Work on the subject contract within the geographic limits of the City of Philadelphia and Seller or Seller’s LBE certified subcontractor(s) will maintain within the City a majority of the inventory or equipment that will be used on the contract or the amount of inventory that is customary for that industry;

¹ For quotes of One Million Dollars or less, the preference is ten percent (10%); for all other quotes the preference is five percent (5%).

² Evidence is required in order to obtain LBE certification and a review is conducted. The City cannot guarantee that LBE certification applications will be processed before the opportunity/bid opening date. The Procurement Department reserves the right to request any additional or clarifying information at any time prior to award of a contract, and during the performance of a contract.

- B) Seller understands that failure to comply with this certification at any time during the term of its contract, may result in Seller's LBE certification being revoked at the discretion of the Procurement Commissioner and Seller shall be in breach of such contract and subject to any and all remedies available, including payment of liquidated damages in the amount of 10% of the total awarded contract amount, and may be debarred by the Procurement Commissioner in accordance with the Procurement Department Debarment Regulation for a period of up to three years. Seller further understands that the City has the right to request any information related to this certification at any time; and
- C) Seller anticipates that the percentage of work to be performed by an LBE on any contract resulting from this opportunity/bid will be as follows:³

Seller or Subcontractor Name	Description of Work	Cost of Work (Dollars)	Overall Percentage of Work (%)
Totals			

IV) Supporting Documentation

Seller hereby certifies that it has submitted with this LBE Determination Form the following supporting documentation, uploaded as an attachment or attachments to PHLContracts with Seller's bid:

A) Seller Documentation

- A current valid certification from the Procurement Commissioner designating Seller as an LBE; and
- Seller's most recent LBE annual affidavit;

B) Subcontractor Documentation⁴

To the extent that Seller is relying on an LBE subcontractor to meet any of its certification requirements in section III:

- A current valid certification from the Procurement Commissioner designating such subcontractor as an LBE; and
- Any such subcontractor's most recent LBE annual affidavit.

³ Attach additional sheets as needed.

⁴ The identity of any subcontractor relied on for an LBE preference is required with Seller's bid submission, notwithstanding any other subcontractor identification requirements contained elsewhere in the opportunity/bid or contract.

BID BOND

FOR CITY OF PHILADELPHIA BID NUMBER: _____
(Please fill in)

KNOW ALL MEN BY THESE PRESENTS, that we _____, as

Principal (hereinafter called the "Principal Obligor"), and

Surety, are jointly and severally held firmly bound unto the City of
Philadelphia hereinafter called the City, in the sum of

TEN PER CENT (10%) of the GROSS AMOUNT OF THE BID

Lawful money of the United States of America, to be paid to the said City of Philadelphia, its successors and assigns, to which payment well and truly to be made, we do bind ourselves and each of us, our and each of our successors and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated the _____ day of _____ A.D. 2025.

WHEREAS, the above bounded Principal Obligor, submitted a bid pursuant to the above-referenced Bid Number to perform certain work for the City of Philadelphia.

NOW, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the City shall accept the bid of the Principal Obligor, the Principal Obligor shall enter into a contract with the City in accordance with the terms of such bid, and furnish such bond or bonds as are specified in the bid documents with good and sufficient surety, for the faithful performance of the contract and for the prompt payment of labor and material furnished in the prosecution thereof; or in the event of the failure or refusal of the Principal Obligor to enter such contract and give such bond or bonds, if the Principal Obligor shall pay to the City the difference between the amount specified in said bid and such larger amount for which the City may legally contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

And we do for ourselves and each of us, our and each of our heirs, executors, administrators, successors, and assigns, hereby authorize and empower the City Solicitor of Philadelphia or any other attorney of any court of record in Pennsylvania or elsewhere by him or here deputized for the purpose, upon the filing of this instrument or a copy thereof, duly attested as correct by the City Solicitor of Philadelphia, to appear for us or either of us, our or either of our heirs, executors, administrators, successors or assigns, in favor of the City of Philadelphia for the sum named in this bond, without defalcation, with costs of suit, release of errors, and with five percentum added for collection fees; hereby waiving the benefit of all exemption laws and the holding of inquisition on any real estate and authorizing the entry of such condemnation upon any writ of fieri fascias and agreeing that said real estate may be sold under the same; and further waiving all errors, defects, and imperfections whatsoever in the entering of the said judgment or any process thereon, and hereby agreeing that no writ or error or objection or motion or rule to open or strike off judgment or to stay execution or appeal, shall be made or taken thereto.

And for the doing of these acts, this instrument or a copy thereof attested as aforesaid shall be full warrant and authority.

CORPORATE SEAL:

PRINCIPAL OBLIGOR:

President or Vice President

Secretary or Treasurer (or either of their
assistants)

SURETY:

Attorney-In-Fact

-
- Note: 1) All sellers must utilize this Bid Bond form when submitting a bid to the City.
- 2) If Principal Obligor is an individual or partnership, Bid Bond should be signed by owner or authorized general partner. Please identify on the Bid Bond the type of business (e.g. individual proprietorship or partnership) and title of party executing the Bid Bond.
- 3) Bid Bond must be executed by a surety company duly authorized and licensed to act as surety by the Pennsylvania Insurance Commissioner pursuant to the laws of the Commonwealth of Pennsylvania.

1. The City is making a concerted effort to expedite the processing of contracts and reduce contract-processing time to an absolute minimum.
A careful analysis of this problem indicates that in the past there has been a serious cause of delay by the successful bidder to return contract documents to the Procurement Department. Therefore, the awarded vendor should be as responsive as possible when returning contract documents.
2. PERFORMANCE OF WORK BY CONTRACTOR

I, the undersigned Contracting Seller, am required to perform, on the site and with my own work force, work with a value of at least twenty percent (20%) of the original total contract price, exclusive of profit, overhead and the costs of procuring insurance and bonds. I, the undersigned Contracting Seller shall submit with my Quote a complete description of the work that will be performed (e.g., earthwork, paving, brickwork, roofing, etc.), the percentage of the total work this represents, and the estimated dollar value thereof.

I shall perform the following work:

Percentage of the total contract to be performed by Contracting Seller

Estimated cost of work to be performed by Contracting Seller:

\$ _____

NOTICE TO SELLERS

WORKING CAPITAL LINE OF CREDIT

The Philadelphia Industrial Development Corporation's ("PIDC") Contract Line-of-Credit provides short-term financing to small businesses who qualify for the program, including minority, woman, disabled-owned businesses performing contracts in the city of Philadelphia. Loans will typically fund the short-term capital needed to provide construction, procurement, or professional services to public, institutional or certain private users. Please contact Marla S. Hamilton at 215-496-8125 or mhamilton@pidcphila.com for more information.

NOTICE TO SELLERS

Chapter 17-1600 of The Philadelphia Code entitled “Economic Opportunity Plans” has been amended to require: 1. The filing¹ of the Successful Seller’s “certified Plan” with the Chief Clerk of City Council within fifteen (15) days of receiving a notice of award from the Procurement Department and 2. Publication of the certified Plan, in a downloadable format, on the OEO website. The “certified Plan” shall mean the winning Seller’s Economic Opportunity Plan containing its M/W/DSBE commitments as signed by both Seller and the Executive Director of the Office of Economic Opportunity (OEO).

Seller is required to sign and date the Plan and return it with its Quote, but the City reserves the right to obtain the Successful Seller’s signature thereon at any time prior to OEO certification. Successful Seller will receive, with the notice of award, a copy of the certified Plan for its records.

¹ Procurement Department will file the certified Plan with the Chief Clerk of Council on behalf of the winning seller.

City of Philadelphia Economic Opportunity Plan [BID 6648]

I. Introduction, Definitions and Goals

- A. Chapter 17-1600 of The Philadelphia Code requires the development and implementation of “Economic Opportunity Plan(s)” for certain classes of contracts and covered projects as defined in Section 17-1601. The Economic Opportunity Plan (“Plan”) memorializes the successful Seller’s best and good faith efforts to provide meaningful and representative opportunities for Minority Business Enterprises (“MBEs”), Woman Business Enterprises (“WBEs”) and Disabled Business Enterprises (“DSBEs”), Disadvantaged Business Enterprises¹ (“DBEs”) (collectively, “M/W/DSBEs”) and an appropriately diverse building trades workforce in connection with the contract or covered project.

This Invitation and Bid and any resulting contract are subject to the Plan requirements as described in Section 17-1603 (2). Accordingly, by submission of its Quote, a responsive and responsible Seller makes a legally binding commitment to abide by the provisions of this Plan which include Seller’s commitment to exercise its best and good faith efforts throughout the contract term to provide meaningful and representative contracting opportunities for M/W/DSBEs and to employ an appropriately diverse workforce of tradespeople including minority and female persons in all phases of any contract awarded under this Bid.

Seller hereby verifies that all information submitted to the City including without limitation, the Plan and all forms and attachments thereto, are true and correct and is notified that the submission of false information by Seller is subject to the penalties of 18 Pa.C.S. Section 4904 relating to unsworn falsification to authorities. Seller also acknowledges that if it is awarded a contract resulting from this Invitation and Bid, it is a felony in the third degree under 18 Pa.C.S. Section 4107.2 (a)(4) if, in the course of this contract, it fraudulently obtains public moneys reserved for or allocated or available to minority business enterprises or women's business enterprises.

- B. For the purposes of this Plan, MBE, WBE, DBE and DSBE shall refer to certified businesses so recognized by the City of Philadelphia through its Office of Economic Opportunity (“OEO”). Only the work or supply effort of firms that are certified as M/W/DSBEs by an OEO approved certifying agency² at the time of bid opening will be eligible to receive credit as a Best and Good Faith Effort. In order to be counted, certified firms must successfully complete and submit to the OEO an application to be included in the OEO Registry which is a list of registered M/W/DSBEs maintained by the OEO and available online at www.phila.gov/oeo/directory. If seller or seller’s

¹ Disadvantaged Business Enterprises (“DBEs”) are those socially or economically disadvantaged minority and woman owned businesses certified under 49 C.F.R. Part 26. If Bidder makes solicitation(s) and commitment(s) with a DBE, Seller shall indicate which category, MBE or WBE, is submitted for credit.

² A list of “OEO approved certifying agencies” can be found at www.phila.gov/oeo

subcontractor(s) is certified by an approved certifying agency, a copy of that certification should be furnished with the quote.

- C. For this Plan, the term “Best and Good Faith Efforts,” the sufficiency of which shall be in the sole determination of the City, means: a Seller’s efforts, the scope, intensity and appropriateness of which are designed and performed to foster meaningful and representative opportunities for participation by M/W/DSBEs and an appropriately diverse workforce and to achieve the objectives of Chapter 17-1600. Best and Good Faith Efforts are rebuttably presumed met, when a Seller makes commitments within the M/W/DSBE Participation Ranges established for this Bid and commits to employ a diverse workforce as enumerated herein.

D. Goals

1. M/W/DSBE Participation Ranges

As a benchmark for the Seller’s expression of its Best and Good Faith Efforts to provide meaningful and representative opportunities for M/W/DSBEs in the contract, the following participation ranges have been developed. These participation ranges represent, in the absence of discrimination in the solicitation and selection of M/W/DSBEs, the percentage of MBE, WBE and DSBE participation that is reasonably attainable on this contract through the exercise of Seller’s Best and Good Faith Efforts. In order to maximize opportunities for as many businesses as possible, a firm that is certified in two or more categories (e.g. MBE and WBE and DSBE or WBE and DSBE) will only be credited toward one participation range as either an MBE or WBE or DSBE. The firm will not be credited toward more than one category. These ranges are based upon an analysis of factors such as the size and scope of the contract and the availability of MBEs, WBEs and DSBEs to perform various elements of the contract:

BID	MBE	WBE	DSBE
6648	12%-15% AND	8%-11%	BGFE

2. Workforce Diversity Goals

Seller agrees to exhaust its Best and Good Faith Efforts to employ minority persons, by race and ethnicity, and females in its workforce of apprentices and journeypersons at the following levels³:

African American Journeypersons – 22% of all journey hours worked across all trades
Asian Journeypersons – 3% of all journey hours worked across all trades
Hispanic Journeypersons – 15% of all journey hours worked across all trades
Female Journeypersons - 5% of all journey hours worked across all trades

Minority Apprentices – 50% of all hours worked by all apprentices
Female Apprentices – 5% of all hours worked by all apprentices

³ These goals have been informed by the City of Philadelphia Fiscal Year 2015 Annual Disparity Study, Economic Opportunity Plan Employment Composition Analysis.

The successful Seller will be required to submit to the City, no later than seven (7) days before the starting date of work on any such contract, a Workforce Diversity Goal Plan which shall include specific availability and utilization strategies for meeting the Workforce Diversity goals. The City's Labor Standards Unit shall have the responsibility of administering oversight of these Workforce Diversity Goals including evaluating the sufficiency of the Workforce Diversity Goal Plan, and monitoring the successful Seller's Best and Good Faith Efforts towards realization of the goals throughout the duration of the contract.

II. Seller Responsiveness and Responsibility

- A. Seller shall identify all its M/W/DSBE commitments and evidence its agreement to employ minority persons and females at the levels stated herein on the form entitled, "M/W/DSBE Participation and Workforce Commitments." The Seller's identified commitment to use an M/W/DSBE on this form constitutes a representation by Seller, that the M/W/DSBE is capable of completing the subcontract with its own workforce, and that the Seller has made a legally binding commitment with the firm. The listing of the M/W/DSBE firm by Seller further represents that if Seller is awarded the contract, Seller will subcontract with the listed firm(s) for the work or supply effort described and the dollar/percentage amount(s) set forth on the form. In calculating the percentage of M/W/DSBE participation, Seller shall apply the standard mathematical rules in rounding off numbers. In the event of inconsistency between the dollar and percentage amounts listed on the form, the percentage will govern. Seller is to maintain the M/W/DSBE percentage commitments throughout the term of the contract which shall apply to the total amount of the contract and any additional increases. In the event the Successful Seller's contract is increased by change order and/or modification, or amendment, it shall be the responsibility of the Successful Seller to apply its Best and Good Faith Efforts to the amended amount in order to maintain any participation ranges committed to on the total dollar amount of the contract at the time of contract completion.

1. Commercially Acceptable Function

A Seller that enters into a subcontract with an M/W/DSBE shall be considered to have made a Best and Good Faith Effort in that regard only if its M/W/DSBE subcontractor performs a commercially acceptable function ("CAF"). An M/W/DSBE is considered to perform a CAF when it engages in meaningful work or supply effort that provides for a distinct element of the subcontract (as required by the work to be performed in accordance with Bid specifications), where the distinct element is worthy of the dollar amount of the subcontract and where the M/W/DSBE carries out its responsibilities by actually performing, managing and supervising the work involved; M/W/DSBE subcontractors must perform at least twenty percent (20%) of the cost of the subcontract (not including the cost of materials, equipment or supplies incident to the performance of the subcontract) with their own employees.

The City may evaluate the amount of work subcontracted, industry practices and any other relevant factors in determining whether the M/W/DSBE is performing a CAF and in determining the amount of credit the Seller receives towards the participation ranges. For example, a Seller using an M/W/DSBE non-stocking

supplier (i.e., a firm that does not manufacture or warehouse the materials or equipment of the general character described by the Bid specifications and required under the contract) to furnish equipment or materials will only receive credit towards the participation ranges for the fees or commissions charged, not the entire value of the equipment or materials furnished.

- B. Upon award, letters of intent, quotations, and any other accompanying documents regarding commitments with M/W/DSBEs, including the M/W/DSBE Participation and Workforce Commitments Form, become part of the contract. M/W/DSBE commitments are to be memorialized in a written subcontract agreement and are to be maintained throughout the term of the contract and shall apply to the total contract value (including approved change orders and amendments). Any change in commitment, including but not limited to termination of the subcontract, reduction in the scope of committed work, substitutions for the listed firms, changes or reductions in the listed dollar/percentage amounts, must be pre-approved in writing by OEO. Throughout the term of the contract, Seller is required to continue its Best and Good Faith Efforts.
- C. In the event Seller does not identify on the M/W/DSBE Participation and Workforce Commitments Form that it has made M/W/DSBE commitments within the participation ranges established for this Bid and/or does not agree to the employment goals described herein, Seller must complete and submit a *Documentation of Best and Good Faith Efforts Form* ("BGFE Form"), documenting its solicitations and any commitments with M/W/DSBEs, and detailing any efforts made to include M/W/DSBEs in the contract and to employ a diverse workforce. The submission of the BGFE Form is an element of bid responsiveness and failure to include this form may result in the rejection of the Quote. The BGFE Form must include at a minimum, certification and documentary evidence that the following actions were taken:
1. Solicitation directed to both qualified M/W/DSBEs registered with OEO and qualified M/W/DSBEs certified by agencies approved by OEO. Seller must provide a list of all certification directories used for soliciting participation for this Bid. Seller must determine with reasonable certainty if the M/W/DSBEs are interested by taking appropriate steps to follow up on initial solicitations; one time contact, without follow up, is not acceptable; and
 2. Seller provided interested M/W/DSBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation; and
 3. Seller negotiated in good faith with interested M/W/DSBEs. A Seller using good business judgment would consider a number of factors in negotiating with subcontractors, including M/W/DSBE subcontractors, and would take a firm's price and capabilities as well as the objectives of the Plan into consideration; and
 4. Documentation of the following:

- i. Any commitments to use M/W/DSBEs in its quote for subcontracted services and materials supply even when Seller would otherwise prefer to self-perform/supply these items; and
 - ii. Correspondence between the Seller and any M/W/DSBE(s) related to this Bid; and
 - iii. Attendance logs and/or records of any scheduled pre-bid meeting; and
5. Certification and evidence that the following actions were taken or documentation of the following, or an explanation why these actions were not taken or why documentation does not exist:
- i. Any arms length business assistance provided to interested M/W/DSBEs which may include access/introduction to major manufacturer/suppliers, lines of credit and union halls; and
 - ii. Solicitation through job fairs, newspapers, periodicals, advertisements and other organizations or media that are owned by M/W/DSBEs and/or focus on M/W/DSBEs; and
 - iii. Telephone logs of communications related to this Bid; and
 - iv. Notification of and access to bid documents at the Seller's office or other office locations for open and timely review; and
 - v. Seller sought assistance from jobs training and employment referral agencies such as the Urban Affairs Coalition, PA CareerLink Philadelphia, Philadelphia OIC and Philadelphia Works to identify candidates for employment and to perform employment outreach; and
 - vi. Seller published its policy of nondiscrimination in the hiring, retention and promotion of employees; and
 - vii. Any agreement with an apprenticeship or training program that targets the employment of minority persons, disabled persons and women.

III. Evaluation of Responsiveness and Responsibility

A. Evaluation and Determination

1. The City, acting through its OEO, will evaluate the responsiveness of the Seller's Plan to these requirements. OEO reserves the right to request further documentation and/or clarifying information at any time prior to the award of the contract which may result in Seller's amendment of its M/W/DSBE Participation and Workforce Commitments Form or BGFE Form.

B. Administrative Reconsideration

1. If the OEO determines that the apparent low Seller has not made sufficient Best and Good Faith Efforts, the Seller will be notified and may file a written appeal with OEO within forty-eight (48) hours of the date of notification. The decision of OEO may be appealed in writing within forty-eight (48) hours of the date of OEO's decision to Chief Operating Officer of the Commerce Department or his designee whose decision shall be final. If it is determined that the apparent low Seller did not make sufficient Best and Good Faith Efforts, its Quote will be rejected.
2. Notwithstanding compliance with the requirements set forth herein, the City reserves the right to reject any or all quotes as deemed in the best interest of the City.

IV. Compliance and Monitoring of Best and Good Faith Efforts

- A. A copy of the Successful Seller's Plan, as certified below by OEO will be filed with the Chief Clerk of Council by the Procurement Department on behalf of the Successful Seller, within fifteen (15) days of the Procurement Department's issuance of the notice of award.

The Successful Seller agrees to cooperate with OEO and the Labor Standards Unit ("LSU") in their compliance monitoring efforts, and to submit, within the time limits prescribed, all documentation which may be requested by OEO and LSU relative to the awarded contract, including the items described below. The Successful Bidder must provide as required and maintain the following contract documentation for a period of three (3) years following acceptance of final payment under the contract:

- Copies of signed contracts and purchase orders with M/W/DSBE subcontractors;
 - Evidence of payments (cancelled checks, invoices, etc.) to subcontractors and suppliers to verify participation;
 - Telephone logs and correspondence relating to M/W/DSBE commitments.
 - Certified Payroll records for all on-site contractors.
- B. The Successful Seller is required to use the City's electronic systems for payment verification, B2GNOW Contract Compliance Reporting System and certified payrolls, LCP Tracker.
 - C. Prompt Payment of M/W/DSBEs
 1. The Successful Seller shall within five (5) business days after receipt of a payment from the City for work performed under the contract, deliver to its M/W/DSBE subcontractors their proportionate share of such payment for work performed (including the supply of materials). In connection with payment of its M/W/DSBE subcontractors, the Successful Seller agrees to fully comply with the City's payment reporting process which may include the use of electronic payment verification systems.

2. Each month of the contract term and at the conclusion of the contract, the Successful Seller shall provide to the OEO documentation reconciling actual dollar amounts paid to M/W/DSBE subcontractors to M/W/DSBE commitments presented in the Plan.

D. Oversight Committee

1. For this project, the City, in its sole discretion, may establish a Project Oversight Committee consisting of representatives from the Seller's company, representatives of the building trades, the construction manager, and the City which may include the Project site's District Councilperson, OEO, and appropriate community organizations ("Committee"). The Committee will meet regularly to provide advice for the purpose of facilitating compliance with the Plan.
2. If a Project Oversight Committee is established, the City will convene meetings of the Committee no later than one (1) month after issuance of the Notice To Proceed.

V. Remedies and Penalties for Non-Compliance

- A. The Successful Seller agrees that its compliance with the requirements of the Plan is material to the contract. Any failure to comply with these requirements may constitute a substantial breach of the contract. It is further agreed and understood that in the event the City determines that the Successful Seller hereunder has failed to comply with these requirements the City may, in addition to remedies reserved under Section 17-1605 of The Philadelphia Code, any other rights and remedies the City may have under the contract, or any bond filed in connection therewith or at law or in equity, exercise one or more of the remedies below, which shall be deemed cumulative and concurrent:
 - a. Withhold payment(s) or any part thereof until corrective action is taken.
 - b. Terminate the contract, in whole or in part.
 - c. Suspend/Debar the successful seller from bidding on and/or participating in any future City contracts for a period of up to three (3) years.
 - d. Recover as liquidated damages, one percent of the total dollar amount of the contract for each one percent (or fraction thereof) of the commitment shortfall. (NOTE: The "total dollar amount of the contract" shall include approved change orders, amendments and for requirements contracts shall be based on actual quantities ordered by the City.)

The remedies enumerated above are for the sole benefit of the City and City's failure to enforce any provision or the City's indulgence of any non-compliance with any provision hereunder, shall not operate as a waiver of any of the City's rights in connection with any contract resulting from this Invitation and Bid nor shall it give rise to actions by any third parties including identified M/W/DSBE subcontractors. No privity of contract exists between the City and the M/W/DSBE subcontractor

identified in any contract resulting from this Invitation and Bid. The City does not intend to give or confer upon any such M/W/DSBE subcontractor(s) any legal rights or remedies in connection with subcontracted services under any law or Executive Order or by any reason of any contract resulting from the Invitation and Bid except such rights or remedies that the M/W/DSBE subcontractor may seek as a private cause of action under any legally binding contract to which it may be a party.

SIGNATURE OF SELLER AND TITLE⁴

DATE

PRINT NAME OF SELLER

DATE

Lynn Newsome, Deputy Director, Office of Economic Opportunity

DATE

⁴Seller is required to sign and date, but the City reserves the right to obtain the Successful Seller's signature thereon at any time prior to Plan certification. The Successful Seller will receive from the City a certified copy of its Plan which will be filed by the Procurement Department with the Chief Clerk of City Council within fifteen (15) days of the Procurement Department's issuance of a notice of award and published by OEO, in a downloadable format, on the OEO website.

OEO Official Use Only	
M/W/DSBE Commitments	Percent/Dollar Amount
_____ [MBE]	_____
_____	_____
_____	_____
_____	_____
_____ [WBE]	_____
_____	_____
_____	_____
_____	_____
_____ [DSBE]	_____
_____	_____

PHILADELPHIA INTERNATIONAL AIRPORT
REPLACEMENT OF PASSENGER BOARDING BRIDGES – PHASE III

BID 6648
PHL-1943.14

Page 1 of 2

M/W/DBSE Participation and Workforce Commitments
EOPs FOR BIDS ESTIMATED AT MORE THAN \$100,000

DEPARTMENT OF COMMERCE OFFICE OF ECONOMIC OPPORTUNITY (OEO)									
Minority (MBE), Woman (WBE), Disabled (DSBE) and Disadvantaged (M-DBE and W-DBE) Business Enterprises ¹									
NAME OF BIDDER - BID OPENING DATE -									
List below all MBE/WBE/DBSE/DBEs ² that you have a commitment to use for a Commercially Acceptable Function On this Bid - Photocopy this form as necessary.									
MBE ☐ WBE ☐ DSBE ☐ M-DBE ² ☐ W-DBE ²	Subcontractor ☐	Supplier ☐	Quote Received	YES ³	NO	Dollar Amount	Percent of Total Proposal	Amount Committed To	
Work or Supply Effort to be Performed						\$			
Company Name									
Address									
Contact Person									
Telephone Number									
E-mail Address									
OEO Registry #									
Certifying Agency									
MBE ☐ WBE ☐ DSBE ☐ M-DBE ² ☐ W-DBE ²									
Company Name									
Address									
Contact Person									
Telephone Number									
E-mail Address									
OEO Registry #									
Certifying Agency									
MBE ☐ WBE ☐ DSBE ☐ M-DBE ² ☐ W-DBE ²									
Company Name									
Address									
Contact Person									
Telephone Number									
E-mail Address									
OEO Registry #									
Certifying Agency									
Work or Supply Effort to be Performed									
YES ³									
NO									
Dollar Amount						\$			
Percent of Total Proposal						%			
Amount Committed To									

¹MBE/WBE/DBSEs Listed above must be certified prior to bid submission date.

²If Bidder makes commitments with DBEs, Bidder shall indicate which class type M-DBE or W-DBE is submitted for credit.

³Bidder should attach quotation with this form, but the City reserves the right to request this information which shall be submitted by bidder within 48 hours of the City's Request.

REV 07/2016

Please make additional copies when necessary.

Page 2 of 2

M/W/DSBE Participation and Workforce Commitments
EOPs FOR BIDS ESTIMATED AT MORE THAN \$100,000

DEPARTMENT OF COMMERCE OFFICE OF ECONOMIC OPPORTUNITY (OEO)
Bidder, by submission of this M/W/DSBE Participation and Workforce Commitments Form, certifies that it will use, for the duration of the project, its Best and Good Faith Efforts, as that term is defined in Chapter 17-1600 of The Philadelphia Code, to employ a diverse workforce for this project and achieve the following goals: African American Journeypersons – 22% of all journey hours worked across all trades Asian Journeypersons – 3% of all journey hours worked across all trades Hispanic Journeypersons – 15% of all journey hours worked across all trades Female Journeypersons - 5% of all journey hours worked across all trades Minority Apprentices – 50% of all hours worked by all apprentices Female Apprentices – 5% of all hours worked by all apprentices List any and all collective bargaining agreements that Bidder is a signatory to:
REV 07/2016
REV 07/2

Notice to Sellers

Workforce Diversity

Amendments to Chapter 17-1600 of The Philadelphia Code establish that the Labor Standards Unit in the Mayor's Office of Labor is responsible for monitoring and enforcing contractor compliance with Workforce Diversity goals included in Economic Opportunity Plans (EOP) on City Contracts. This includes a requirement for a Workforce Diversity Plan. Projects that fall under the Workforce Diversity requirements are public works contracts and contracts for the purchase of services where the Procurement Department solicits sealed bids which will cost the City more than \$100,000 must include an EOP.

Compliance with the Workforce Diversity requirements will be evaluated in stages throughout the contract term. The first step is that the successful seller will be required to submit a Workforce Diversity Form upon notification of award. The Workforce Diversity Form is included with this Notice of Award. It is due back to the Procurement Department within 10 days upon receipt of notice of award. A Notice to Proceed will not be issued until the form is submitted to the City and received satisfactory review by the Labor Standards unit. Failure to return the completed Form in a timely manner may be cause for cancellation of award.

On the form Bidders must indicate what steps they will take to make their "best and good faith efforts" to meet the workforce diversity goals. This form constitutes evidence that the successful seller intends to use Best and Good Faith Efforts to meet the stated goals and has a plan to accomplish that throughout the duration of the project.

After the Notice to Proceed has been issued the contractor is required to notify the Labor Standards Unit of any changes in the information contained in the Workforce Diversity form within five (5) days of any such changes occurring.

The Labor Standards unit will review certified payrolls to ensure that workforce diversity goals are being met. If the goals are not being met, the Unit will meet with the contractor to ascertain why. Additionally, when conducting on-site interviews related to prevailing wage enforcement, the Labor Standards Unit may also include questions related to workforce diversity.

The specific Workforce Diversity Goals for FY 20 are as follows:

Apprentices	Journeyman
All minorities: 50%	African American: 22%
Female: 5%	Asian: 3%
	Hispanic: 15%
	Female: 5%



WORKFORCE DIVERSITY PLAN

BID#: _____ CONTRACT#: _____ DATE SUBMITTED: _____
PROJECT NAME: _____
COMPANY NAME: _____ CONTACT PERSON: _____
TELEPHONE#: _____ EMAIL: _____

As identified in the City of Philadelphia's Annual Disparity Assessment of Workforce Diversity, the current employment hourly goals for Journeymen is 40% minority (22% African American, 15% Hispanic, and 3% Asian) and 5% female. Apprentice is 50% minority and 5% female. You must utilize Best and Good Faith Efforts to remain in compliance with the Workforce Diversity Goals outlined above. Overall employment goals are to be achieved by the completion of the contract.

PLEASE NOTE: Best and Good Faith Efforts are defined as efforts, the scope, intensity and appropriateness of which are designed and performed to foster meaningful and representative opportunities for an appropriately diverse workforce. Pro forma efforts are not Best and Good Faith Efforts. You are expected to make appropriate outreach to labor sources (e.g. union hiring hall, job training organizations, etc.) to satisfy the goals. Failure to demonstrate Best and Good Faith Efforts may result in the Labor Standards Unit ("LSU") imposing remedies and penalties for non-compliance.

Please provide an estimate of your quarterly employment utilization for each category.

Quarter	Total Workers	Journeymen				Apprentice	
		African American %	Hispanic %	Asian %	Female %	Minority%	Female%
Quarter 1*							
Quarter 2							
Quarter 3							
Quarter 4							

**17-1605(4)(c) of The Philadelphia Code requires the Labor Standards Unit ("LSU") to determine, after completion of this quarter, whether you are on track to meet the Workforce Diversity Goals. If you are not achieving your committed percentages at this stage, LSU will take appropriate enforcement action including issuance of fines of \$300. for each violation, stop payment on your contract and any other available remedies.*

Note: The information in this form is required for Public Works and Service contracts as outlined in Chapter 17-600 of the Philadelphia Code.



Please answer the following questions concerning your efforts to achieve the diversity goals on this project. If you need more space, please attach an additional sheet of paper.

1. What are the estimated Total Project Hours for this project? _____
2. If your estimated quarterly employment utilization for each category of minority and female workers falls below the identified Workforce Diversity goals established by the Annual Disparity Assessment (referenced above), please provide a brief explanation for each category in which you anticipate a shortfall.

3. How do you plan to achieve the diversity goals on this project (Journeyman and Apprentices)?

4. Please identify the Labor Organization(s), if any, with whom you have a collective bargaining agreement.

5. Did you contact the Labor Organization(s) applicable to the scope of the work of this contract in writing (dated within 30 days of submission of this form) to request a diverse workforce?

☐ Yes ☐ No, please provide a brief explanation

Please provide a copy of your request as well as a copy of any responses received.

Attached? ☐ Yes ☐ No

6. What resources will you utilize to recruit minority and female workers for this project?
☐ Urban Affairs Coalition ☐ CareerLink Philadelphia ☐ Opportunity Industrial Center
☐ Philadelphia works ☐ Finishing Trades Institute ☐ JEVS Orleans Technical Institute
☐ Philadelphia Housing Authority ☐ Other: _____

Note: The information in this form is required for Public Works and Service contracts as outlined in Chapter 17-600 of the Philadelphia Code.



7. If you have not identified any minority or female apprentices for this project, please provide your plan to meet the established Workforce Diversity Goal(s):

8. Please provide a copy of your company's Equal Employment Opportunity statement and any published non-discrimination policies.

Attached? ☐ Yes ☐ No

Contractor hereby verifies that all information submitted to the City including without limitation, this Workforce Diversity Plan and all attachments thereto, is true and correct and Contractor is notified that the submission of false information is subject to the penalties of 18 Pa.C.S. Section 4904 relating to unsworn falsification to authorities.

Prepared by: _____ Title: _____

Signature: _____ Date: _____

Note: The information in this form is required for Public Works and Service contracts as outlined in Chapter 17-600 of the Philadelphia Code.

DIESEL ENGINE EMISSIONS CONTROLS FOR PUBLIC WORKS PROJECTS

In accordance with Executive Order 1-07 and in furtherance of *Greenworks Philadelphia*, City establishes a requirement to include clean diesel specifications in public works contracts. Contractor, by submission of its bid, agrees to meet the requirements of this Section. This Section applies to contract bids advertised between July 1, 2013 and June 30, 2014 in which the total estimated dollar amount is \$1,000,000 or greater, and to all bids, awarded on or after July 1, 2014, regardless of estimated dollar amount. Notwithstanding the foregoing, engine noncompliance shall not constitute a material breach of contract nor shall monetary penalties be assessed as provided in subsection E.2 until after January 1, 2014. If noncompliant vehicles subject to this Section are observed prior to January 1, 2014, the City may issue written warnings to the contractor.

A. Covered Vehicles: Vehicles covered under this Section include any non-road diesel engine that has a horsepower greater than 50.

B. Requirements

1. All bids for public works contracts and all applicable contracts entered into as a result of such bids covered under this Section shall include specifications that all contractors, and all of the contractor's subcontractors, if any, in the performance of such contracts use ultra-low sulfur diesel fuel, and a listed clean diesel technology for reducing the emission of pollutants for diesel-powered non-road engines. Clean diesel technologies are further defined in part D of this Section. Retrofit emission control devices shall consist of diesel oxidation catalysts (DOC) or such other technologies that provide a minimum emissions reduction of twenty percent (20%) of particulate matter with a mean aerodynamic width of less than ten (10) microns (PM10) in the application for which it is verified. Any retrofit emission control device installed to comply with this Section must be either listed by the Environmental Protection Agency (EPA) or the California Air Resources Board (CARB) as a verified diesel retrofit technology that reduces particulate matter emissions by 20% or more, or must be certified by the diesel retrofit device manufacturer as a product that reduces particulate matter emissions by 20% or more for the covered vehicle.
2. No later than two business days before any covered vehicle is brought onto the City's contract site, the successful bidder (hereinafter, "contractor") shall submit to the City's project manager information about the vehicle including confirmation that the appropriate emissions control technology has been installed on the vehicle or that the vehicle is Tier 4 or Tier 4 Interim. Except as otherwise provided, any vehicle covered under this Section shall be in compliance with this Section prior to being brought onto the contract site.

- a. Contractor shall submit the following information for each covered vehicle (using *Fleet Roster for Public Works Construction Projects* form):
 1. vehicle identification number (VIN), if applicable, or vehicle serial number, and the vehicle type, make, year and owner;
 2. the horsepower rating of each engine;
 3. the emission control device manufacturer name, model, and verifying/certifying organization; and
 4. the type of fuel to be used and approximate expected quantity.
 - b. In the event contractor has purchased appropriate emissions control technology, but the technology is not delivered before use of the covered vehicle is required on the contract site, the contractor shall, in addition to submission of a.i. through iv. above, submit proof of purchase of the emissions control technology. Installation of the appropriate emissions control technology must be completed within five (5) days of delivery of the technology. In no event may the contractor use the covered vehicle without the use of the emission control technology, for which the technology has already been purchased and identified, on the contract site for longer than sixty (60) days.
 - c. If a covered vehicle owned by a contractor breaks down on the contract site, the contractor may use, if a compliant replacement is unavailable, a temporary vehicle that is not compliant while the covered vehicle is being repaired; the temporary vehicle cannot remain on site for more than 30 cumulative days after the date of the initial breakdown of the covered vehicle. Contractor shall notify the project manager in writing prior to bringing a non-compliant vehicle on the contract site.
3. The contractor shall establish truck-staging zones for vehicles that are waiting to load or unload material at the contract site. Such zones shall be located where the emissions from the trucks will have minimum impact to the public.
 4. The contractor shall not permit idling of delivery and/or dump trucks, or equipment on the contract site during periods of non-active use, and it should be limited to three (3) minutes in accordance with the Philadelphia Traffic Code Anti-Idling Ordinance Section 12-1127(1) of The Philadelphia Code
(http://www.phila.gov/philacode/html/data/title12/chapter_12_1100_misce

llaneous /12 1127 excessive idling of an.html) and the Pennsylvania Diesel-Powered Motor Vehicle Idling Act, Title 35 Purdons Pennsylvania Statutes, Section 4601 *et seq.*

C. Exemptions

1. Subject to written approval the City of Philadelphia Air Management Services (AMS), covered vehicles will be exempted from low diesel emission controls if one or more of the following conditions exist:
 - a. it is physically impossible to install appropriate emissions control technology on the vehicle;
 - b. installation of the appropriate emissions control technology would render vehicle operation unsafe due to obstructed sightline;
 - c. installation of the appropriate emissions control technology would void any applicable expressed manufacturer's warranty on the vehicle; or
 - d. the covered vehicle will not be at the work site for more than a total of three (3) business days.
2. In support of a request for exemption, contractors shall provide to AMS one of the following:
 - a. a signed letter from one or more diesel technology vendors, written on the vendor's formal stationary, certifying that no emissions controls that would reduce Particulate Matter (PM) emissions by at least 20% and allow for safe operation could be physically installed, or the cost of installing such control technology would cost 150% more than the purchase price of the clean diesel technology device;
 - b. a signed letter from the vehicle manufacturer certifying that the installation of any device to reduce PM emissions by 20% or more would void the applicable expressed manufacturer's warranty, along with a copy of the warranty for each vehicle for which an exemption is sought; or
 - c. a signed letter on the contractor's company letterhead stating that the covered vehicle will remain on site for no longer than three (3) days total during the duration of the project.
3. In no event will the City grant an exemption from the required use of ultra-low sulfur diesel fuel or the idling laws.

D. Definitions

1. Contract site – all areas covered under the contract, and areas accessed for purposes of performing activity under the contract;
2. Non-active use – a period of time greater than five (5) minutes when a piece of diesel equipment is not being operated in performance of its work;
3. Non-road – diesel vehicles listed by EPA for use in non-road applications. These include construction, agricultural, and other industrial vehicles that are not legally operable on highways;
4. On-road – vehicles listed by EPA for on-highway applications;
5. Truck-staging zone – a designated area on the contract site where delivery or pickup activities will be located;
6. Ultra-low sulfur diesel fuel – Diesel fuel with a sulfur content of 15 parts per million or less;
7. Vehicle – a piece of diesel-powered equipment being used for contract activities; and
8. Listed diesel technology – includes:
 - a. *Diesel oxidation catalyst – a device similar to a catalytic converter that reduces diesel emissions and does not require regeneration;*
 - b. *Tier 4 or Tier 4 Interim – any vehicle certified by EPA as meeting Tier 4 emissions standards or Tier 4 Interim emissions standards.*
 - c. *Particulate filter – a device that traps soot produced by the engine and vaporizes this soot through the application of heat, requiring only periodic maintenance;*
 - d. *Closed crankcase ventilation – a device that reduces fugitive emissions from the vehicle's crankcase by routing them through the tailpipe;*
 - e. *Selective catalytic reduction – A device that reduces emissions of oxides of nitrogen by treating exhaust with urea;*
 - f. *Emissions upgrade groups – groups of replacement components that, when installed during vehicle overhaul, reduce engine emissions;*
 - g. *Engine repower – the replacement of a vehicle's engine with a newer model to reduce tailpipe emissions; and*
 - h. *Any other technology verified by EPA or CARB to reduce diesel particulate emissions by 20% or more.*

E. General

1. City reserves the right to request purchasing and/or installation documents to verify contractor's, any subcontractor's, installation of the retrofit in the vehicle. These purchasing documents shall be provided to the City's project manager and AMS by the contractor within five (5) days of the request. The contractor shall in addition submit written notification to the City's project manager and AMS when an addition or deletion of diesel retrofit equipment, used by it or its subcontractors, occurs.
2. Any false certification or representation in connection with the requirements of this Section and/or any failure to comply with the requirements of this Section shall constitute a material breach of contract entitling the City to all rights and remedies provided in the contract and otherwise available at law and/or in equity, including but not limited to the monetary assessment set forth herein. For contracts of \$500,000.00 or less, an assessment of \$500.00 per offense per day shall be imposed upon the contractor for every covered vehicle operating in violation of this section. For all other contracts, an assessment of \$1000.00 per offense per day shall be imposed upon the contractor for every covered vehicle operating in violation of this section. In addition, it is understood that false certification or representation is subject to penalties under Title 18 Pa. C.S.A. § 4904 (relating to unsworn falsification to authorities).

F. Monitoring and Penalties for Non-Compliance

1. City reserves the right to request purchase and/or installation documents to verify contractor's and any subcontractor's installation of the retrofit in the vehicle. These purchase documents shall be provided to the City's project manager by the contractor within five (5) days of the City's request.
2. Any false certification or representation in connection with these requirements for Diesel Engine Emissions Controls and/or any failure to comply with these requirements shall constitute a material breach of contract entitling the City to all rights and remedies limited to the monetary assessment set forth herein. For contracts of \$500,000 or less, an assessment of \$500.00 per offense per day shall be imposed upon the contractor for every covered vehicle operating in violation of this section. For all other contracts, an assessment of \$1000.00 per offense per day shall be imposed upon the contractor for every covered vehicle operating in violation of this section. In addition, it is understood that false certification or representation is subject to penalties under Title 18 Pa. C.S.A § 4904 (relating to unsworn falsification to authorities).



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BID PROCESSING FEES

Quotes shall be accompanied by a non-refundable processing fee and must be received by the City of Philadelphia prior to the date and time of the bid closing. Payments must be in the exact amount that is specified in paragraph 11 of the Standard Contract Requirements and the Seller Quote Checklist within the bid solicitation.

Electronic Payment Submission

Electronic payment submission of Bid Processing fees can be made at:
<https://secure.phila.gov/PaymentCenter/AccountLookup/>

OTHER

BEFORE YOU START

Other Payment Center Payments.

ALARM REGISTRATION AND ALARM FINES	CODE VIOLATION NOTICES	PARKING TICKETS
BID PROCESSING FEE	ANNUAL BID SECURITY FEE	PERFORMANCE SECURITY FEE

Bid number must be referenced on the payment

***Please note: Electronic payments made by credit card will have an additional service charge.



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Call 215-686-4755 or 215-686-4720

www.PHLContracts.phila.gov

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NOTICE TO SELLERS

Contractors and their subcontractors are required to submit weekly certified payroll records to the Labor Standards Unit through an electronic system, LCP Tracker, or as directed by the Labor Standards Unit. Failure to pay Prevailing Wage, as applicable, or to submit certified payroll records is a substantial breach of Contract and may be subject to fines and penalties as prescribed by Section 17-107 of The Philadelphia Code which may include withholding from any sums due to the Contractor under the Contract so much as may be necessary to pay the employees the difference between the wages required to be paid hereunder and the wages actually paid to such employees, and the City may make such payments directly to the appropriate employees.

NOTICE TO SELLERS

Pursuant to the Mayor's Executive Order 7-14, available on-line at <http://www.phila.gov/ExecutiveOrders/Executive%20Orders/EO%207-14.pdf>, Contractor agrees that Contractor and all of its Subcontractors, at any tier, shall report to the OIG knowledge of violations subject to investigation by the OIG pursuant to the Order; shall cooperate fully with representatives of the OIG by providing complete and accurate information as well as necessary assistance in matters under investigation; shall keep conversations and contact with the OIG confidential, except and to the extent the OIG may authorize disclosure; and shall instruct their employees that under no circumstances shall any person take or threaten any action in an attempt to prevent anyone from providing information to a City official regarding conduct that may be investigated by the OIG, or from cooperating with the OIG, or retaliate against anyone for doing so or against anyone who is about to do so.

All entities and individuals affected by Mayor's Executive Order 7-14 are advised to thoroughly read the Order, especially Section 3, **Type of Matters Investigated by the OIG**, Section 4, **Entities Subject to Investigation by the OIG**, Section 8, **Duties of Executive Agencies and Other Entities**, Section 9, **Responsibilities of Officers and Employees of Executive Agencies and Other Entities**, and Section 10, **Responsibilities of City Contractors, Recipients of City Assistance and Recipients of City Funding**.

Act 141 VERIFICATION FORM ADDENDUM



Commonwealth of Pennsylvania
Public Works Employment Verification Form

Complete and return the form to the contracting Public Body prior to the award of the contract.

Company Legal Name: _____

Doing Business As: _____

(if different from Legal Name)

Mailing Address:

Street Address 1

Street Address 2

City

State

Zip Code

Check one:

☐

Contractor

☐

Subcontractor

Contracting Public Body: _____

Contract/Project Number: _____

Project Description: _____

Project Location: _____

Date Enrolled in E-Verify (MM/DD/YYYY): _____

As a contractor/subcontractor for the above referenced public works contract, I hereby affirm that as of the above date, our company is in compliance with the Public Works Employment Verification Act ("the Act") through utilization of the federal E-Verify Program (EVP) operated by the United States Department of Homeland Security. To the best of my/our knowledge, all employees hired are authorized to work in the United States.

It is also agreed to that all public works contractors/subcontractors will utilize the federal EVP to verify the employment eligibility of each new hire within five (5) business days of the employee start date throughout the duration of the public works contract. Documentation confirming the use of the federal EVP upon each new hire shall be maintained in the event of an investigation or audit.

I, _____, authorized representative of the company above, attest that the information contained in this verification form is true and correct and understand that the submission of false or misleading information in connection with the above verification shall be subject to sanctions provided by law.

Authorized Representative Signature

Date of Signature

Printed Name: _____

Phone Number: _____ Email: _____

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MEMORANDUM

TO: Municipal Operating Departments and Awarding Agencies

FROM: Andre Bragg, Director, Fair Labor Standards

DATE: Effective May 9th, 2025

RE: Updated Prevailing Wage Schedule for the City of Philadelphia

The Philadelphia Labor Standards Unit has issued an updated prevailing wage rate schedule for construction projects done on behalf of the City of Philadelphia. Enclosed herein you will find the two (2) decisions, which comprise the updated prevailing wage schedule. They are as the follows:

- I. Building Construction**
- II. Heavy and Highway Construction**

Please direct any questions or concerns regarding the prevailing wage rate schedule to my attention:

**Philadelphia Labor Standards Unit
Municipal Services Bldg., 1st Floor Room 170C
1401 John F. Kennedy Blvd.
Philadelphia, PA 19102-1670
Telephone Numbers: (215) 686-2132
Fax Number: (215) 686-2116**

Thank you for your cooperation.

**PREVAILING WAGE RATE SCHEDULE
FOR CONSTRUCTION WORK DONE ON BEHALF OF CITY OF PHILADELPHIA
INCLUDING REPAIR, ALTERATION, AND REMODELING WORK**

I. BUILDING CONSTRUCTION

A. Job Classification and Wage Rates

	Basic Hourly Rate	Fringe Benefits
ASBESTOS WORKER		
Journeyman	59.37	46.03
Handler Level 1	32.62	23.87
Handler Level 2	47.46	23.87
BOILERMAKER	52.10	35.72
BRICKLAYER	48.70	32.11
CARPENTER	55.82	30.52
CEMENT MASON	48.70	32.46
DRY WALL FINISHER	42.25	32.56
ELECTRICIAN	70.97	47.27
(Telecommunication Senior Tech)	65.86	35.64
(Telecommunication Tech A)	61.91	33.51
ELEVATOR CONSTRUCTOR	71.85	40.03

FOOTNOTES FOR ELEVATOR MECHANICS:

A. PAID VACATION: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% for 6 months to 5 years of service.

B. Eight Paid Holidays (provided employee has worked 5 consecutive days before and the working day after the holiday): New Year's Day; Memorial Day; Independence Day; Labor Day; Veteran's Day; Thanksgiving Day and the Friday after Thanksgiving Day, and Christmas Day.

GLAZIER	49.96	38.34
IRONWORKER		
Structural & Ornamental	53.20	41.01
Reinforcing (Rodsetter)	50.29	34.77
Rigger & Machinery Mover	46.73	34.39
LABORER		
Journeyman Class One	37.85	27.17
Journeyman Class Two	37.95	27.17
Journeyman Class Three	38.00	27.17
Journeyman Class Four	38.15	27.17
Journeyman Class Five	38.20	27.17
Journeyman Class Six	37.99	27.17
Journeyman Class Seven	39.10	27.17
Journeyman Class Eight	39.15	27.17
Journeyman Class Nine	39.15	27.17

Prevailing Wage Schedule (Effective 05/09/2025)
Building Construction

Journeyman Class Ten	39.40	27.17
Journeyman Class Eleven	39.25	27.17
Journeyman Class Twelve	38.22	27.17
LABORER: ASBESTOS ABATEMENT, LEAD ABATEMENT, TOXIC WASTE HANDLING, HAZARDOUS WASTE HANDLING		
MASTER ABATEMENT TECHNICIAN	41.00	27.70
LANDSCAPE LABORER		
Class I	30.85	24.38
Class II	30.85	24.38
LATHER	52.64	29.46
LINE CONSTRUCTION		
Lineman	62.54	31.36
Winch Truck Operator	43.78	27.18
Ground hand	37.52	24.90
Watch/Flag Person	26.74	21.19
MARBLE SETTER	48.40	32.45
MARBLE FINISHER	40.52	29.90
MILLWRIGHT	57.39	35.81
(as of 5/1/2026)	60.20	35.81
PAINTER		
Brush & Roller	44.38	34.55
Spray, Steel, & Swing	45.63	34.55
Bridges	61.81	33.95
PILEDRIVERMAN	51.48	41.74
(as of 5/1/2026)	53.23	41.74
(Diver)	64.35	41.74
(as of 5/1/2026)	66.54	41.74
(Diver Tender)	51.48	41.74
(as of 5/1/2026)	53.23	41.74
PLASTERER	43.78	33.09
PLUMBER	67.53	38.31
POINTER, CAULKER, & CLEANER	50.00	31.20
POWER EQUIPMENT OPERATOR		
Group One	54.52	34.49
(as of 5/1/2026)	55.67	35.34
Group One A	57.52	35.38
(as of 5/1/2026)	58.68	36.22
Group Two	54.27	34.42
(as of 5/1/2026)	55.43	35.26
Group Two A	57.29	35.29
(as of 5/1/2026)	58.44	36.14
Group Three	50.18	33.22
(as of 5/1/2026)	51.34	34.06

Group Four	49.88	33.13
(as of 5/1/2026)	51.04	33.97
Group Five	48.16	32.62
(as of 5/1/2026)	49.32	33.46
Group Six	47.17	32.33
(as of 5/1/2026)	48.34	33.16
Group Seven (A)*	66.26	39.55
(as of 5/1/2026)	67.73	40.48
Group Seven (B)*	65.97	39.46
(as of 5/1/2026)	67.44	40.39

*****TOXIC/HAZARDOUS WASTE REMOVAL*****

ROOFER	44.13	34.77
Shingle	34.35	22.20
Slate & Tile	37.35	22.20
SHEET METAL WORKER	59.22	50.56
(Sign Makers and Hangers)	25.03	21.41
SOFT FLOOR LAYER (Resilient Floor)	53.93	30.54
SPRINKLER FITTER	66.22	34.25
STEAM FITTER	70.32	43.09
STONE MASON	48.40	32.45
SURVEYING AND LAYOUT		
(Chief of Party)	65.96	30.09
(as of 5/1/2026)	67.52	30.44
(Instrument Person)	57.36	30.09
(as of 5/1/2026)	58.71	30.44
(Rodman)	45.88	23.19
(as of 5/1/2026)	46.97	23.54
TERRAZZO MECHANIC	51.36	30.16
TERRAZZO FINISHER (Grinder)	45.08	28.46
TERRAZZO FINISHER (Finisher)	44.81	28.46
TILE SETTER	51.36	30.16
TILE FINISHER	40.52	29.90
TRUCK DRIVER		
Journeyman Class I	37.57	23.32
Journeyman Class II	37.67	23.32
Journeyman Class III And Low Boy	37.92	23.32
WALL COVERER	46.47	34.55
WELDER - Rate for craft to which, welding work is incidental.		
WINDOW TINTER	24.97	12.38

B. Job Classification Definitions: Building Construction,

1. Laborer Classifications:

Class One: Strip concrete, dismantle concrete, load, unload, handle and/or transport reinforced steel and steel mesh, carry lumber, handle miscellaneous building materials operate

jack hammers, use paving breakers and other pneumatic tools, build scaffolds, perform raking, handle asphalt, perform spading and concrete pit work, perform grading, perform form pinning or shorting, perform demolition work with exception of burners, lay conduits, lay ducts, perform sheeting or lagging, lay non-metallic pipe, perform caulking.

Class Two: Power Buggies, Burners on Demolition.

Class Three: Wagon drill operator (single)

Class Four: Powderman, wagon drill operator (multiple), perform circular caissons excavations, caisson groundman, perform underpinning excavation, perform laborers' work at depth of eight (8) feet or below.

Class Five: Caisson bottom worker.

Class Six: Yard worker.

Class Seven: Trackmen, Brakemen, Groutmen, Bottom Shaft Men, All Other Men in Free Air Tunnels.

Class Eight: Caisson Foreman

Class Nine: Miner Helper, Form Setters.

Class Ten: Miners Bore Driver, Blasters, Drillers, Pneumatic Shield Operator.

Class Eleven: Welders & Burners.

Class Twelve: Mason Tenders

Landscape Laborers:

Class I: Landscape laborer

Class II: Farm tractor driver, hydro seeder, mulched nozzle worker, backhoe operator, bulldozer crawler type loader, tree crane operator.

Laborer - Lather and Plasterer: Wheel and/or hod carry any lather and plaster materials used by lathering and plastering contractors' build scaffolds; build runways; perform clean-up and removal of debris as covered by lathering and plastering contractor's contract; deliver any material used by lathering and plastering contractor, from curbside to building and back, unless motor vehicles are permitted to enter building with required materials; all mortar designated for use by plasterer shall be carried via wheel barrow or hod; all plastering and fire proofing machines, as well as guns and mixers requiring the assistance of a worker other than plasterer operator, shall be manned by helper (tender).

2. **Truck driver classifications:**

Class I: Helper, stake body truck operator (single axle, dumpster).

Class II: Dump truck operator, tandem truck operator, batch truck operator, semi-trailer truck operator, agitator-mixer truck operator, dump Crete type vehicle operator, asphalt distributor, farm tractor operator (when tractor used to transport materials), stake body truck (tandem) operator.

Class III: Euclid type; off highway equipment back truck operator; belly dump truck operator; double-hitched equipment trailer operator; straddle carrier (Ross) operator; low-bed trailer truck operator.

3. **Power Equipment Operator Classifications – Building**

Group One:

Handling steel and stone in connection with erection Cranes doing hook work

Any machines handling machinery

Helicopters

Concrete Pumps (building)

Machines similar to above, including remote control equipment

Group One A:

Handling steel and stone in connection with erection.

Cranes doing hook work

Any machines handling machinery
Concrete Pumps (Building)
High Rail/Burro Crane
Rail Loader (Winch Boom Type)

All equipment in this group which previously received the hour in lieu of an oiler will receive Wage Group I (A). Equipment in this Wage Group that does not require an oiler.

Machines similar to above, including remote control equipment

Group Two:

All types of cranes
All types of backhoes
Cableways
Draglines
Keystones
All types of shovels
Derricks
Pavers 21E and over
Trenching machines
Trench shovels
Cable spinning machine
Gradalls
Front- end Loaders
Boat Captain
Hoist with Two Towers
Building Hoists-double drum (unless used as a single drum)
Pippin type backhoes
Tandem scrapers
Tower type crane operation erecting dismantling jumping or jacking
Drills self-contained (Drillmaster type)
Fork lift (20ft. and over)
Motor Patrols (fine grade)
Batch Plant with Mixer
Carryalls, Scrapers, Tournapulls
Roller (High Grade Finishing)
Spreaders (Asphalt)
Bulldozers and Tractors
Mechanic-Welder
Conveyor Loaders (Euclid-Type Wheel)
Concrete Pumps (Heavy Highway)
Milling Machine
Bobcat
Side Boom
Directional Boring Machines
Vermeer Saw Type Machine (other than hand held)
Tractor Mounted Hydro Axe
Chipper with boom
All Autograde and concrete finishing machines
Bundle Pullers/Extractors (Tubular)

Machines similar to the above including remote control equipment

*Surcharge

Group Two (A):

Crawler backhoes and Crawler gradalls over one (1) cubic yard factory rating
Hydraulic backhoes over one (1) cubic yard factory rating
Single person operation truck cranes 15 ton and over factory rating
Cherry picker type machinery and equipment 15 ton and over factory rating, etc.
Cranes doing hook work will be paid Wage Group I (A).
All equipment in this Group which previously received the hour in lieu of an oiler will receive Wage Group II (A) including concrete pumps (Heavy/Highway).

Machines similar to the above including remote control equipment

*Surcharge

Group Three:

Asphalt Plant Engineers
Conveyors (except building conveyors)
Well Driller
Forklift Trucks of all types
Ditch Witch (small trenchers)
Motor Patrols
Fine Grade machines
Rollers
Concrete Breaking Machines (Guillotine Only)
Stump Grinder
High or Low Pressure Boilers
Building Hoist (single drum)
Elevator Operator (New Construction)

Machines similar to above including remote control equipment

Group Four:

Seamen Pulverizing Mixer
Form Line Graders
Farm Tractors
Road Finishing Machines
Concrete Spreaders (Heavy Highway)
Power Broom (self-contained)
Seed Spreader
Grease Truck

Machines similar to the above including remote control equipment

Group Five:

Compressors
Pumps
Well pint pumps
Conveyors (Building)
Welding Machines
Heaters
Tireman, Power Equipment
Maintenance Engineers (Power Boats)
Miscellaneous Equipment
Operator
Elevator Operator (Renovations)
House Car
Machines similar to above including remote control equipment

Group Six:

Fireman

Oilers and Deck Hands (Personnel Boats)/Grease Truck Helpers

*Surcharge

Group Seven (A):

Handling steel and stone in connection with erection

Cranes doing hook work

Any machines handling machinery

Cable spinning machine

Helicopters

Concrete pumps (Building)

High Rail/Burro Crane

Rail Loader (Winch Boom Type)

Machines similar to above, including remote control equipment

Group Seven B

All types of cranes

All types of backhoes

Cableways

Conveyor Loader (Euclid-Type Wheel)

Drag Lines

Keystones

All types of shovels

Derricks

Pavers 21E and over

Trench shovels

Trenching machines

Gradalls

Front-end Loaders

Boat Captain

Hoist with two towers

Concrete Pumps (Heavy, Highway)

Building Hoists-double drum (unless used as a single drum)

Milling Machine

Mucking Machines in Tunnel

Pippin type backhoes

Bobcat

Tandem scrapers

Side Boom

Tower type crane—operation, erecting, dismantling,

Jumping or jacking

Directional Boring Machines

Vermeer Saw Type Machine (other than hand held)

Drills self-contained (Drillmaster type)

Fork Lift (20 ft. & over)

Track or Mounted Hydro Axe

Motor Patrols (Fine Grade)

Chipper with boom

Batch Plant with Mixer

All autograde and concrete finishing machines

Prevailing Wage Schedule (Effective 05/09/2025)
Building Construction

Carryalls, Scapers & Tournapulls
Rollers (High Grade Finishing)
Bundle Pullers/Extractors (Tubular)
Spreaders (Asphalt)
Bulldozers and Tractors
Mechanic – Welders
Production Switch Tamper
Ballast Regulators
Tie Replacer
Rail/Road Loader
Power Jack liner
Machines similar to above, including remote control equipment

II. HEAVY AND HIGHWAY CONSTRUCTION

A. JOB CLASSIFICATION AND WAGE RATES

	Basic Hourly Rate	Fringe Benefits
BOILERMAKER	55.00	35.82
CARPENTER	57.36	30.09
(as of 5/1/2026)	58.71	30.44
CEMENT MASON	45.00	34.21
(as of 5/1/2026)	45.00	35.81
ELECTRICIAN	70.97	47.27
IRONWORKERS		
Structural & Ornamental	53.20	41.01
Reinforcing (Rodsetter)	50.29	34.77
Rigger & Machinery Mover	46.73	34.39
LABORERS		
Group One	38.95	27.60
Group Two	39.15	27.60
Group Three	39.15	27.60
Group Four	33.65	27.60
Group Five	39.80	27.60
Group Six	39.85	27.60
Group Seven	39.70	27.60
Group Eight	38.45	27.60
Group Nine	39.30	27.60
Group Ten	39.45	27.60
Group Eleven	39.35	27.60
Group Twelve	41.05	27.60
Group Thirteen	43.08	27.60
Group Fourteen	39.64	27.60
LANDSCAPING LABORER		
Class I	30.43	23.95
Class II	29.13	23.95
LINE CONSTRUCTION		
Lineman	62.54	31.36
Winch Truck Operator	43.78	27.18
Ground hand	37.52	24.90
Watch/Flag Person	26.74	21.19
MILLWRIGHT	57.39	35.81
(as of 5/1/2026)	60.20	35.81
PAINTERS		
Brush & Roller	44.38	34.55
Spray, Steel, & Swing	45.63	34.55
Bridges	61.81	33.95
PILEDRIVERMAN	51.48	41.74
(as of 5/1/2026)	53.23	41.74
(Diver)	64.35	41.74
(as of 5/1/2026)	66.54	41.74

(Diver Tender)	51.48	41.74
(as of 5/1/2026)	53.23	41.74
POWER EQUIPMENT OPERATOR		
Group One	54.52	34.49
(as of 5/1/2026)	55.67	35.34
Group One A	57.52	35.38
(as of 5/1/2026)	58.68	36.22
Group Two	54.27	34.42
(as of 5/1/2026)	55.43	35.26
Group Two A	57.29	35.29
(as of 5/1/2026)	58.44	36.14
Group Three	50.18	33.22
(as of 5/1/2026)	51.34	34.06
Group Four	49.88	33.13
(as of 5/1/2026)	51.04	33.97
Group Five	48.16	32.62
(as of 5/1/2026)	49.32	33.46
Group Six	47.17	32.33
(as of 5/1/2026)	48.34	33.16
Group Seven (A)*	66.26	39.55
(as of 5/1/2026)	67.73	40.48
Group Seven (B)*	65.97	39.46
(as of 5/1/2026)	67.44	40.39

***TOXIC/HAZARDOUS WASTE REMOVAL**

POWER EQUIPMENT OPERATOR DREDGER		
Class A1	42.66	14.01
Class A2	38.02	13.73
Class B1	36.89	13.66
Class B2	34.73	13.53
Class C1	33.78	13.18
Class C2	32.69	13.11
Class D	27.16	12.58
STEAM FITTER	72.52	44.89
STONE MASON	48.40	32.45
SURVEYING AND LAYOUT		
(Chief of Party)	65.96	30.09
(as of 5/1/2026)	67.52	30.44
(Instrument Person)	57.36	30.09
(as of 5/1/2026)	58.71	30.44
(Rodman)	45.88	23.19
(as of 5/1/2026)	46.97	23.54
TRUCK DRIVER		

Class I	37.42	23.32
Class II	37.52	23.32
Class III	38.02	23.32

B. Job Classification Definitions: Heavy and Highway Construction

1. Laborer Classifications:

Group One: Yard workers: (laborer, scale mixerman, burnerman, dustman, feeder)

Group Two: General laborer; Asphalt Shovelers; Sheeting, Shoring & Lagging – Laborer; Stone, Granite & Artificial Stone Setting Laborer; Hod Carriers; Scaffold Building; Relief Joint & Approach Slabs; Assembling & Placing Gabions; Pneumatic Tool Laborers; Concrete Forms & Stripping Laborers; Concrete Lumber Material Laborers; Steel & Steel Mesh (carrying & handling); Form Pinners; Mortar Mixers; Pouring & Placing Concrete; Grade Men.

Group Three: Vibrator Laborers; Finish Surface Asphalt Rakers; Jackhammer Operators; Paving Breaker Operator; Pipelayer & Caulker (all joints up to within 5 feet of the Building Foundation Line); Conduit & Duct Layers

Group Four: Flag person

Group Five: Miners

Group Six: Welders and Burners.

Group Seven: Miner Bore Driver; Blasters; Drillers Pneumatic Shield Operator

Group Eight: Form Setters

Group Nine: Trackmen; Brackmen; Groutmen; Bottom Shaft Men; All other Laborers in Free Air Tunnels; Underpinning (When an underpinning excavation for a pier hole of five feet square or less and eight feet or more deep is dug, the rate shall apply only after a depth of eight feet is reached, to the men working in the bottom)

Group Ten: Circular Caissons (Where an excavation for circular caissons are dug eight feet or more below the natural grade level adjacent to the starting point of the caisson hole, at ground level, for the men working in the bottom); Welders, Burners & Air Tuggers

Group Eleven: Powdermen; Multiple Wagon Drill Operator Laborer

Group Twelve: Caisson Laborer Foreman

Group Thirteen: Toxic/Hazardous waste Handler

Group Fourteen: Wagon Drill/Hydraulic Track Drill Operator Laborer

Landscape Laborers:

Class I: Landscape laborer

Class II: Farm tractor driver, hydroseeder, mulcher nozzle worker, backhoe operator, bulldozer crawler type loader, tree crane operator.

2. Power Equipment Operator Classifications - Heavy, & Highway

Group One:

Handling steel and stone in connection with erection Cranes doing hook work

Any machines handling machinery

Cable spinning machine

Helicopters

Concrete Pumps (building)

Machines similar to above including remote control equipment

Group One A:

Handling steel and stone in connection with erection.

Cranes doing hook work

Any machines handling machinery

Concrete Pumps (Building)

High Rail/Burro Crane

Rail Loader (Winch Boom Type)

All equipment in this group which previously received the hour in lieu of an oiler will receive Wage Group I (A). Equipment in this Wage Group that does not require an oiler.

Machines similar to above, including remote control equipment

Group Two:

All types of cranes

All types of backhoes

Draglines

Keystones

All types of shovels

Derricks

Pavers 21E and over

Trenching machines

Trench shovels

Gradalls

Front- end Loaders

Boat Captain

Hoist with Two Towers

Building Hoists-double drum (unless used as a single drum)

Pippin type backhoes

Tandem scrapers

Tower type crane operation erecting dismantling jumping or jacking

Drills self-contained (Drillmaster type)

Fork lift (20ft. and over)

Motor Patrols (fine grade)

Batch Plant with Mixer

Carryalls, Scrapers, Tournapulls

Roller (High Grade Finishing)

Bulldozers and Tractors

Mechanic-Welder

Conveyor Loaders (Euclid-Type Wheel)

Concrete Pumps (Heavy Highway)

Milling Machine

Bobcat

Side Boom

Directional Boring Machines

Vermeer Saw Type Machine (other than hand held)

Tractor Mounted Hydro Axe

Chipper with boom

All Autograde and concrete finishing machines

Bundle Pullers/Extractors (Tubular)

Machines similar to the above including remote control equipment

Group Two A:

Crawler backhoes and Crawler gradalls over one (1) cubic yard factory rating

Hydraulic backhoes over one (1) cubic yard factory rating

Single person operation truck cranes 15 ton and over factory rating

Cherry picker type machinery and equipment 15 ton and over factory rating, etc.
Cranes doing hook work will be paid Wage Group I (A).
All equipment in this Group which previously received the hour in lieu of an oiler will receive Wage Group II (A) including concrete pumps (Heavy/Highway).

Machines similar to the above including remote control equipment

Group Three:

Asphalt Plant Engineers
Conveyors (except building conveyors)
Well Drillers
Forklift Trucks of all types
Ditch Witch (small trenchers)
Motor Patrols
Fine Grade machines
Rollers
Concrete Breaking Machines (Guillotine Only)
Stump Grinder
High or Low Pressure Boilers
Building Hoist (single drum)
Elevator Operator (New Construction)

Machines similar to above including remote control equipment

Group Four:

Seamen Pulverizing Mixer
Form Line Graders
Farm Tractors
Road Finishing Machines
Concrete Spreaders (Heavy Highway)
Power Broom (self-contained)
Seed Spreader
Grease Truck

Machines similar to the above including remote control equipment

Group Five:

Compressors Pumps
Well pint pumps
Conveyors (Building)
Welding Machines
Heaters
Tireman, Power Equipment
Maintenance Engineers (Power Boats)
Miscellaneous Equipment Operator
Elevator Operator (Renovations)
House Car

Machines similar to above including remote control equipment

Group Six:

Fireman
Oilers and Deck Hands (Personnel Boats)
Grease Truck Helpers

Group Seven A:

Handling steel and stone in connection with erection
Cranes doing hook work

Any machines handling machinery
Cable spinning machinery
Helicopters
Concrete pumps (Building)
High Rail/Burro Crane
Rail Loader (Winch Boom Type)
Machines similar to above, including remote control equipment

Group Seven B:

All types of cranes
All types of backhoes
Cableways
Conveyor Loader (Euclid-Type Wheel)
Drag Lines
Keystones
All types of shovels
Derricks
Pavers 21E and over
Trench shovels
Trenching machines
Gradalls
Front-end Loaders
Boat Captain
Hoist with two towers
Concrete Pumps (Heavy, Highway)
Building Hoists-double drum (unless used as a single drum)
Milling Machine
Mucking Machines in Tunnel
Pippin type backhoes
Bobcat
Tandem scrapers
Side Boom
Tower type crane operation, erecting, dismantling,
Jumping or jacking
Directional Boring Machines
Vermeer Saw Type Machine (other than hand held)
Drills self-contained (Drillmaster type)
Fork Lift (20 ft & over)
Tractor Mounted Hydro Axe
Motor Patrols (Fine Grade)
Chipper with boom
Batch Plant with Mixer
All autograde and concrete finishing machines
Carryalls, Scrapers & Tournapulls
Rollers (High Grade Finishing)
Bundle Pullers/Extractors (Tubular)
Spreaders (Asphalt)
Bulldozers and Tractors
Mechanic – Welders
Production Switch Tamper

Ballast Regulators
Tie Replacer
Rail/Road Loader
Power Jack liner

Machines similar to above, including remote control equipment

*Surcharge

Power Equipment Operator Dredger Classifications

Class A: Lead Dredgeman, Operator, Leverman, Licensed Tug Operator over 1000HP.

Class A1: Dozer Operator, Front-end Loader.

Class B1: Derrick Operator, Spider/Spill Barge Operator, Engineer, Electrician, Chief welder Chief Mate, Fill Placer, Operator 2, Maintenance Engineer, Licensed Boat Operator.

Class B2: Certified Welder.

Class C1: Mate, Drag Barge Operator, Steward, Assistant Fill Placer, Welder.

Class C2: Boat Operator.

Class D: Shoreman, Deckhand, Rodman, Scowman, Cook, Messman, Porter/Janitor, Oiler.

3. Truck Driver Classifications:

Class I: Helper, stake body truck operator (single axle, dumpster)

Class II: Dump truck operator, tandem truck operator, batch truck operator, semi-trailer truck operator, agitator-mixer truck operator, dumpcrete type vehicle operator, asphalt distributor, farm tractor operator (when used to transport materials), stake body truck (tandem) operator.

Class III: Euclid type, off highway equipment back truck operator, belly dump truck operator, double-hitched equipment trailer operator, straddle carrier (Ross) operator; lowbed trailer truck operator.

NOTE:

1. Contractors are advised to contact the Philadelphia Labor Standards Unit with any questions regarding job classification, prevailing wage rates, and fringe benefits.
2. Prior to employing apprentices on a public works project, the contractor is required to provide written evidence of employee's registration with a statewide training program recognized by the U.S. Bureau of Apprenticeship and Training (BAT). Contractors shall forward proper documentation for each bona fide apprentice to:

**Philadelphia Labor Standards Unit
Municipal Services Building
1401 John F. Kennedy Boulevard – 1st Floor, Room 170C
Philadelphia, PA 19102-1670
Telephone Number: (215) 686-2132
Fax Number: (215) 686-2116**

CITY OF PHILADELPHIA



**STANDARD CONTRACT REQUIREMENTS
FOR PUBLIC WORKS CONTRACTS**

PROCUREMENT DEPARTMENT

August 25, 2021

CITY OF PHILADELPHIA

STANDARD CONTRACT REQUIREMENTS

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STANDARD CONTRACT REQUIREMENTS

A. DEFINITIONS

1. **Definitions.** The terms used in the Contract Documents shall have the following meanings:
 - a. "ADA" has the meaning set forth in Paragraph 113 below.
 - b. "Amendment" means a written modification or change to any Contract Document signed by both Parties.
 - c. "Applicable Law" means all applicable present and future federal, state or local laws, ordinances, executive orders, rules, regulations and all court orders, injunctions, decrees and other official interpretations thereof of any federal, state or local court, administrative agency or governmental body, including the City of Philadelphia ("City"), the Commonwealth of Pennsylvania ("Commonwealth") and the United States of America ("USA"). Applicable Law includes, without limitation, laws, etc. relating to the environment, the Philadelphia Home Rule Charter ("HRC"), as amended from time to time, The Philadelphia Code ("Code"), as amended from time to time, and the specific laws set forth in Paragraphs 107–116 below, each as amended from time to time. Sellers submit quotes, and the parties execute, deliver and perform their respective obligations under the Contract, under and pursuant to the applicable provisions of all Acts of the General Assembly of the Commonwealth and applicable ordinances of the City, as such enactments may hereafter be supplemented or amended.
 - d. "Application for Final Estimate" has the meaning set forth in Paragraph 56 below.
 - e. "Application for Payment" has the meaning set forth in Paragraph 52 below.
 - f. "Application for Semi-Final Estimate" has the meaning set forth in Paragraph 55 below.
 - g. "Bid Solicitation" means a public invitation to submit competitive Quotes for a specific City contract or City contracts that is or are issued by the Procurement Department in accordance with Sections 8-200(1), 2(a) and 2(b) of the Philadelphia Home Rule Charter. A Bid Solicitation includes all addenda thereto issued by the Procurement Department.
 - h. "Change Order" means an instrument altering the scope of the work under the Contract issued under Paragraph 48 below.
 - i. The "City" means The City of Philadelphia, a corporation and body politic existing under the laws of the Commonwealth, and includes its various executive and administrative departments, agencies, boards and commissions, including the Department, and its legislature, City Council. The City is a City of the First Class under the laws of the Commonwealth.
 - j. "City Work" has the meaning specified in Paragraph 107(d) below.
 - k. "Contingent Price" means a price for a unit or component of work specified on the "Contingent Price List" published from time to time by the City.
 - l. "Commonwealth" means the Commonwealth of Pennsylvania.
 - m. "Contract" means the agreement of the Parties evidenced by the Contract Documents.
 - n. "Contract Documents" means the Standard Contract Requirements; the Department's Standard Details and Specifications, as they apply; the Department's General Bidding and Contract Requirements; the Technical Specifications; the Quote; the Plans with all of the notes thereon (excluding any records or reports of test borings, underground structures, and test piles); the Notice to Proceed ("NTP"), the Notice of Contract Award

("NCA"), the performance bond and the payment bond, as prepared by the Department and issued with the Bid Solicitation, and includes all exhibits, schedules and addenda, if any, to any of the foregoing documents, and any and all Amendments and Change Orders.

o. "Contractor" means the Person that has entered into the Contract with the City, has had its authorized individual(s) sign the Contract Documents on behalf of the Person but does not include, without the City's written consent, any subsidiary, affiliate, agent, etc., or parent company, if any, of the Contractor.

p. "Current Estimate" has the meaning set forth in Paragraph 53 below.

q. "Demographic Data" means statistical information on a group of individuals, aggregated by specific characteristics, including but not limited to race, ethnicity, gender identity, job title, salary range, length of employment, Philadelphia residence, and such other categories as may be established by regulation.

r. "Department" means the department, board, commission, or agency of the City for which the Contractor carries out the work under the Contract, except when the Department of Public Property ("DPP") supervises the Contract, in which case "Department" means the Department of Public Property.

s. "Disputed Change Order" means a Change Order issued by the City under Paragraph 49 below.

t. "Event of Insolvency" means (a) the filing of a voluntary petition by the Contractor under the Federal Bankruptcy Code or any similar state or federal law; or (b) the filing of an involuntary petition against The Contractor under the Federal Bankruptcy Code or any similar state or federal law which remains undismissed for a period of forty-five (45) days; or (c) the Contractor's making of an assignment for the benefit of creditors; or (d) the appointment of a receiver for the Contractor or for the property or assets of the Contractor, if such appointment is not vacated within forty-five (45) days thereafter; or (e) any other proceeding under any bankruptcy or insolvency law or liquidation law, voluntary or otherwise; or (f) the Contractor proves unable to pay its obligations as they mature; or (g) the Contractor is insolvent as otherwise defined under any Applicable Law.

u. "General Bidding and Contract Requirements" means the additional bidding and contract conditions and requirements specifically prepared by the Department for a specific Bid Solicitation (which may accompany the Technical Specifications) and may from time to time include, but not be limited to, Quote proposal forms, special or additional or supplementary instructions to Sellers, minimum wage rate schedules, prevailing wage rate schedules, contingent price lists, requirements of the City's Office of Economic Opportunity ("OEO"), and general tax requirements.

v. "Inspector" means the representative of the City's Project Manager assigned to inspect work and the delivery of services under the Contract.

w. "Labor Source" means a defined pool of trained and qualified individuals from which workers can be secured by agreement or through other means from an entity other than the contractor itself, including but not limited to a business, union hiring hall, job training organization, or registered apprenticeship program.

x. "Lump Sum Bid Breakdown" has the meaning set forth in Paragraph 52 below.

y. "Notice of Contract Award" (NCA) means a notice from the City to the Seller informing the Seller of the City's determination to award the Contract to the Seller.

z. "Notice to Proceed" (NTP) means a notice from the City to the Contractor authorizing the Contractor to commence work under the Contract.

aa. "Operating Commissioner" means the director, commissioner, or other head of the Department issuing the work to the Contractor pursuant to the Contract.

- bb. "Parties" means the City and the Contractor, and a "Party" means either the City or the Contractor.
- cc. "Person" means any individual, sole proprietorship, association, company, firm, partnership, limited partnership, joint venture, corporation, limited liability company or other form of entity or association recognized at law.
- dd. "PGW" means the Philadelphia Gas Works.
- ee. "Plans" means the general plans and design drawings which accompany the Technical Specifications, the Standard Details and Specifications, and such detail and supplementary drawings as may be furnished from time to time.
- ff. "Procurement Commissioner" means the head of the City's Procurement Department, or his or her designee.
- gg. "Procurement Department" means the Procurement Department of the City.
- hh. "Project" means all of the work which the City seeks to complete at the Project site, including, but not limited to, the work which the Contractor has agreed to perform under the Contract. The Project includes other work at the Project site by the City and by other contractors pursuant to other City contracts.
- ii. "Project Manager" means the designated representative of the City officer in charge of the construction branch, division or unit of the Department, or the individual specifically designated as "Project Manager" in the Technical Specifications, and any other individual who may be designated in writing by the Project Manager as his or her representative. The City may delegate or provide for the performance of certain of the duties and functions of the Project Manager by architectural or engineering firms under contract with the City.
- jj. "Proposal" means a Seller's price and other specific terms and conditions included in a Quote.
- kk. "Public Works Contract(s)" means any contract awarded by the Procurement Department for the construction, reconstruction, alteration, or repair of any public building or other public work or public improvement within the City and County of Philadelphia.
- ll. "Quote" means a Seller's signed response, including a Proposal, submitted to the Procurement Department pursuant to a Bid Solicitation.
- mm. "Report Date" means December 31st of the calendar year, immediately preceding the date the bid is filed.
- nn. "Responsibility" or "Responsible" means the capacity to perform a City contract in accordance with its terms and conditions. Elements of Responsibility include the following, among others: judgment, skill, promptness, faithfulness, skillful workers, honesty of the Contractor, financial standing, reputation, experience, resources, facilities, past history of adherence to plans and specifications, capacity and ability to do the work according to the plans and specifications, availability and efficiency, and such other factors as may be determined by law and the City.
- oo. "Seller" means a Person submitting a Quote, signed by the Person, to the Procurement Department pursuant to a Bid Solicitation. Seller includes only the Person who signs the Contract. Seller does not include, without the written consent of the City, any subsidiary, affiliate, agent, etc., or parent company, if any, of the Person.
- pp. "Semi-Final Estimate" has the meaning set forth in Paragraph 55.
- qq. "Shop Drawings" means all drawings, diagrams, illustrations, brochures, schedules, performance charts, instructions, and other data which are prepared by the Contractor, its Subcontractors, suppliers, or distributors, or equipment fabricators or manufacturers, and which illustrate the manufacture or fabrication of the product or equipment or any part thereof, and which are submitted to the Department to establish that the materials, articles and components of equipment Contractor proposes to supply will, when installed, meet all requirements of the Contract Documents.

oo. "Standard Contract Requirements" or "SCR" means these Standard Contract Requirements of the City in connection with the Bid Solicitations for, and the award, execution, and performance of Public Works Contracts, except as modified by the Department's General Bidding and Contract Requirements, the Technical Specifications and Plans and any other special requirements for the Contract. These Standard Contract Requirements are attached to and form an integral part of the Contract Documents.

rr. "Standard Details and Specifications" means the standard details and specifications for specific, recurring types of work or components thereof, as may be issued by the Department from time to time, *e.g.*, the Standard Details and Standard Specifications for Sewers, as issued by the Philadelphia Water Department, or the Standard Construction Items, as issued by the Department of Streets.

ss. "Structures" has the meaning set forth in Paragraph 83 below.

tt. "Subcontract" means a contract made between the Contractor and a Subcontractor, or between a Subcontractor and a sub-subcontractor at any tier, providing for the completion of one or more portions of the work which the Contractor has agreed to perform under the Contract, including agreements for the manufacture or supply of equipment, systems or components forming part of such work.

uu. "Subcontractor" means a Person performing at any tier under a contract with the Contractor or another Subcontractor one or more portions of the work which the Contractor has agreed to perform under the Contract. Subcontractors shall include, without limitation, vendors, manufacturers, suppliers, or other Persons contracting with a Subcontractor or the Contractor for the manufacture or supply of equipment, systems or components forming part of the work under the Contract. There is no contractual relationship (privity of contract) between the Contractor's Subcontractor, or a Subcontractor's subcontractor, and the City.

vv. "Substantial Completion" or "Substantially Complete" or "Substantially Completed" means that construction is sufficiently complete in accordance with Contract Documents and certified by the Project Manager, as modified by Change Orders or amendments, so that (a) the work under this Contract can be used, occupied or operated for its intended use, and (b) all applicable permits and licenses, including, if applicable, a statement or certificate of occupancy, shall have been duly issued by all government offices, including those of the City. In no event shall the Contract be certified as substantially complete until the Contractor has completed at least ninety percent (90%) of the work under the Contract.

ww. "Technical Specifications" means the written and detailed requirements, prepared by the Department, or its consultants or representatives, for materials, equipment, systems, standards and workmanship for the work under this Contract and related services to be performed under the Contract.

xx. "Unbalanced Quote" means an offer by the Contractor which (1) contains extremely low prices on items or types of work which are, as determined by the City in its sole discretion, unimportant or infrequently ordered or performed, and extremely high prices on items or types of work which are frequently ordered or performed, resulting in an effort to qualify as the low Seller while charging disproportionately high prices for certain items or types of work; or (2) contains prices for phases of the work to be performed early in the course of the work under this Contract that are, as determined by the City in its sole discretion, disproportionately high relative to prices for later phases of the work, resulting in payment of a disproportionately high percentage of the total Contract price early in the Contract period.

yy. "Working Days" means calendar days, less allowances for days or parts of days, in increments of one-quarter (1/4) day, for conditions entirely beyond the control of the Contractor as defined in Paragraph 25(c)(2); and also excludes New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, or the Monday thereafter when these days occur on Sunday, and Saturdays and Sundays shall not be considered as Working Days.

xx. "Working Drawings" means those drawings prepared by the Contractor to supplement the Plans and Shop Drawings to accurately and clearly depict all working and installation dimensions, arrangement and sectional views, units of equipment in the proposed positions for installation, details of required attachments and connections, and dimensioned locations between units and in relation to the existing and proposed structures. Working Drawings shall show all necessary details and information for making connections between the various

trades including, but not limited to, power supplies and interconnecting wiring between units, accessories, and appurtenances.

2. **Interpretation; number, gender.** The words "herein" "hereof" and "hereunder" and other words of similar import refer to the Contract as a whole, including all of the Contract Documents, and not to any particular article, paragraph, subparagraph or clause contained in the Contract Documents. Whenever the context requires, words used in the singular shall be construed to include the plural and vice versa, and pronouns of any gender shall be deemed to include the masculine, feminine and neuter genders.

B. QUOTE SUBMISSION REQUIREMENTS

3. Qualifications of Seller.

a. Each Seller must demonstrate to the satisfaction of the City that it is Responsible, capable of performing the work under the Contract, and has successfully completed contracts equivalent in scope and nature, and comparable in magnitude. Seller must further demonstrate that: 1) it has the necessary financial resources, equipment, and workforce to perform the work under the Contract in a proper and satisfactory manner, in accordance with the Contract Documents, and within the time specified, and 2) that the possible award of this Contract to the Seller will not, in the City's sole discretion, overextend the Seller because it is already performing another City contract or other contract(s) or project(s).

b. As required by Section 17-101, as amended, of The Philadelphia Code, entitled "Prequalification of Prospective Bidders for Contracts for Construction of Public Works", all Sellers shall submit to the Procurement Department through PHLContracts, by the date specified in the Quote advertisement(s), a "City of Philadelphia Prequalification Questionnaire," for the purpose of determining the Seller's Responsibility. Should the Seller omit any required information, or refuse to give any required information, or should the information submitted by Seller, in the judgment of the Procurement Commissioner, taking into consideration the recommendations of the Operating Commissioner, reveal that the Seller is not sufficiently equipped or qualified to enter into or perform the Contract, the City shall not accept any Quote from such Seller(s), and the Procurement Commissioner shall notify the Seller to that effect. In such case, Section 17-101 of The Philadelphia Code shall govern any appeal to which the Seller may be entitled.

4. Examination of Contract Documents and Site.

a. Sellers shall thoroughly acquaint themselves with the Contract Documents, including, without limitation, a careful study and review of the Plans and Technical Specifications. Sellers shall examine in detail the Project site and shall acquaint themselves with conditions affecting the work under the Contract and the overall Project, and, when applicable, the condition of walls and foundations of overlying and adjacent structures, the character of the paving, and the soil and subsurface soil. The Quote shall be prepared with due regard to the provisions of the Contract Documents and to the conditions existing or to be anticipated at the Project site.

b. Where test borings, test piles, and existing underground and above-ground structure locations are reported on, or included with, the Contract Plans or Technical Specifications, or where they are provided as separate Plans or Technical Specifications, they are for the information of the City only and are not provided to Sellers to show the conditions to be encountered by the Seller; the correctness, accuracy, or interpretation of the information is not guaranteed or warranted in any fashion by the City; and in no event is any boring or underground or above-ground structure information to be considered as a part of the Contract, notwithstanding any provision to the contrary that may appear in the Technical Specifications. If a Seller uses any of this information in preparing its Quote, Seller shall assume any and all risks resulting from conditions that differ from the conditions or approximation shown on the Plans or Shop Drawings.

1. If Seller desires to obtain similar data or information, or to conduct an independent subsurface investigation of the Project site, the Seller must notify the Department in writing at least ten (10) days prior to the date for opening of Quotes, or not later than five (5) days after the date on which Quotes are first advertised by the City, whichever date is earlier. Upon written notice from Seller, the City shall afford Seller the opportunity, at Seller's sole expense, to make test borings or soundings, to drive test piles, or to dig test pits on that portion of the Project site in which the work under this Contract will take place. Seller shall be responsible for complying with all Applicable Law relating to such activity. The foregoing to the contrary notwithstanding, the

City reserves the right to reject such investigations by any Seller when the City deems such rejection to be in the City's best interest. If the City permits such investigations by any Seller, then (a) each such Seller, prior to its entry onto the Project site, shall deliver to the City a certificate of insurance conforming to the

requirements of Paragraph 30 below, and a License Agreement in the form provided by the City; (b) each such Seller shall indemnify, defend and hold the City harmless from and against any and all claims, causes of action, suits, damages, losses, costs and expenses, whether for personal injury or property damage or for any other reason, arising out of such Seller's entry on the Project site; (c) such Seller covenants and agrees that it shall restore the Project site to the same condition as existed prior to such Seller's entry onto the Project site; (d) the City reserves the right to require the delivery of payment and performance bonds prior to any entry onto the Project site by such Seller; (e) in the event more than one Seller seeks to conduct such investigations, the City reserves the right to coordinate and schedule such investigations so as to minimize interference with the use of the Project site and other adjacent sites and any interference with other work at the Project site or adjacent to the Project site.

2. Failure of a Seller to notify the Department in writing of a Seller's desire to obtain such information shall operate as an absolute bar to any claim by a Seller that it had no reasonable means of making an independent subsurface investigation of the site.

c. If a Seller discovers or encounters any ambiguity or discrepancy in the Contract Documents in the course of preparing its Quote, the Seller shall promptly notify the Department of the ambiguity or discrepancy prior to the date and time for receipt and opening of Quotes. The City, so advised, may, at its sole discretion determine whether such ambiguity or discrepancy exists and whether any corrective action is necessary.

5. **Antibid-Rigging Act.** All Sellers, by submitting a Quote, certify that they have not committed or engaged in, or attempted to commit or engage in, a prohibited activity under the Antibid-Rigging Act, 62 Pa. C.S.A. § 4501, et seq., as amended, in connection with their Quote. In addition, all Sellers by submitting a Quote certify that the Seller has not been convicted or found liable for any act prohibited by any federal or state law in any jurisdiction involving conspiracy or collusion with respect to bidding on any public contract within the five (5) years prior to the date of the Quote; that the Seller acknowledges that a conviction or finding of liability for any act prohibited by federal or state law in any jurisdiction involving conspiracy or collusion with respect to submitting a Quote on any public contract within the three (3) years prior to the date of the Quote shall not prohibit the City from accepting a Quote from the Seller or awarding a Contract to the Seller, but may nonetheless serve as grounds for Seller's suspension or debarment at the sole discretion of the Procurement Commissioner, or may serve as grounds for a non-award of a Contract to the Seller on the basis of the Seller's lack of Responsibility.

6. **Multiple Quote Restriction.** No Seller shall be a party to more than one (1) Quote for the same Bid Solicitation. A violation of this condition may in the sole discretion of the Procurement Commissioner, result in rejection of any or all such Quotes in which the Seller is interested.

7. **Quote Submission.**

a. By submitting a Quote, the Seller certifies that it is familiar with the Project site and the conditions affecting the Project site, that it has thoroughly reviewed the Contract Documents, and that all work can be completed for the amount stated in the Quote and within the Contract time specified. No Quote may be considered if received after the date and time for opening of Quotes established by the Bid Solicitation, nor may any Quote be modified after that date and time, except as provided herein or by Applicable Law. The time of Quote opening shall be the time displayed in PHLContracts. In the event of any discrepancy between actual time and the time displayed in PHLContracts, the latter shall determine the time of Quote opening.

b. It is the sole responsibility of the Seller to ensure that it has received any and all addenda and the Procurement Commissioner may, in his or her discretion, reject any Quote for which all addenda have not been executed and returned in accordance with the instructions provided therein.

c. For purposes of determining the basis of a contract award, in the event of a discrepancy between a unit price and an extended price for a work or line item, the unit price shall govern, and the extended price shall be re-computed by the City. If the amount set forth as a unit price is ambiguous, unintelligible, or uncertain for any cause, or is omitted entirely, or is the same amount as the extended price for a work or line item, then the amount set forth as the extended price shall govern for purposes of determining the basis of a contract award. In such event, the extended price shall be divided by the estimated quantity for the work or line item to

arrive at a re-computed unit price which shall thereafter govern for purposes of payment under Paragraph 45.

d. Where a unit or other price (including a unit price extension or the aggregate or total price) contained in the Quote contains a mistake or error in computation, or is otherwise ambiguous as to computation, or there is a discrepancy between a unit price and an extended price for a work or line item, and where the mistake, ambiguity, or discrepancy is not discovered prior to contract award and results in the award of a contract to the Seller, which award is later determined to be mistaken or erroneous, or the Contract Amount is determined to be erroneous, based upon a re-computation of the unit prices and the total price, the Contractor shall bear the sole financial risk of such mistake or ambiguity, and such mistake or ambiguity shall be construed solely against the Contractor and in favor of the City. In all such cases of price mistake, ambiguity, or discrepancy, if work under the Contract has not yet commenced, the City shall have the discretion, at its sole option, to formally rescind the Contract, if the Contractor is deemed not to be the low Seller in accordance with the rule set forth in Paragraph 7(c) above, or to unilaterally reform the Contract and the prices therein in accordance with the rule set forth in Paragraph 7(c), if the Contractor would still be deemed to be the low Seller notwithstanding any mistake, ambiguity, or discrepancy. If work under the Contract has already commenced, the City shall have the discretion, at its sole option, to make payment at the unit price as recomputed in accordance with Paragraph 7(c) above or at the mistaken or ambiguous unit price, or to dispute payment at the mistaken or ambiguous price. In the event of a rescission or reformation of the contract under this Paragraph, the Contractor agrees and acknowledges that it shall have no claim against the City, including any claim for breach of contract or breach of any other legal duty, or for lost profits, costs, damages, or expenses of any kind, arising out of the rescission or reformation. In the event that the City disputes payment to the Contractor at a mistaken or ambiguous unit price, and the parties cannot mutually agree upon a price to be paid to the Contractor for the item of work in question, the payment to the Contractor for the item of work shall not exceed the payment which would be made pursuant to Paragraph 51, and the City's liability to the Contractor for such item of work shall not in any event exceed the Contract Amount as specified in Paragraph 44.

8. Quote Withdrawal. P.L. 9, No. 4, Act of January 23, 1974, 73 P.S. § 1601, et seq., as amended, shall govern the withdrawal of Quotes for clerical mistakes. A Seller must provide the Procurement Department written notice of a right to withdraw a Quote under 73 P.S. § 1601, et seq., within two (2) business days after the opening of Quotes.

9. Quote Responsiveness. Subject to the right of the Procurement Commissioner to waive irregularities and non-responsiveness as set forth below in this Paragraph 9, the Contract Documents are mandatory and must be strictly followed by all Sellers in the preparation and submission of their Quotes. After Quotes are opened, the Procurement Department, and other City departments or agencies where appropriate or specified, shall review all Quotes for responsiveness. Any Quote which is incomplete, obscure, conditional, unbalanced, which contains additions not called for, or irregularities of any kind, including alterations or erasures, or which fails to conform in any respect to the Contract Documents shall be deemed to be non-responsive and shall be rejected, except where the Procurement Commissioner, in his or her sole discretion, determines that the irregularity or non-responsiveness is not material or that a waiver of the irregularity or non-responsiveness is otherwise permitted by the Contract Documents or by Applicable Law. The Procurement Commissioner reserves the right to waive such irregularities or non-responsive matters in a Quote. The Procurement Department's determination of non-responsiveness shall be final and any Quote rejected as non-responsive shall not be eligible for Contract award. The Procurement Commissioner's determination of non-responsiveness is not appealable to the Court of Common Pleas.

10. Security for Execution of Contract. The Seller shall include with its Quote a bid bond in the amount of ten percent (10%) of the gross amount of the Quote. The gross amount of the Quote shall mean the sum of all items enumerated in the Quote, without reduction for "deduct" alternates. All Sellers must use the City's standard bid bond form, which is included in the Bid Solicitation or otherwise available at the City's Procurement Information Center (Rm. 170 Municipal Services Bldg.), in fulfilling the requirement of this Paragraph 10. The City shall not accept any other bid bond form. The Seller may not submit cash. Upon return of the duly executed Contract Documents by the lowest responsible Seller to the City's Law Department, the bid bonds of all Sellers shall be deemed released.

11. Bid Processing Fee.

a. In addition to bid security and any other fee or monies required, the Quote shall be accompanied by a non-refundable processing fee in the form of a separate check payable to the City or electronic payment as specified in the bid solicitation. The processing fee is based on the advertised cost estimate for the bid in accordance with the formula below. Cash is not acceptable.

\$0	when the advertised cost estimate does not exceed \$10,000
\$10	when the advertised cost estimate is or exceeds \$10,000 but does not exceed \$100,000
\$30	when the advertised cost estimate is or exceeds \$100,000 but does not exceed \$300,000
\$50	when the advertised cost estimate is or exceeds \$300,000 but does not exceed \$500,000
\$100	when the advertised cost estimate is or exceeds \$500,000 but does not exceed \$1,000,000
\$200	when the advertised cost estimate is or exceeds \$1,000,000 but does not exceed \$2,000,000
\$300	when the advertised cost estimate is or exceeds \$2,000,000 but does not exceed \$3,000,000
\$400	when the advertised cost estimate is or exceeds \$3,000,000 but does not exceed \$4,000,000
\$500	when the advertised cost estimate is or exceeds \$4,000,000 but does not exceed \$5,000,000
\$600	when the advertised cost estimate is or exceeds \$5,000,000.

b. For the purpose of estimating the amount of the bid processing fee the amount of work and labor or the quantities of materials or supplies to be furnished will be in accordance with the estimated quantities, but the City will not be bound by such estimates in regard to the actual quantities of work and labor or materials or supplies required to be furnished under the Contract.

c. Failure to submit the bid processing fee may result in the Seller's disqualification from submitting a Quote. In addition, if an award is made pursuant to the Bid Solicitation and Quote, any unpaid processing fees owed by the Seller to the City must be paid prior to the City's release of any payments to the Contractor under the Contract.

12. Business Tax Requirements. Any Contractor, or vendor of goods, wares and merchandise, or purveyor of services, who submits a Quote and is awarded a contract by the City or the School District of Philadelphia ("School District" or "SDP"), is subject to Philadelphia's business tax and applicable ordinances and regulations. Anyone who is awarded a contract by the City or the School District of Philadelphia pursuant to a formal bid solicitation, including a Bid Solicitation, shall be deemed to have entered into a contract within the City, and the subsequent delivery of goods into the City, or performance of services within the City constitutes "doing business" in the City and subjects the successful Seller to one or more of the following taxes: (a) Business Privilege Tax; (b) Net Profits Tax; and (c) City Wage Tax. The successful Seller, if not already paying the aforesaid taxes, is required to apply to the Department of Revenue for a tax identification number and to file appropriate business tax returns as provided by law.

13. Tax Indebtedness. The successful Seller shall represent, warrant and covenant that the Contractor and any entities controlling the Contractor, under common control with the Contractor, or controlled by the Contractor are not currently indebted to the City, and will not at any time during the term of the Contract be indebted to the City, and will not at any time during the term of this Contract (including any extensions or renewals thereof) be indebted to the City, for or on account of any delinquent taxes (including, but not limited to, taxes collected by the City on behalf of the School District of Philadelphia), liens, judgments, fees or other debts for which no written agreement or payment plan satisfactory to the City has been established. In addition to any other rights or remedies available to the City at law or in equity, the Contractor acknowledges that any breach or failure to conform to this representation, warranty and covenant may, at the option of the City, result in the withholding of payments otherwise due to the Contractor and, if such breach or failure is not resolved to the City's satisfaction within a reasonable time period specified by the City in writing, may result in the offset of any such indebtedness against said payments or the termination of this Contract for default (in which case the Contractor shall be liable for all excess costs and other damages resulting from the termination), or both.

14. Commercial Activity License. A Commercial Activity License ("CAL") is required for every Person desiring to engage in any business within the City, whether or not such Person maintains a place of business in the City. The successful Seller will be required to furnish a CAL number at the time of Contract

award, but no later than before the "Notice to Proceed" is issued. In the event the successful Seller has applied for, but not been issued, a CAL, a photocopy of the application will be acceptable. The CAL is a one-time license with no expiration date. Only one (1) license is needed for multiple locations or for multiple businesses for the same Person. If the Seller has never had a CAL assigned, the Seller may request one by filing a "Miscellaneous License Application". In order to be assigned a CAL, it is necessary to have a "Philadelphia Business Tax Account Number". This is a number assigned by the City's Department of Revenue to identify City tax accounts. If the Seller has never had a number assigned, the Seller may request one by filing an "Application for Philadelphia Business Tax Account Number". Any tax account previously opened for the Seller which is unsettled or delinquent will cause delay and may preclude the issuance of a new license. Applications may be obtained from the Department of Licenses and Inspection, License Issuance Unit.

15. **Comparison of Quotes.** Quotes will be compared on the basis of the aggregate of all the items of the Quote, unless otherwise specified in the General Bidding and Contract Requirements.

16. **Award of Contract.** The City shall make the Contract award to the lowest responsive, Responsible Seller. In the event of an absolute tie, the Procurement Commissioner shall make the Contract award in accordance with the best interests of the City. The Procurement Commissioner, in his or her sole discretion, may reject all Quotes, if deemed in the best interests of the City. The award of the Contract shall be governed in all respects by 62 Pa.C.S. §3911, as amended. However, the failure of the City to comply with the statutory requirement set forth in 62 Pa.C.S. §3911 shall not operate as a release of the Seller, unless the Seller shall first notify the City in writing, prior to the end of the deadline set forth in 62 Pa.C.S. §3911, of the Seller's intent to demand compliance of the City with such requirement.

17. **Binding Contract and Execution of the Contract.**

a. The award shall not become a contract binding upon the City until after written Notice of Contract Award is made by the Procurement Department to the lowest responsive, Responsible Seller and until after all of the following conditions have been satisfied:

1. Successful Seller posts a proper performance bond and a proper payment bond, as provided for in Paragraph 18 below, on the City's current bond forms, within the time set forth in the Notice of Contract Award;
2. Successful Seller provides proof of the requisite insurance;
3. The Contract is approved as to form by the City's Law Department;
4. The Director of Finance and the City Controller's Office certify the availability of funds for the Contract; and
5. The Procurement Commissioner executes the Contract.

The Procurement Commissioner may, in his or her sole discretion, cancel any contract award if any of the above conditions are not satisfied, or if the Procurement Commissioner, in his or her sole discretion, determines cancellation of the contract award to be in the best interests of the City. In the event of such cancellation, the successful Seller agrees and acknowledges that it shall have no claim against the City, including any claim for breach of contract or breach of any other legal duty, or for lost profits, costs, damages, or expenses of any kind.

b. The execution of the Contract shall be made within sixty (60) days of the date of the award of the Contract and shall in any event be governed in all respects by 62 Pa.C.S. §3912, as amended. Any Seller who is not lawfully released from its Quote and who fails, refuses, or is unable to furnish the required performance and payment bonds or insurance, shall be liable to the City for the actual loss or damage sustained by the City as a result of the failure of the Seller to enter into the Contract. This remedy against the Seller shall be in addition to, and not in lieu of, any remedy or claim which the City may have under the bid bond posted by the Seller.

c. In no event shall the Contract awarded to the Contractor be construed or deemed to include, as a term, covenant or condition, any exception, addition or other term which the Seller may have included or as part of its Quote, except as may be expressly approved by the Procurement Commissioner pursuant to Paragraph 9 above.

18. **Contract Surety.** As provided by the Act of 1967, December 20, P.L. 869 (8 P.S. § 193.1, *et seq.*, as amended), the successful Seller will be required at the time of execution of the Contract to give security for the faithful performance of the work and for compliance with the Contract in the form of a performance bond, with a surety company approved by the City, in a sum equal to 100% of the amount of the Contract (equal to the Quote amount plus any contingency amount). In addition, as provided by the Act of 1967, December 20, P.L. 869 (8 P.S. § 193.1, as amended), the Contractor will be required at the time of execution of the Contract to give a payment bond, with a surety company approved by the City, in a sum one hundred percent (100%) of the amount of the Contract (equal to the Quote amount plus any contingency amount), conditioned for the full payment of Subcontractors and others furnishing labor and materials in the performance of the Contract. Both the performance and payment bonds must be submitted by the Seller to the City on bond forms provided by the City.

C. GENERAL REQUIREMENTS OF THE CONTRACT

19. **Unauthorized Acts.** Any act of any City representative, official, agent, or employee, which is not within the scope of his or her authority as set forth in the Contract Documents or pursuant to the Philadelphia Home Rule Charter, shall not be binding on the City and shall not be deemed as a defense to the Contractor for the breach of any of the terms and conditions of the Contract.

20. **Cancellation of the Contract.** The Contractor will not be required to proceed with the work of the Contract, if:

- a. for any reason for which the Contractor it is not responsible, the Contractor cannot commence work within three (3) months from the date of execution of the Contract, except in the case of Contracts for street improvements, when six (6) months shall be the limiting period; or
- b. at any time prior to the issuance of the Notice to Proceed, the City, in its sole discretion, determines that it must reduce the scope of the work in an amount equal to or greater than twenty-five percent (25%) of the amount of the Quote. In such event, the City shall give notice thereof the Contractor.

In the event the Contractor cannot commence work, the Contractor shall give notice of cancellation within five (5) days after the date which is three (3) months from the date of execution of the Contract by the Contractor, except in the case of Contracts for street improvements, when the Contractor shall give such notice six (6) months from the date of execution of the Contract by the Contractor. In the event the City gives notice to the Contractor that the City has determined to reduce the scope of the work as provided in Paragraph 20(b) above, then the Contractor shall give notice of cancellation within five (5) days after the date the Contractor receives such notice from the City, otherwise the Contract shall remain valid.

This Paragraph 20 shall not apply to Contracts entered into for work the commencement of which is dependent upon progress of other contracts where this condition is plainly indicated by the character and location of such work at the time the City issues the Bid Solicitation and where Departmental constraints limit construction activities as described in the Technical Specifications. The City shall have no liability, by way of any penalty or otherwise, arising out of the cancellation of the Contract pursuant to this Paragraph 20.

21. **Termination for the Convenience of the City.** The City may terminate this Contract at any time during the term of the Contract, for any reason, including, without limitation, the City's own convenience. Written notice of termination shall be sent to the Contractor by the Procurement Commissioner and said notice shall set forth the effective date of the termination. Upon receipt of such notice of termination, the Contractor shall stop all work under the Contract. Upon termination under this Paragraph, the City shall be liable to the Contractor only for the cost and profit on the physical work then completed on the job site by the Contractor

and in place. The City shall have no additional liability or cost for termination of the Contract, including, but not limited to, any penalty, the Contractor's anticipated profits, the Contractor's estimating costs, or any loss on the work terminated. If termination of the Contract occurs prior to the issuance of the Notice to Proceed, the City shall not be liable to the Contractor for any cost or lost profits of the Contractor, regardless of whether the Contractor may have performed some physical work, except where the Project Manager has otherwise authorized in writing the commencement of work by the Contractor, in which case the City's liability to the Contractor shall be governed by the prior terms of this Paragraph. Termination of the Contract shall not affect any obligation or liabilities of either Party accruing prior to termination.

22. **Contractor's Obligations.** The work to be done under the Contract is set forth in detail in the Contract Documents. The Contractor shall furnish all labor, materials, plant, tools and appliances, and shall complete the work to the satisfaction of the Project Manager in the manner and within the time required in the Contract Documents at the prices set forth in the Contract. If at any time the Contractor's methods, workforce, or equipment appear to the Project Manager to be unsafe, insufficient, or inadequate for the proper performance of the provisions of the Contract, the Project Manager may order the Contractor to make such changes as the Project Manager may deem necessary, and the Contractor shall comply with such orders, but the failure of the Project Manager to make such demands shall not relieve the Contractor of its obligations under the Contract. The Contractor shall maintain an office on the Project site where orders and instructions may be delivered, and shall give personal attention to the faithful performance of the work of the Contract. The Contractor shall employ a competent representative or superintendent on the Project site who shall have full authority to receive and execute orders, and to supply such labor, tools, and materials as may be required for the proper performance of the work.

23. **Performance of Work by the Contractor.** The Contractor is required to perform, on the site and with its own work force, work with a value of at least twenty percent (20%) of the original total contract price, exclusive of profit, overhead and the costs of procuring insurance and bonds. The Contractor shall submit with its Quote a complete description of the work it will perform (e.g., earthwork, paving, brickwork, roofing, etc.), the percentage of the total work this represents, and the estimated dollar value thereof.

24. **Materials and Equipment Loaned or Rented by the City.** Any materials, or equipment loaned or rented by the City to the Contractor for use on the particular job must be returned by the Contractor in kind or in cash, or as a credit to the Contract as determined by the Department or the Contractor will be considered in default of the Contract. The use or operation of such material or equipment shall be at the Contractor's own risk. The material or equipment shall be taken in its "AS IS" condition and the Contractor shall maintain the material or equipment in the same condition as when received, less normal wear and tear. Should damage occur, repair or replacement shall be made by the Contractor at its own expense, at the election and to the satisfaction of the City, in accordance with specifications approved in writing by the City.

25. **Contract Time.**

a. Times set forth in the Contract Documents for the performance of the work or any portions thereof are essential elements of the Contract. The Contractor shall begin work within ten (10) days from the date of issuance of the Notice to Proceed from the Department directing the Contractor to proceed with the work, and shall complete all work covered by the Contract Documents within the time specified in the General Bidding and Contract Requirements. The Contract completion date shall be determined by reference to the date of the issuance to the Contractor of the Notice to Proceed. In submitting a Quote, the Contractor acknowledges and agrees that the Contract time, as specified in the General Bidding and Contract Requirements, is a reasonable period for performing the work.

b. Except as may otherwise be required by the General Bidding and Contract Requirements or the Technical Specifications, the Contractor shall prepare and submit to the Project Manager, before starting work, a written and detailed construction schedule which shall, at a minimum, indicate the milestone dates on which the Contractor intends to start and end each of the principal items of work under the Contract and which shall indicate generally how the Contractor intends to complete the work under the Contract within the Contract time specified. The Contractor's construction schedule shall include a schedule or timeline for submission of Shop Drawings or other submittals to the Department, which shall be coordinated with the overall construction schedule and which allows for a reasonable time for the Department or the Project Manager to review the

submittals or such time as the Department or the Project Manager may otherwise require pursuant to any of the Contract Documents. The Contractor's construction schedule shall in no event exceed the time allotted for completion of the Contract. From time to time, the Contractor shall revise and update its construction schedule to show changes to the schedule and any agreed revisions to the Contract time. The Contractor acknowledges that its failure to submit a written schedule to the Project Manager, as herein provided, shall preclude the assertion of any claims for delay or interference to Contractor's schedule or prosecution of the work and shall further preclude the assertion of any claim or request for an extension of the Contract time.

c. The Contractor shall be entitled to a reasonable extension of time for unavoidable delays or interference in completion of the Contract caused by:

1. Any acts or omissions of the City (but not PGW, or its contractors, or any other non-City utilities or authorities) which occur subsequent to the issuance of the Notice to Proceed and which cause delay in the completion of the Contract, by failure to give possession of the Project site, by changes in the Plans and Technical Specifications, or by requiring for any cause the suspension of the work under the Contract, except where such suspension is the result of a default or other act or omission by the Contractor. Any delay or postponement in the issuance of the Notice to Proceed shall not entitle the Contractor to an extension of the Contract time and shall not give rise to any claim for delay, disruption, or interference by the Contractor. The Contractor's remedies in the event of a delay or postponement in the issuance of the Notice to Proceed shall be governed solely by 62 Pa.C.S. §3913, as amended.

2. Causes not reasonably foreseeable by the Parties at the time of the complete execution of the Contract and which are entirely beyond the control and without the fault or negligence of the Contractor, including, but not limited to, acts of God, acts of the public enemy, acts of governmental authorities, quarantine restrictions, general strikes throughout the trade or freight embargoes not caused or participated in by the Contractor, fire, floods, pandemics and weather of unusual severity, such as hurricanes or tornadoes.

d. Delays caused by the Contractor's Subcontractors or materialmen shall not, in themselves, be cause for an extension of time by the City. To warrant an extension of time, such delays must be occasioned by the same causes specified in Paragraphs 25(c)(1) and (2) above.

e. Time extensions shall be handled as follows:

1. The Contractor, within five (5) days after the beginning of any delay or interference to its construction schedule, shall notify the Project Manager in writing of the occurrence of the delay or interference, stating with reasonable particularity the cause or causes of the delay or interference and the Contractor's intention to seek an extension of time.

2. Any claim by the Contractor for a time extension must be made in writing to the Project Manager within ten (10) days after the conclusion of the delay or interference for which a time extension is requested or the City will not consider such claim. The City shall not in any event grant a time extension for any delay or interference which was incurred more than five (5) days before the Contractor gave written notice as required in subparagraph (1) above.

3. Before the Project Manager reviews a claim for a time extension, the Contractor shall demonstrate in writing the effect of the delay or interference on the Contractor's construction schedule, including plotting such effect on the Contractor's critical path documents, showing graphically therein the effect on the Contract completion date, both in calendar days and Working Days. This depiction of the delay or interference must accompany the written claim for a time extension submitted in accordance with subparagraph (2) above. If the Contractor believes that it has been impacted beyond a mere time delay, the Contractor shall also provide the Project Manager with an estimate of the costs incurred by the Contractor as a result of the delay or interference. The failure of the Contractor to provide the Project Manager with this contemporaneous cost estimate shall bar any later claim by the Contractor for any costs incurred as a result of the delay or interference.

4. If the Project Manager determines that an extension of time is in order, the time allowed for any delay will be added to and will correspondingly extend the Contract time for completion and

adjust any Contract completion milestones set forth in the General Bidding and Contract Requirements or the Technical Specifications. The Contractor agrees that a time extension granted by the Project Manager shall be its sole remedy for a delay or interference and shall operate as a full and complete release of any claim by Contractor for any and all costs and expenses related to or arising out of the event giving rise to the delay or interference.

f. NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED HEREIN, THE CONTRACTOR AGREES AND ACKNOWLEDGES THAT THERE SHALL BE NO PAYMENT OR COMPENSATION OF ANY KIND TO THE CONTRACTOR FOR DAMAGES OR COSTS ARISING FROM ANY DELAY OR INTERFERENCE WHETHER SUCH DELAY IS AVOIDABLE OR UNAVOIDABLE. CONTRACTOR FURTHER AGREES AND ACKNOWLEDGES THAT ITS SOLE REMEDY IN THE CASE OF DELAYS OR INTERFERENCES TO ITS CONSTRUCTION SCHEDULE WHICH ARE ATTRIBUTABLE TO THE CITY, SHALL BE A REASONABLE EXTENSION OF THE CONTRACT TIME.

g. On contracts on a calendar day basis (a specified number of days), no allowance will be made for Saturdays, Sundays or holidays. On contracts on a Working Day basis, allowances will be made for days or parts of days, in increments of one-quarter (1/4) day, for conditions entirely beyond the control of the Contractor; New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, or the Monday thereafter when these days occur on Sunday, and Saturdays and Sundays shall not be considered as Working Days. The Department shall keep a record of the Working Days and the Department shall make this record available to the Contractor on request. The Contract time shall start with the first Working Day after the date of the Notice to Proceed and the scheduled date of completion shall be that established by the specified number of Working Days plus the allowance.

h. If, for reasons other than those stated above, any portion of the work remains uncompleted after the Contract date specified for its completion, notwithstanding Substantial Completion of the work, the Project Manager shall deduct from payments due the Contractor, as liquidated damages an amount per diem, according to the following schedule:

<u>Contract Value</u>	<u>Agreed Delay Damages Per Diem</u>
\$0-\$100,000	\$ 250
\$100,001-\$500,000	\$ 500
\$500,001-\$1,000,000	\$ 750
Over \$1,000,000	\$1,000

These per diem delay damages are assessed as agreed liquidated damages because the Parties have considered the difficulty of determining the City's actual damages and agreed that computation of the City's actual damages is impossible. If a delay is due to causes which the Contractor considers extraordinary or beyond its control, the Contractor must give timely notice thereof in writing as specified in Paragraph 25(e) above. In the event that the General Bidding and Contract Requirements or the Technical Specifications contain a provision allowing for the imposition of liquidated damages for delays to the completion of the work, such provision shall take precedence over this subparagraph (h).

This subparagraph (h) shall not be construed to apply to claims, offsets, credit change orders, and/or chargebacks which the City may assert or assess against any Contractor for the reimbursement or recovery of any costs incurred by a different Contractor on the Project due to the fault or delay of the Contractor. In all such cases, the City shall not be limited to the per diem amounts listed above and shall be permitted to seek recovery or reimbursement of the full amounts incurred by any non-delaying Contractor.

26. **Independent Contractor.** The Contractor is an independent contractor and shall not in any way or for any purpose be deemed or intended to be an employee or agent of the City. Neither the Contractor nor its employees or Subcontractors shall in any way represent that they are acting as employees, officials or agents of the City.

27. **Risk of Loss.** The Contractor shall assume all risk and responsibility for casualties of every description in connection with its work. The Contractor shall have charge of the entire work until completion and acceptance, and shall alone be liable and responsible for any injuries to persons and any loss or damage to property, buildings, or adjacent work that may occur as a consequence of or during the progress of the work under this Contract, whether such damage or accident be due to the Contractor's own negligence or that of its servants, agents, employees, or whether such damage or accident be due to the inherent nature of the work, or whether such damage or accident be due to other causes.

28. **Indemnification.** The Contractor shall indemnify, defend and hold harmless the City, its officers, employees, and agents, from and against any and all losses, costs and expenses, including but not limited to litigation costs, settlement fees and expenses, and counsel fees and expenses, claims, suits, actions, damages, liability and expenses, arising out of or resulting in whole or in part from the performance of the work under the Contract, including, but not limited to, those in connection with loss of life, bodily injury, personal injury, damage to property, contamination or adverse effects on the environment, intentional acts, failure to maintain a drug-free work site and workforce and any other breach of the Contract, regardless of the inherent nature of the work and regardless of whether or not such loss, cost, claim, suit, action, damage, liability, or expense is caused in whole or in part by the negligent act or omission of a party indemnified hereunder. Such obligation shall not be construed to negate, abridge or reduce other rights or obligations of indemnity which would otherwise exist as to a Party or Person described in this Paragraph. The Contractor shall further indemnify, defend and hold harmless the City from and against any and all claims, demands, liens, causes of action, liabilities and judgments of any kind asserted against the City by any Subcontractor or suppliers on account of or relating to the furnishing of services, work, labor, materials or equipment under the Contract for the Contractor.

In claims against any Person indemnified under this Paragraph 28 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Paragraph 28 shall not be limited by a limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers compensation acts, disability benefit acts or other employee benefit acts.

29. **Assignment.** Except through a Subcontract, the Contractor shall not assign the Contract, or any part of the Contract, or delegate performance of the Contract (other than to its own work forces), without obtaining the prior written consent of the Procurement Commissioner and Operating Commissioner. The decision whether to consent to an assignment, the timing of consent (if any), and conditions to such consent, if any, shall each be at the City's sole discretion. Any consent to the assignment of any monies to be paid under the Contract shall not relieve the Contractor from the faithful performance of any of its obligations under the Contract or change any of the terms and conditions of the Contract. Any purported assignment in violation of this provision shall be void and of no effect. The City's consent to an assignment shall not release the assignor from any liability accrued or thereafter accruing under the Contract. Any assignment or purported assignment shall be in writing and shall contain an express assumption by the assignee of all liability accrued or thereafter accruing under the Contract. Consent by the City to any assignment shall not be deemed a course of conduct, dealing or performance with respect to any other assignment or proposed assignment. For purposes of this Paragraph 29, an assignment includes the transfer or acquisition of the Seller or the Contractor, or a controlling interest therein, through a corporate or other merger, and the appointment of a receiver or bankruptcy trustee, and the transfer of the Contract or the Contractor in any bankruptcy or other insolvency proceeding.

30. **Insurance.** Unless otherwise approved by the City's Risk Manager in writing, the Contractor shall, at its sole cost and expense, procure and maintain, or cause to be procured and maintained, in full force and effect until the Contractor completes the work under the Contract, the types and minimum limits of insurance specified below, covering the Contractor's performance of the work required under the Contract. The Contractor shall procure, or cause to be procured, all insurance from reputable insurers admitted to do business on a direct basis in the Commonwealth or otherwise acceptable to the City. All insurance herein, except Professional Liability insurance, shall be written on an "occurrence" basis and not a "claims-made" basis. In no event shall the Contractor perform any work under the Contract until the Contractor has delivered or caused to be delivered to the City's Office of Risk Management the required evidence of insurance coverages. If the Contractor fails to obtain or maintain the required insurance, the City shall have the right to treat such failure as a default under

the Contract and to exercise all appropriate rights and remedies. All insurance coverages shall provide for at least thirty (30) days prior written notice to be given to the City in the event coverage is materially changed, cancelled, or non-renewed. The City, its officers, employees, and agents, shall be named as additional insureds on the General Liability Insurance policy and, where applicable, the Builders Risk Insurance Policy. The Contractor shall also deliver or cause to be delivered to the City an endorsement stating that the coverage afforded the City and its officers, employees and agents, as additional insureds, will be primary to any other coverage available to them and that no act or omission of the City, its officers, employees or agents shall invalidate the coverage.

a. Workers' Compensation and Employers' Liability.

1. Workers' Compensation: Statutory limits
2. Employers' Liability: \$100,000 Each Accident – Bodily Injury by Accident; \$100,000 Each Employee – Bodily Injury by Disease; and \$500,000 Policy Limit – Bodily Injury by Disease.
3. Other states insurance including Pennsylvania.

b. Commercial General Liability Insurance.

1. Limit of liability: \$1,000,000 per occurrence combined single limit for bodily injury (including death) and property damage liability; \$1,000,000 advertising injury; \$2,000,000 general aggregate, and \$1,000,000 aggregate for products and completed operations. The City may require higher limits of liability if, in the City's sole discretion, the potential risk warrants.
2. Coverage: Premises operations; Blanket Contractual liability; Personal injury liability; Products and completed operations; Independent Contractors; Employees and volunteers as additional insureds; Cross liability; Broad form property damage (including completed operations); Explosion, collapse and underground hazards; and asbestos abatement liability Coverage (Note: Required for asbestos abatement projects only).

c. Automobile Liability.

1. Limit of Liability: \$1,000,000 per occurrence combined single limit for bodily injury (including death) and property damage liability.
2. Coverage: Owned, non-owned and hired vehicles.

d. Builders' Risk/Installation Floater Insurance.

1. When required: This insurance is required only when the total Contract price is \$500,000 or greater (Note: not for road and street work, unless required in the Supplementary Conditions, Technical Specifications, Standard Details and Specifications, and/or General Bidding and Contract Requirements).
2. Coverage: "All risks" in an amount equal to not less than the full replacement cost of the work under the Contract (meaning work in replacement which is of like kind and quality).
3. Period of Coverage: Anything herein to the contrary notwithstanding, the Builders' Risk Insurance shall be procured and maintained during the entire period of performance of the Contract until final acceptance of the work by the City.

Certificates of insurance evidencing the required coverages and additional insured endorsements must specifically reference the City contract Number for which they are being submitted. The original certificates of insurance shall be submitted to the Department and the Office of Risk Management at least ten (10) days before work is to commence and at least ten (10) days before each renewal date. The ten (10) day requirement for advance documentation of insurance coverage may be waived in situations where such waiver will benefit the City, but under no circumstances shall the Contractor actually begin work (or continue work, in the case of renewal) without providing the required proof of insurance and required endorsements. The City reserves the right to require the Contractor to furnish certified copies of the original policies of all insurance required under this Contract, including certified copies of all required endorsements, at any time upon ten (10) days prior written notice to the Contractor.

31. Proprietary Rights Indemnity. The Contractor shall indemnify, defend and hold harmless the City, and its officers, employees, and agents, from and against any and all losses, costs and expenses, including, but not limited to, litigation costs, settlement fees and expenses, and counsel fees and expenses, claims, suits, actions, damages, liability and expenses for or on account of the use of patented appliances, products, processes, constructions, designs, or methods, or the infringement of any patent, trademark, service mark, copyright, or trade secret rights of any third party, and the Contractor shall pay all royalties, charges and penalties which may become due or payable by reason of such use or infringement. Before the issuance of the Final Estimate, upon request by the Project Manager, the Operating Commissioner, or the Procurement Commissioner, the Contractor shall submit evidence of the full payment of such royalties, charges and penalties, or in lieu thereof, Contractor shall give such security, approved by the City Solicitor, as may in the opinion of the Project Manager, the Operating Commissioner, or the Procurement Commissioner, be necessary to indemnify, defend and hold harmless the City, its officers, employees, and agents, as aforesaid.

32. Default and Remedies.

a. It shall be a violation of the Contract for the Contractor to abandon the work under the Contract; to fail or refuse to prosecute the work with promptness and diligence; to unreasonably delay the work so that it may not be completed within the contract time; to fail or refuse to proceed with work under a Disputed Change Order; to fail or refuse to furnish suitable materials in place of any which may be rejected by the Project Manager as unsuitable as not being in accordance with the Contract Documents, or to refuse or neglect to furnish and supply a sufficient number of properly skilled workers and necessary equipment or either of them; to execute any of the work improperly, carelessly, or in bad faith; to fail or refuse to remove any of the work which, in the opinion of the Project Manager, is defective and unsuitable and not in accordance with the Contract Documents, and to replace it with work that is in accordance with the Contract Documents; to cause or permit to occur an Event of Insolvency with respect to the Contractor; or to otherwise violate any of the terms, conditions, and provisions of the Contract. In the event of a violation of Contract, the Operating Commissioner may notify the Contractor and its surety in writing to require that each remedy the Contractor's violation of the Contract and require the Contractor to comply with the terms, conditions, and provisions of the Contract which it has violated or is violating. The failure of the City to promptly notify the Contractor of a violation of Contract shall not constitute an acceptance by the City of work which is performed or installed in violation of the Contract.

b. If the Contractor shall fail to cure or remedy, or diligently commence to cure or remedy, the violation of the Contract, as described in the notice specified above, within five (5) days after the receipt of said notice, or within twenty four (24) hours after receipt of said notice when, in the opinion of the Operating Commissioner, immediate action is necessary to safeguard life or property, or within some other period of time specified in the notice, the Operating Commissioner shall thereupon notify the Procurement Commissioner, who shall have the right to declare the Contractor in default of the Contract, and to notify the Contractor to discontinue the work or any part thereof under the Contract, and to call upon the surety to carry out its obligations under the performance bond posted for the Contract.

c. If the surety fails to abide by the terms of the performance bond or if the surety shall deny liability to the City under the performance bond, the Procurement Commissioner shall have the right to declare the surety in default under the performance bond and, at his or her sole option, shall also have the right:

1. To terminate the work under the Contract, to maintain conditions, to obtain Quotes (if circumstances will allow) for all or any portion of the work, and to enter into a new contract to complete the work of the original Contract; or

2. In case of an emergency, including, but not limited to, danger to life or property, or serious interference with traffic, to terminate any and all of the work under the Contract, and to then and there secure in the open market, from any Person, at the then current market prices the materials of the quality and quantity required, the necessary workers and mechanics, and the required equipment to complete the Contract.

d. Upon default by the Contractor as herein set forth, all moneys due and owing to the Contractor upon estimates, retainage, or otherwise, materials delivered, materials built into the work, and the Contractor's plant (including tools, appliances, and equipment on the premises intended for use in the performance of the Contract), shall become the property of the City for use in the completion of the work under the Contract, and the City shall have resort thereto to the extent necessary to maintain and complete the work and reimburse the City for its outlays and expenditures.

e. In case of such default by the Contractor the remedies herein provided shall be in addition to and not in substitution of the rights and remedies which would otherwise be vested in the City by statute, at law or in equity, all of which rights and remedies are specifically reserved to the City. In addition, upon default by the Contractor, the Procurement Commissioner shall have the right to secure from any Person the materials, equipment, and labor necessary and required for the proper completion of the Contract. In such event, the Contractor shall pay the City, upon demand, the difference between the cost paid by the City for such materials, equipment and labor and the price or prices set forth in the Contract, together with all costs and expenses incident to the same and incurred by the City. Upon default by the Contractor, the Procurement Commissioner, in his or her sole discretion, shall also have the right, to terminate the Contract and to secure from any Person the materials, equipment, and labor necessary and required for the proper completion of the work. In such event, the Contractor shall pay the City, upon demand, the difference between the price or prices set forth in the Contract and the price or prices which may be paid upon such termination and completion of the work, together with all costs and expenses incident to such re-advertisement. In the exercise of either of these remedies, the City shall further have the right to a set-off against any monies which may be due or may thereafter become due the Contractor under the Contract or any other contract between the City and the Contractor. If the Procurement Commissioner shall secure materials, equipment, and labor to complete the work under the Contract, or if the Procurement Commissioner shall terminate this Contract, the Procurement Commissioner shall have the right to take possession, for the purpose of completing the work under the Contract, of all materials, tools, appliances, and equipment on the Project site, intended for use in the performance of the Contract. The Contractor hereby assigns to the City (and each Subcontract shall require each Subcontractor to assign) all right, title, and interest of the Contractor in and to such materials, tools, appliances, and equipment. The failure of the City to exercise any of the remedies herein provided shall not preclude the resort by the City to any other remedy available to the City arising out of the Contractor's default.

f. The use of any specific remedy herein provided shall not bar subsequent or concurrent resort to any other remedy available to the City at law or in equity, for the recovery of damages or otherwise, on account of such default, or in the event of any other default by the Contractor.

g. The Contractor and its surety shall pay to the City on demand, all loss, expense, cost or damage suffered or incurred by the City by reason of any default.

33. Subcontracts. Within fifteen (15) days after execution of the Contract, the Contractor shall submit in writing to the Project Manager the names of all Subcontractors who will perform any work on the Contract or who will supply any materials or equipment for the Contract. All proposed Subcontractors who have not been pre-approved by the Department may be approved by the Project Manager if in his or her opinion such proposed Subcontractor is reliable, Responsible and competent to perform the work in compliance with the Contract Documents. The City, acting in its sole discretion, reserves the right to reject any Subcontractor. The City shall have no liability to the Contractor for additional compensation under the Contract, or otherwise, in connection with the substitution of a Subcontractor for any proposed subcontractor rejected by the City pursuant to this Paragraph 33. The Contractor shall be as fully responsible to the City for the acts and omissions of its

Subcontractors and Persons either directly or indirectly employed by them, as it is for the acts and omissions of the Contractor and Persons directly or indirectly employed by the Contractor. The City and the Contractor specifically understand and intend, and acknowledge and agree that no Subcontractor utilized by the Contractor shall have any right or claim against the City or the Department to any monies due and owing to the Contractor for the performance of work under the Contract. Each Subcontract for any portion of the work is hereby assigned to the City provided that (a) such assignment is effective only after termination of the Contract by the City and only for a Subcontract which the City, acting in its sole discretion, accepts by issuing notice to such Subcontractor and to the Contractor; and (b) such assignment, if exercised, is subject to the prior rights of the surety, if any, obligated under a bond relating to this Contract. The exercise of the foregoing option for an assignment shall be in the City's sole discretion, the City having no duty or obligation to the Contractor, such Subcontractor or any surety, to exercise or decline to exercise the foregoing option for an assignment. The Contractor shall incorporate the foregoing option for an assignment into each Subcontract for any portion of the work.

34. Permits and Licenses. Unless otherwise noted elsewhere, the Contractor shall obtain all permits and licenses required by the City or pursuant to Applicable Law in connection with the performance of all or any part of the work under the Contract, unless otherwise specifically directed. The Contractor will be required to pay the current fee for such permits and licenses required in connection with all or any portion of the work under the Contract, including any permits and licenses required in connection with any equipment, system or component forming part of the work.

35. Co-operation and Coordination with other Contractors.

a. The Contractor shall have the duty to co-operate and coordinate with any other contractors on other work which is being performed concurrently on or adjacent to the Project site, including specifically PGW, or its contractors or any other non-City utilities or authorities, and shall afford reasonable facilities and access to them. The Project Manager will decide any matters in dispute as to the performance of the work, including access to the Project site and priority of performance on either side of any division line between contiguous sections of the Project site where the Contractor and another contractor each work.

b. Where the work or any portion thereof is performed by the Contractor as part of a "multiple-prime" project, or in conjunction or combination with other "prime" contractors, the Contractor shall have the duty to cooperate and coordinate its work with the work of each of the other prime contractors. The Contractor shall further have a duty not to delay, disrupt, interfere with, or otherwise retard the progress of the work of any of the other prime contractors.

c. It is expressly understood by the Contractor that, on "multiple-prime" projects, the City relies primarily, but not exclusively, upon the organization, management, skill, cooperation and efficiency of the "Contractor for general construction" (unless a different Contractor is otherwise designated in the General Bidding and Contract Requirements or the Technical Specifications) to oversee, coordinate, and plan the work of all the other prime contractors, including, but not limited to, the prime contractors for electrical, mechanical, HVAC, and plumbing work, so as to complete the work under all of the prime contracts in a timely and efficient manner. The Contractor therefore expressly recognizes that the "Contractor for general construction" shall be the coordinating Contractor for all aspects of the multiple-prime contract work, including the scheduling of all such work. The Contractor shall have an explicit duty on "multiple-prime" projects to rely primarily upon the organization, management, skill, cooperation and efficiency of the "Contractor for general construction" to oversee, coordinate, and plan its work with the work of all of the other prime contractors, so as to ensure completion of the work under all of the contracts, including the Contract, in a timely and efficient manner and without disruption and interference. It is expressly understood by the Contractor, however, that the City is also relying upon the organization, management, skill, cooperation and efficiency of the Contractor so as to ensure completion of the work under the Contract in a timely and efficient manner and without disruption and interference.

d. It is expressly understood by the Contractor that time is of the essence of this Contract. The Contractor agrees to diligently prosecute its work in coordination and cooperation with the work of the other prime contractors and under the coordination of the "Contractor for general construction," without delay,

interference, or disruption, so as to ensure the completion of the Contract work in a timely and efficient manner and in conformity with the schedule approved by the City under the Contract. In the event that the Contractor shall unnecessarily delay, disrupt, or interfere with the work of any of the other prime contractors, the Contractor shall be liable for the payment of all costs and expenses incurred by such prime contractor or prime contractors on account of such delay, disruption, or interference. The Contractor accordingly authorizes the City to deduct the amount of such costs and expenses from any monies due and owing to the Contractor under the Contract. The Contractor shall further assume all liability, financial or otherwise, in connection with its Contract and shall protect, defend, and hold harmless the City from and against any and all damages or claims that may arise because of inconvenience, delay, interference, disruption, or loss experienced by the Contractor because of the presence and operations of other prime contractors working within the limits of the same multiple-prime project.

e. The provisions of this Paragraph 35 shall be read in conjunction with any provisions in the Technical Specifications, the Proposal, and the Plans, and, notwithstanding Paragraph 95 of these Standard Contract Requirements, the provisions of this Paragraph 35 shall take precedence over any other provisions in the Technical Specifications respecting the "coordination and cooperation" among prime contractors on a "multiple-prime" project, except where such other provisions shall impose greater duties upon the Contractor for coordination and cooperation.

36. Clean-up of Project Site. The Contractor and its Subcontractors shall remove all rubbish or refuse and all unused materials and tools from the Project site daily, if required by the Project Manager, and as the work progresses the Contractor shall carefully clean and keep the Project site clean from such rubbish and refuse. The Contractor shall furnish to the Project Manager upon request all documentation regarding the proper disposal of all rubbish, soil, refuse, and other debris. Before the City will approve the completion of the work under the Contract, the Project site and any other place or places affected by the work shall be thoroughly cleared of all construction and other debris and dust, and left clean, free from debris, construction plant, buildings, and materials; fit for travel or other proper use; and in as good condition as existed before the work was begun. The Contractor shall resod or plant anew any grass plot or plots disturbed, and replace any shrubbery destroyed. Structures shall be broom clean, free from stains, spots or other blemishes, and ready for use, and all glass shall be washed. The clean-up work shall be governed by the record of existing conditions made and filed with the Department prior to the commencement of work.

37. Maintenance after Completion and Contractor's Guarantee.

a. The Contractor shall guarantee the work of the Contract against defects in materials and workmanship for a period of one (1) year from the date of completion and acceptance of the work by the City, unless a longer period is specified, and shall guarantee and warrant that all equipment shall perform in accordance with the specifications of the manufacturer and in accordance with the Technical Specifications. When individual items of the Contract, including equipment, are formally accepted in writing by the Project Manager and used or operated by the City prior to the completion of the total work under the Contract, the period of guarantee for such items shall be calculated from the date of final written acceptance of such items, provided, however, that the item of work and equipment is used or operated by the City for a period of ninety (90) consecutive days following the date of acceptance without the occurrence of any defects, breakdowns, or faulty operation. Paving, including curbs and footway, shall be similarly guaranteed for a period of five (5) years from the date of completion and acceptance of the work by the City.

b. If, within such one (1) year or five (5) year period of guarantee, any of the work shall prove to be defective either in materials or workmanship, or if damage occurs by settlement of the backfill placed under this Contract, or if any part or parts of any equipment furnished shall prove to be inadequate, insufficient, or defective, either in design, materials, or workmanship, the Contractor shall immediately, upon demand of the Project Manager (whose decision as to such inadequacy, insufficiency, or defectiveness shall be binding and conclusive upon the Parties hereto), repair and replace the same in accordance with the Plans and Technical Specifications, and shall repair and replace any damage to other parts or structures at the Contractor's sole cost and expense, without cost or expense to the City, to the approval and satisfaction of the Project Manager.

c. Should the Contractor or its sureties fail to comply with the orders of the Project Manager to replace or repair defective materials, workmanship, or equipment as aforesaid within the time specified in

subparagraph (a) above, the Operating Commissioner shall notify the Procurement Commissioner, who shall have the right to declare the Contractor or its surety, or both, in default and to proceed with the correction of the defect in accordance with the methods provided herein.

38. Access to Accounting Records. The Contractor shall certify that all materials, equipment, and labor charged to the City are accounted for and shall keep such full and detailed accounts as may be necessary for proper financial management under this Contract. The Contractor shall retain, and shall provide the City and its representatives access to, all records, books of account, correspondence, instructions, Shop Drawings, receipts, vouchers, memoranda, and similar data and documentation pertaining to the Contract for a period of five (5) years following final payment, or earlier termination of the Contract, or for such longer period as may be required by law; however, if any litigation, claim or audit is commenced prior to expiration of said five (5) year period, then the records shall be retained until all litigation, claims or audit findings have been completely terminated or resolved, without right of further appeal, or if Applicable Law requires a longer period, then the records shall be retained for such longer period. From time to time during the performance of the work under the Contract, and for a period of five (5) years after the completion of the work under the Contract, the City may audit any and all aspects of the Contractor's performance under the Contract, including but not limited to its billings and invoices. Representatives, agents or contractors of the City, including the Department, or other authorized City representatives including, without limitation, the City Controller may conduct audits. If requested by the City, the Contractor shall submit to the City all vouchers or invoices presented for payment pursuant to the Contract, all cancelled checks, work papers, books, records and accounts upon which the vouchers or invoices are based, and any and all documentation and justification in support of expenditures or fees incurred pursuant to the Contract. All books, invoices, vouchers, records, reports, cancelled checks and other materials shall be subject to periodic review or audit by the City. All work, equipment, materials, systems, subassemblies, tools appliances and plant shall be subject to inspection and review by City, federal and state representatives, as may be applicable, or their designees, at the offices of the Contractor in the City, or in another location with the City's consent. The Contractor shall cooperate with all City, state and federal inspections and reviews conducted in accordance with the provisions of the Contract. Such inspection and review of the Contractor's work hereunder shall be in the sole discretion of the inspecting or reviewing entity. Such inspection or review may include, without limitation, review of staffing ratios and job descriptions, and meetings with any of the Contractor's staff who are either directly or indirectly involved in providing all or any portion of the work hereunder. The Contractor shall make available, within the City at reasonable times during the performance of the work hereunder and for the period set forth above in this Paragraph 38, all records pertaining to the Contract for the purpose of inspection, audit or reproduction by any authorized representative (including any agent or contractor and the City Controller) of the City, the Commonwealth Auditor General, and any other federal or state auditors, as may be applicable, at no additional cost to the City.

39. Sales and Use Tax; Federal Excise Tax.

a. The City is not subject to federal, state or local sales or use tax or federal excise tax. Contractor hereby assigns to City all of its right, title and interest in any sales or use tax which may be refunded as a result or the purchase of any materials in connection with the Contract, and the Contractor, unless directed by the City, shall not file a claim for any sales or use tax refund subject to this assignment. The Contractor authorizes the City, or its agent, in its own name or in the name of the Contractor, to file a claim for a refund of any sales or use tax subject to this assignment. To the extent it may be applicable to the work under this Contract, the Contractor covenants and agrees that it shall not bill the City for or otherwise pass-through to the City for payment any Federal Excise Tax paid in connection with the work under this Contract; in consideration of the Contractor's foregoing covenant, the City hereby consents to any filing by the Contractor for a refund of any Federal Excise Tax paid in connection with the work under this Contract.

b. The Contractor agrees to include the above referenced Paragraph in any Subcontracts with Subcontractors.

D. ADMINISTRATION, MEASUREMENT, AND PAYMENT

40. Status and Authority of the Project Manager. The Project Manager shall be responsible for the general direction of the work to be performed under the Contract, the interpretation of the Plans and General Bidding and Contract Requirements, and the Technical Specifications, the ordering of additions to or deductions from the work, and the determination of procedure. The Project Manager shall give all orders and directions contemplated under the Contract. The Project Manager shall in all cases determine the amount, quality, acceptability, and fitness of the several kinds of work and materials which are to be paid for under the Contract, and shall have authority and sole discretion to reject all work and materials which in his or her opinion do not conform to the requirements of the Contract. The Project Manager shall determine all other questions that may arise in relation to the execution of the work and shall have the authority to halt the work whenever such action may be necessary to secure the safe and proper execution of the Contract. The Project Manager shall adjust and decide any differences or conflicts that may arise between the Contractor and other prime contractors for the performance of concurrent work. The provisions of this Paragraph are not intended to supersede or limit the provisions of Paragraph 35.

41. Plans and Technical Specifications. The Plans, with all notes thereon, and the Technical Specifications are intended to be consistent with one another and of equal force and effect, and in the event the Contractor should believe that an apparent discrepancy may exist between the Plans and the Technical Specifications, the Contractor shall bring such apparent discrepancy to the attention of the Project Manager, who will interpret their meaning. The Plans give general dimensions and sizes, and such details as are required to cover special features. Figures shall have preference over scale in reading dimensions. The Contractor shall maintain at the site of the work for use of the Project Manager or Inspector one record copy of the Plans and Technical Specifications, and Change Orders and other Contract modifications, and one record copy of all approved Shop Drawings and other submittals, including the construction schedule.

42. Shop Drawings and Working Drawings. The Contractor shall prepare and submit to the Department or the Project Manager, as specified in the Technical Specifications or as required by the Project Manager, all Shop Drawings and Working Drawings, which shall include all details required to carry out the City's Plans and Technical Specifications. By approving and preparing Shop Drawings and other similar submittals, the Contractor represents that it has determined and verified materials, field measurements, and field construction criteria related thereto and has checked and coordinated the information contained within such Shop Drawings and submittals with the requirements of the Contract Documents. The Contractor shall not proceed with any portion of the work until the Shop Drawings or other submittal which governs the work has been approved. The Shop or Working Drawings shall conform to standards specified by the Department. Upon correction, if found necessary, and after approval, the Contractor shall furnish three (3) or more prints of the Shop Drawings or Working Drawings for construction purposes. After the completion of the work, the documents shall be delivered to and become the sole property of the City for its unrestricted use. The approval of Shop Drawings shall not relieve the Contractor of responsibility for the proper fit of the work, nor for its completion pursuant the Contract.

43. Lines and Grades – City Datum. Vertical dimensions are given in United States standard feet and fractions thereof. Unless otherwise stated, elevations preceded by a plus (+) or a minus (-) sign refer respectively to distances above or below the established City Datum, which is two and one quarter (2.25) feet above mean high water in the Delaware River at Chestnut Street, Philadelphia. Dimensions locating buildings and structures shall be verified and checked in the field by the Contractor before proceeding with construction details affected thereby. Curb line and paving stakes giving the requisite basic data will be set by the City. The price for the setting of these lines shall be at the predetermined rate as set by the Board of Surveyors and made part of the public record or as stated in the Contract Documents. The Contractor will be held responsible for the proper and correct extensions of measurements from such data, and the correctness of work based thereon. The Contractor will be held responsible for the preservation of stakes, benchmarks, and survey monuments, until authorized to remove them. Should any stakes be disturbed, the cost of replacing them will be charged against the Contractor at the then current fee as determined by the City's district surveyor and regulator, to be deducted from the Final Estimate. All survey monuments or benchmarks moved, covered or uprooted in the course of performance of the work of this Contract will be reset by the City at the expense of the Contractor, at the then current fee per monument or benchmark, as determined by the City's district surveyor and regulator. Said cost shall be deducted

from the Final Estimate. The Contractor shall provide reasonable and necessary opportunities and facilities for setting points and taking measurements. The Contractor shall not proceed until it has made timely demand upon the District surveyor and regulator for, and has received from him or her, such points and from the resident engineer such instructions as may be necessary for the progress of the work. Any work improperly done without lines or levels or instructions shall be removed and replaced by the Contractor at its own expense. Failure to do so may be considered a default under the Contract.

44. Contract Amount. The total amount which is to be paid by the City to the Contractor for the work performed and materials supplied under the Contract shall in no event exceed the sum of the Contractor's Quote price, plus a contingency fund of approximately ten percent (10%) of the Contractor's Quote price (to be specified by the Procurement Department upon the award of the Contract), which fund is intended to cover additional compensation which may be due to the Contractor as a result of Change Orders issued pursuant to Paragraphs 48 and 49 below, as such sum may be increased or reduced pursuant to a Change Order or Change Orders, or pursuant to an Amendment. The City shall specify the contract amount in the Notice of Contract Award. The Contractor acknowledges that the City's liability under the Contract shall be limited by the amounts which shall have been or may be from time to time appropriated by City Council. The City reserves the right to authorize the Contractor to commence work prior to appropriation of the total amount of the Contract, in which case the City shall give the Contractor notice thereof, and the City shall not be liable hereunder in any amount greater than that appropriated therefor by City Council. Payments will only be made payable to the Contractor as shown on the purchase order; the invoice must reflect this same Contractor name as the entity to "pay to". For any bids awarded for work to begin on or after July 1, 2019, the City has instituted a policy of making all of its payments through electronic deposits into the awarded Contractor's designated bank account. Before any City payments are made, the Contractor will be required to supply the City with the information necessary for the City to initiate electronic payments by completing one of the electronic payment processing enrollment forms available on the City's vendor portal at <https://secure.phila.gov/finance/vendorpayments>. Applicants awarded a contract before July 1, 2019 are encouraged to complete one of the electronic payment processing enrollment forms before the conversion to electronic payments becomes mandatory. The City intends to stop issuing paper checks. The foregoing notwithstanding, nothing herein shall be construed to limit the City's ability to make payments by assessment bills as provided in paragraph 57, below.

45. Scope of Payments. Payment for the cost of all work, labor, materials, and services required to complete the work of the Contract as shown in the Plans, Technical Specifications, Standard Details and Specifications, or as otherwise specified (except where payment is otherwise specifically provided), will be made at the unit prices or lump sum prices contained in the Quote. The prices contained in the Quote shall each cover the supply and installation, in a good, sound, substantial and workmanlike manner, of everything required for and incidental to the full completion of the work of that item as called for by the Plans, Technical Specifications, Standard Details and Specifications, or as otherwise specified, including its proportionate share of the expense of all plants, tools, and equipment required; the cost of all bonds, fees, and permits; of all administration, superintendence, and insurance; and of any loss or damages arising out of the nature of the work, from the action of the elements, from any unforeseen difficulties encountered in the prosecution of the work, and from risks of all kinds connected with the work, except as otherwise specifically provided in the Contract Documents.

46. Quantities are Approximate. When quantities of the various classes or components of work and materials required under the Contract are stated in the Bid Solicitation or elsewhere, such quantities are estimated and approximate, except where otherwise stated to the contrary. When stated in the Bid Solicitation or a Seller's Proposal, they are given only for the purpose of comparing the Quotes on a uniform basis. The City does not guarantee that such estimated quantities will correspond to the actual quantities ultimately required to complete the work, and the City will not allow any claim for damages, for anticipated profit, or for loss of profit of the Contractor in the event that actual quantities used to complete the work under the Contract vary from the estimates in the Bid Solicitation. The Department reserves the right to increase or decrease the quantities or to entirely omit any of the items as contained in the Bid Solicitation to the extent found necessary by the Project Manager, provided that the aggregate cost of the work performed is within the limit of funds fixed in the Contract.

47. Changes.

a. If changes to any portion of the work or the requirements of the Plans, Technical Specifications or Standard Details and Specifications are deemed necessary by the Project Manager, in order to carry out and complete the work covered by the Contract Documents, the Project Manager may by notice to the Contractor order alterations to or changes in the work covered by the Contract Documents, and the Contractor shall promptly comply with such orders. No changes or alterations to the work shall be made or performed by the Contractor except upon prior written orders from the Project Manager authorizing the change and a Change Order fixing the additional compensation or deduction therefor, except where the order authorizing the change states that the method of compensation or deduction shall be determined at a later date.

b. Where the Project Manager pursuant to Paragraph 47(a) orders additions to or deductions from the amount of work called for by the Plans or Technical Specifications, or where changes are ordered in writing in the design of the work or the requirements of the Plans or Technical Specifications which increase or reduce the cost of the work to the Contractor, adjustment in compensation therefor shall be made to cover the additional work required or the work reduced, in accordance with a written order of the Project Manager, as follows:

1. For work for which applicable unit prices are bid in the Bid Solicitation, payment or deduction shall be made in accordance with the prices bid. When the final quantity of work performed on a unit price bid item differs substantially (twenty-five percent (25%) or more) from the Bid Solicitation quantity, the Project Manager will review the price contained in the Quote and the actual work performed by the Contractor and may, in his or her sole discretion, determine if an adjustment is appropriate. Where the Project Manager deems an adjustment appropriate, the Contractor shall:

i. substantiate that the Quote unit price remains fair and reasonable despite the substantial change in quantity; or

ii. in the case of substantial underrun compared to the previously estimated quantity, negotiate a revised unit price for all the work actually completed; or

iii. in the case of substantial overage compared to the previously estimated quantity, negotiate a revised unit price for that portion of the actual work completed in excess of one hundred twenty-five (125%) of the Quote quantity.

This provision shall not be deemed, however, to vest in the Contractor any rights to any adjustment.

2. For work not covered by the unit prices contained in the Quote, payment or deduction shall be made at the applicable contingent prices named for work.

3. For work for which neither the unit prices bid nor the prices for contingent work are applicable, payment or deduction shall be made in accordance with Paragraphs 48 and 49 below.

48. Change Orders by Agreement.

a. If alterations or changes increase the cost of the work to the Contractor, additional compensation will be allowed by the City, based upon unit prices, contingent prices, or by a detailed cost proposal submitted by the Contractor to the Project Manager, negotiated by the Department and agreed to by the Contractor, or by Force Account, in accordance with Paragraph 51 below. The cost proposal shall detail the costs of materials, labor, overhead and profit, as well as any proposed changes to the Contract time. If such alterations or changes reduce the cost of the work to the Contractor, the amount of such reduction may be deducted by the City, and any such reduction may be based upon unit prices contained in the Quote for the performance of the deleted items of work, upon any Subcontract already entered into by the Contractor for the performance of the deleted item of work, or upon a detailed cost proposal submitted by the Contractor to the Project Manager and negotiated by the Department. Credit Change Orders will include the same mark-ups as chargeable Change Orders. The Contractor shall submit its cost proposal for the change or alteration within twenty (20) days after the Project Manager gives notification to the Contractor of the intended change or

alteration. Thereafter, a formal Change Order will be executed and signed by the Department reflecting the change or alteration and the additional cost or reduction negotiated by both Parties.

b. A Change Order negotiated and agreed to by the Contractor and the City and then executed as a Change Order by the City and the Contractor shall be deemed to cover all of the Contractor's costs associated with the change or alteration to the work, as reflected in the Change Order, including all costs and expenses incurred by the Contractor for time, material, labor, and extended or field office or home office overhead. Any Contract time extension granted by the City for the Change Order shall be the sole time extension granted for the change or alteration and for which Contractor is entitled, and no other time extension shall be granted by the City in connection with the work reflected in such Change Order. No loss of profit on account of any changes or alterations to the work or on account of work not executed or performed by the Contractor will be allowed, except that the Contractor may be entitled to an extension of time on account of changes or alterations to the work, provided that the Contractor satisfies the requirements of Paragraph 25 above.

c. The Contractor agrees and acknowledges that after a Change Order is negotiated and agreed to by the Parties and then executed by the City, the Change Order shall operate as a full and complete waiver and release of any and all claims of the Contractor related to or arising out of such change or alteration, whether such change or alteration is considered individually or cumulatively, including, but not limited to, any claim by the Contractor for extended home office overhead, extended field office overhead, time-impact costs, schedule delay costs, acceleration costs, compression costs, loss of productivity costs, extra work, additional work, and interference costs, or any combination of such costs.

49. Disputed Change Orders. If, after submission of a cost proposal, the Department and the Contractor cannot agree upon a price within a reasonable amount of time, or if the Contractor disputes the applicability of unit prices or contingent prices, the Project Manager may direct the Contractor to perform or complete the extra or additional work notwithstanding that there is no agreement between the Parties as to price, and the Contractor shall proceed to perform the work so as to avoid any delay or interference to the progress of its work. In all such cases, the Contractor shall promptly comply and maintain proper force account time sheets and records, in accordance with Paragraph 51 below. The Project Manager shall also process a Change Order in an amount that he or she determines to be reasonable, necessary and appropriate. If the Contractor does not agree with the amount processed by this Disputed Change Order, the Contractor must notify the Project Manager within ten (10) days of issuance of the Disputed Change Order that it is proceeding under protest and that it reserves the right to a claim for the cost of the disputed work. In all cases of Disputed Change Orders which are protested by the Contractor, the Contractor shall submit to the Project Manager, within five (5) days after completion of the work, a detailed cost proposal which shall detail the costs of materials, labor, overhead and profit, actually expended by the Contractor for the work, as well as any changes to the Contract time.

50. Disputed Work. If the Contractor is of the opinion that any work required or ordered by the Project Manager violates the terms and provisions of the Contract or is not called for under the Contract Documents, the Contractor shall promptly notify the Project Manager, in writing, of its contentions with respect thereto and shall request a final determination thereof. If the Project Manager determines that the work in question is work required under the Contract Documents and is not "extra" work, or that the order complained of is proper, the Project Manager will direct the Contractor to proceed with the work in question. In all such cases, the Contractor shall promptly comply and maintain proper force account time sheets and records, in accordance with Paragraph 51 below. In order to preserve its right to claim compensation for such disputed work or damages resulting from compliance with such an order, the Contractor must notify the Project Manager in writing, within five (5) days of receiving notice from the Project Manager of this final determination, that the work is being performed or that the determination and direction is being complied with under protest. Furthermore, in order to claim an adjustment in the Contract price for work performed under protest, the Contractor must submit in writing to the Project Manager, within five (5) days after completion of the work in question, the nature and precise amount of compensation sought for the work, as well as copies of all force account time sheets and records compiled by the Contractor for the work. Failure of the Contractor to so notify the Project Manager of both its protest and its claim for compensation shall be deemed as a full and final release and waiver of any claim for extra compensation or damages therefor.

51. Force Account.

a. Payment under Force Account will be for the reasonable, actual and necessary direct cost of the work in accordance with the orders of the Project Manager, and in addition thereto the percentage of such cost hereafter stated. "Reasonable, actual and necessary direct cost" shall be deemed to include the following:

1. Wages of forepersons, equipment operators and skilled and semi-skilled and common laborers directly assigned to the specific operation at actual payroll rate of wages per hour and actual fringe benefits paid, labor taxes as established by law, and workers compensation and employers liability insurance, for each hour that such employees are actually engaged in the performance of the authorized work and, if directed, overtime, as provided by existing laws and regulations, as well as other insurance premium expenses, including but not limited to premiums for general liability insurance, where the such insurance premium expenses are a direct function of the foregoing wages, but only to the extent such insurance premium expenses derive solely from the foregoing wages.

2. The reasonable actual expenditure for materials (including sales tax paid, if applicable, and except as provided to the contrary in Paragraph 39 above), used up or incorporated in the work.

3. For any equipment, including machinery and trucks, mutually deemed as necessary for the performance of the work, the Project Manager shall allow the Contractor reasonable rental rates, computed as follows: (i) for all equipment rented, the Contractor will be reimbursed the reasonable actual costs based upon the receipts provided, plus an allowance for operating cost as provided in subparagraph (ii) of this subparagraph 51(a)(3).; (ii) for all equipment owned, including pumps and compressors, a reasonable hourly rate will be determined by using the reasonable monthly rental rates taken from the current edition (with updated supplements) of the Rental Rate Blue Book for Construction Equipment and dividing it by one hundred seventy-six (176); an allowance may be made for operating costs for each and every hour the machinery or equipment is actually operated in accordance with the rates listed in the aforesaid rental book; if the machinery or equipment is required to be at the work site, but is not operated, the Contractor may be compensated at the reasonable hourly rental rate, exclusive of operating costs. The Contractor will be allowed to add to the above rates the reasonable predominate areas adjustment percentage for the state as shown on the area adjustment map contained in the Rental Rate Blue Book for Construction equipment. In the case of any machinery or equipment not referred to in the Rental Rate Blue Book for Construction Equipment, a monthly rental rate shall be computed on the basis of an amount that is the equivalent of six percent (6%) of the manufacturer's list price for the sale (new) of such equipment; the hourly rate in such cases will be determined by dividing the monthly rate by one hundred sixty (160) when actually operating, and by one hundred seventy-six (176) when at the Project site, but not operating, to which no percentage shall be added. The above rates shall be for the time such equipment is required on the Project site for the performance of force account work exclusively.

b. To the reasonable, actual and necessary direct cost of the work done under Force Account as noted above, twenty percent (20%) will be added to the expenditure for labor and fifteen percent (15%) will be added to the expenditure for materials, excluding sales tax. No additions will be allowed for equipment costs, whether such equipment is rental or Contractor-owned. These percentages shall be deemed to cover the cost of heat, light, bond or bonds, use and up keep of small hand tools, administration, engineering, field and office superintendence, home office and site overhead, extended general conditions, non-payroll taxes, insurance (including general liability and non-payroll insurance), all loss, damage, risk and expenses incidental to the work and profit. The Contractor shall have no claim in excess of the above, such payments being in full compensation for the performance of such work and the furnishing of such materials and for all expense in connection therewith and incidental thereto.

c. Should the Contractor subcontract any portion of the work, with the prior written approval of the Project Manager, payment for that portion will be computed as the reasonable, actual and necessary costs defined above (exclusive of any profit to the Subcontractors), plus the percentages allowed, plus eight percent (8%) mark-up of the total paid to the Subcontractor. No additional percentage mark-up by or for any additional tiers of Subcontractors will be allowed.

d. The Contractor shall submit daily a statement in duplicate of work done on a Force Account

basis within twenty-four (24) hours of the time the work is done, and representatives of the Project Manager and the Contractor shall make daily comparison of the time and rates of labor, material used, etc., as shown therein. After correction, if necessary, this comparison shall be signed by each and filed with the Project Manager and the Contractor. The Contractor shall submit to the Project Manager monthly, prior to each Current Estimate, four (4) copies of an itemized statement of the amount and value of labor and materials furnished, accompanied by the original invoices for work performed under a Subcontract, and by an affidavit certifying the correctness of such statement. The Project Manager shall have access to any books, vouchers, time sheets, records, and memoranda showing the labor employed and the materials actually used on the specific operation and the actual net cost thereof, for the Contractor and any Subcontractor(s). Daily force account time sheets must include the name and job titles of employees, actual starting and quitting times, and the total number of hours worked each day by each employee.

e. Work done under Force Account shall be subject to all of the requirements of the Contract. It shall be prosecuted in an orderly, reasonable and economical way, and the prices paid for labor and material and the method of prosecuting the work shall be subject to the approval of the Project Manager. Neither work nor material will be paid for under Force Account unless it is ordered as such in writing.

52. Lump Sum Bid Breakdown; Applications for Payment. In order to assist the Project Manager in estimating approximate quantities and the value of the work performed, the Contractor shall furnish in writing to the Project Manager within thirty (30) days after the issuance of the Notice to Proceed, an apportionment of any lump sum Quote (the "Lump Sum Bid Breakdown") showing in detail its component parts. The Lump Sum Bid Breakdown shall be subject to the approval of the Project Manager. In addition, the Contractor shall furnish within sixty (60) days of the commencement of the work, and thereafter every thirty (30) days until Substantial Completion of the work, an application for payment (the "Application for Payment") which shall set forth in detail the approximate quantities and value of the work performed as of the date of the Application for Payment in conformity with the approved Lump Sum Bid Breakdown. The Contractor shall certify that the information set forth in the Application for Payment is true, correct and complete, and accurately and fairly represents the work performed to date by the Contractor in accordance with the Contract Documents.

53. Current Estimates.

a. The Project Manager, after receipt of an Application for Payment, shall prepare a current estimate (the "Current Estimate") of the approximate quantities and value of the work performed at intervals of about one (1) month during the progress of the work, except that the first Current Estimate may be prepared within sixty (60) days of the commencement of work under the Contract, provided at all times, however, that the Contractor is in compliance with all of the requirements of the Contract and the value of the work done during the time covered by the Current Estimate exceeds the amount of fifteen hundred dollars (\$1,500). The City shall make payments to the Contractor on the basis of the Current Estimates, when approved by the Project Manager. The City shall have no obligation to pay interest on the amount due under any Current Estimate, any provision of Applicable Law to the contrary notwithstanding. Payments on uncompleted items will be for the value of work done and materials furnished, as apportioned by the Project Manager. The Current Estimates are approximate only, and subject to correction in the Final Estimate. The payment of a Current Estimate shall not bind the City to the acceptance of any materials furnished or work performed by the Contractor. The City shall not be precluded from later contesting a Current Estimate and shall enjoy every legal defense, or other claim or counter-claim, in recoupment or otherwise, by reason of the character, quality, and quantity of the work and materials covered by a Current Estimate, notwithstanding payment of a Current Estimate.

b. The City may withhold payment for deficient items according to the terms of the Contract. The City shall pay the Contractor according to the provisions of 62 Pa. C.S.A. §§ 3931 et seq., as amended, Subchapter D, Prompt Payment Schedules, for all other items which appear on the Application for Payment and have been satisfactorily completed. If the City withholds payment from the Contractor for a deficient item, it shall notify the Contractor of the deficient item within sixty (60) calendar days of the date that the City received the Application for Payment.

c. Subject to the provisions of subparagraph (e) below, Current Estimates on Contracts which include the furnishing or installing of electrical, mechanical, plumbing, heating, and other equipment, systems or

components especially fabricated as part of the work under the Contract, which are subject to mechanical or electrical test, will include payment of invoice or invoices previously paid by the Contractor, not to exceed ninety percent (90%) of the amount shown on the Lump Sum Bid Breakdown approved by the Project Manager for such equipment, systems or components, when such equipment is delivered to the site, City property, or a bonded warehouse approved by the Project Manager. The City shall pay the balance of ten percent (10%) upon completion of successful testing of such equipment, systems or components, and acceptance thereof by the City. If no invoice is available, the City will pay the Contractor fifty percent (50%) of the cost of such specially fabricated equipment, systems or components, in conformity with the Lump Sum Bid Breakdown when delivered to the site, City property, or a bonded warehouse approved by the Project Manager, and an additional forty percent (40%) when such equipment, systems or components are installed and ready for test. The City shall pay the balance of ten percent (10%) upon completion of successful testing of such equipment, systems or components, and acceptance thereof by the City. The Current Estimates described in this subparagraph shall be reduced by the retainage required under Paragraph 54 below.

d. Subject to the provisions of subparagraph (e) below, Current Estimates may also include, when authorized by the Project Manager, an amount equal to the actual cost of specially fabricated materials and equipment not subject to electrical or mechanical test, furnished but not incorporated into the work, provided that the quantity allowed does not exceed the corresponding quantity estimated in the Contract Documents. The Current Estimates described in this subparagraph shall be reduced by the retainage called for in Paragraph 54 below.

e. Before including payments for equipment and materials described in subparagraphs (c) and (d) above in a Current Estimate, the Project Manager must be satisfied that:

1. the equipment and materials are properly stored, insured and protected through appropriate security measures;
2. paid invoices of suppliers support the Contractor's actual net cost for the equipment and materials;
3. the equipment and materials will be incorporated in the work under this Contract within a reasonable period; and
4. the Contractor assumes full responsibility for the safe storage and protection of the equipment and materials. If the equipment and materials paid for hereunder are damaged, stolen or prove to be unacceptable, the payment made therefor shall be deducted from subsequent estimates and payments unless the equipment and materials are promptly replaced to the satisfaction of the Project Manager and in conformity with the requirements of the Contract Documents. Equipment and materials shall be available for inspection and inventory at the storage site by the Project Manager or his or her authorized representative at all times. Upon payment, title to all such equipment and materials shall be vested in the City, free and clear of any and all debts, claims, liens, mortgages, taxes and encumbrances. The Contractor, at its own expense, shall execute such documents and take such other steps as reasonably required by the City to vest the aforesaid title in the City.

f. The Contractor for itself and any and all Subcontractors acknowledges and agrees that neither the Contractor nor any Subcontractor has any right to file a mechanics', materialman's or other lien against the Project site under the Pennsylvania Mechanics' Lien Law of 1963, Act of August 24, 1963, P.L. 1175, 49 P.S. § 1101 *et seq.*, as amended, or under any other law.

54. Retainage. Act 57 of 1998, 62 Pa.C.S. §3921, as amended, shall govern the withholding of retainage on the Contract. Provided that the Contractor is making satisfactory progress and is in compliance with all of the requirements of the Contract and there is no specific legal or other basis for the withholding of greater amounts, retainage under the Contract shall be ten percent (10%) of the amounts due the Contractor until fifty percent (50%) of the work under the Contract is completed, at which time one-half (½) of the amount then retained shall be returned to the Contractor, and thereafter five percent (5%) of the amounts due the Contractor until substantial completion of the Contract.

55. Semi-Final Estimate and Punchlist.

a. Upon substantial completion of the Contract, the Contractor shall submit an Application for Semi-Final Estimate (the "Application for Semi-Final Estimate"), which shall include a request for a semi-final inspection of the work under the Contract. The Project Manager shall make a semi-final inspection within thirty (30) days of the City's receipt of the Application for Semi-Final Estimate and request for inspection. If, based on said inspection, the City determines that the Contractor has Substantially Completed the work under the Contract, the Project Manager shall issue a certificate of Substantial Completion, which shall include the punchlist items required under subparagraph 55(b) below, and the Project Manager shall process the Semi-Final Estimate. The City shall, upon receipt of said Application for Semi-Final Estimate and upon receipt by the City of any guarantee bonds and other written warranties which may be required in accordance with the contract to ensure proper workmanship for a designated period of time, make payment on the Semi-Final Estimate within forty-five (45) days after issuance of the Certificate of Substantial Completion, except as provided in Paragraph 54 above, and less such additional sums as the City may withhold pursuant to this Paragraph 55. The City shall have the same right to withhold payment from the Semi-Final Estimate as is set forth in subparagraph 53(b) above with respect to Current Estimates. The City shall pay interest on the amount due under the Semi-Final Estimate to the extent provided by Applicable Law. Except as provided in Paragraph 54 above, the Semi-Final Estimate shall reduce the retainage withheld by the City to one and one-half (1½) times the amount required to complete any remaining uncompleted items of work, provided that the Contractor has made satisfactory progress towards completion of the Contract and is in compliance with all of the requirements of the Contract and provided there is no legal or other basis for the withholding of a greater amount. The City reserves the right to withhold additional retainage to the extent the same as is permitted under 62 Pa.C.S. § 3921, as amended.

b. Upon preparation of the Semi-Final Estimate, the Project Manager, with the assistance of the Contractor, shall list in detail and in comprehensive fashion the remaining uncompleted items of work, and a reasonable cost of completion for each item on said list, or such other basis for payment thereof as may be provided in the Contract (which ever method may apply pursuant to the Contract), in an official punchlist which shall thereafter be issued in writing to the Contractor. If the Contractor disputes any of the items on the official punchlist, the Contractor must notify the Project Manager in writing, detailing the items in dispute and the nature of its dispute, with all supporting documentation, within five (5) days after receipt of the official punchlist. The Contractor must commence work on the official punchlist within ten (10) Working Days after receipt of the official written punchlist. The Contractor shall thereafter proceed promptly and expeditiously to complete the official punchlist items, and shall give notice to the Project Manager in writing of the date on which the Contractor completes the official punchlist items. The Contractor shall perform and complete all work on the official punchlist at its sole cost and expense and at no additional cost or expense to the City, subject to payment of the Final Estimate under Paragraph 56 below. The Contractor's work in completion of the official punchlist items shall in all respects be governed by the requirements of the Contract Documents.

56. Final Estimate and Inspection. The Project Manager shall conduct final inspection of the work, including the completion of all punchlist items, after completion of all punchlist items to the Project Manager's satisfaction and within thirty days (30) of receipt of the Contractor's formal written request for such final inspection and application for Final Estimate (the "Application for Final Estimate") (which request the Contractor shall not make until completion of the punchlist items). After the punchlist inspection, and provided that all the requirements of the Contract Documents have been complied with to the satisfaction of the Project Manager, including completion of all official punchlist items, the Project Manager will prepare a final payment (the "Final Estimate") and, based upon the Final Estimate, the City will pay the balance due to the Contractor, after all allowable additions and deductions have been made, by checks drawn by the City Treasurer or assessment bills as provided in Paragraph 57 below, or a combination of these two methods of payment. The foregoing to the contrary notwithstanding, the City shall have the same right to withhold payment from the Final Estimate as is set forth in subparagraph 53(b) above with respect to Current Estimates.

57. Assessment Bills. Where required by ordinance of the City Council of the City, the Contractor shall receive, and accept as payment, assessment bills against abutting property, as compensation for furnishing materials, labor, tools, and equipment, and for doing the work set forth in the Contract Documents. The Contractor shall collect such assessment bills at its own cost, and employ all legal remedies or proceedings, whether by lien, civil action, or otherwise, including recourse to the appellate courts, to which the City may be entitled. The

Contractor acknowledges and understands that the City does not in any way guarantee either the value, or the collection, of any assessment bill or bills, and that in the event of neglect to properly file and collect the assessment bill or bills, no recourse shall be had to the City by reason thereof. The Contractor hereby accepts and assumes all risk of failure to collect any such assessment bill or bills.

58. Contractor Claims.

a. Except as otherwise provided in these Standard Contract Requirements, the Contractor must notify the Project Manager in writing of any and all claims whatsoever relating to or arising out of Contractor's performance of the work under the Contract within ten (10) days of the event or occurrence giving rise to the claim, except where a shorter time is specified by the Contract Documents. The written notice of claim to the Project Manager shall provide a detailed statement of and basis for the claim, with supporting documentation attached. For purposes of this Paragraph 58, a "claim" shall mean a demand or assertion by the Contractor seeking, as a matter of right, an adjustment or interpretation of the Contract, payment of money, extension of time or other specific relief with respect to the terms and conditions of the Contract. The Project Manager will review all claims submitted by the Contractor and shall approve or reject each claim in whole or part, or shall request additional documentation in support of the claim from the Contractor.

b. The City and the Contractor hereby release and waive any and all claims against each other for consequential damages arising out of or related to the Contract and the work performed thereunder. This mutual release and waiver includes damages incurred by the Contractor for principal home office expenses, including home office overhead and the compensation of personnel stationed there, for losses of financing, business, and reputation, and for loss of profit associated with any other work, except anticipated profit arising directly from the Contract and the work thereunder. Nothing hereunder shall preclude, however, the assessment by the City of liquidated direct damages, when applicable in accordance with the Technical Specifications, General Bidding and Contract Requirements, and other applicable locations in the Contract Documents, or damages pursuant to Paragraph 25(h) above.

c. After Substantial Completion of the work under the Contract, but prior to the Contractor's acceptance of the Final Estimate, the Contractor shall notify the Project Manager in writing of any and all unresolved and previously asserted claims relating to or arising out of the work. The Contractor's written notice of claims to the Project Manager shall list the claims by number, assign a dollar value to each claim, and provide a detailed statement of each claim, with supporting documentation attached, including a copy of the notice by which the Contractor first brought the claim to the attention of the Project Manager.

d. Failure of the Contractor to notify the Project Manager of any claims in accordance with subparagraphs (a) and (c) above, and the Contractor's acceptance of and negotiation of payment under the Final Estimate under Paragraph 55 above, shall constitute and operate as a full and final release and a waiver of all such claims by the Contractor.

59. Review by Project Manager of Contractor Claims and Compulsory Non-Binding Mediation of Contractor Claims.

a. Within thirty (30) days after receipt of the Contractor's notice to the Project Manager under Paragraph 58(c) above, the Project Manager shall review all identified claims of the Contractor and shall notify the Contractor whether the claims are approved or rejected, in whole or in part.

b. Any claim of the Contractor which shall have been rejected by the Project Manager, in whole or in part, shall be subject to non-binding mediation. Mediation of the claim shall be an irrevocable condition precedent to institution of legal proceedings by the Contractor against the City with respect to such claim.

c. The Contractor must submit its demand for mediation to the Project Manager and the City of Philadelphia Law Department, c/o Chief Deputy City Solicitor, Affirmative and General Litigation Unit not later than 30 days after the Project Manager's notice of rejection. Failure of the Contractor to submit such claim to mediation within this time period shall be an absolute bar to institution of legal proceedings by the Contractor.

d. The Contractor shall submit a written timely request for mediation to the Project Manager and the City of Philadelphia Law Department, c/o Chief Deputy City Solicitor, Affirmative and General Litigation Unit. Upon submission of the claim to mediation, the City and the Contractor shall endeavor to resolve the claim by mediation in accordance with such rules as may be mutually agreed upon by the City and the Contractor.

e. The fee of the mediator, who shall be selected jointly by the parties, and the common expenses and costs incurred in connection with conduct of the mediation, shall be borne equally by the City and the Contractor. The mediation shall be conducted in the City of Philadelphia. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

60. Contractor's Liability for Services and Materials.

a. Notwithstanding the acceptance and approval by the City of any work the Contractor shall continue to be responsible for the professional quality, technical accuracy and the coordination of all work under the Contract. The Contractor shall, without additional compensation, correct any defects, deficiencies or omissions in the work.

b. The City's review, approval, or acceptance of, or payment for, any of the work performed under the Contract shall not constitute any representation, warranty, or guaranty by the City as to the substance or quality of the work reviewed, approved, or accepted, and shall not be construed to operate as a waiver or estoppel of any of the City's rights or privileges under the Contract, nor of any cause of action arising out of the performance of the Contract. No Person shall rely in any way on such review, approval or acceptance by the City. The Contractor shall be and remain liable in accordance with the Contract and Applicable Law for all damages to the City caused by the Contractor or the work under the Contract. Review, approval or acceptance by the City or the Project Manager under the Contract shall not constitute approval otherwise required by any City department, board, commission, or other regulatory agency in the exercise of such department's, board's, commission's or agency's independent regulatory authority of police powers under applicable law.

61. False Claims. The Contractor covenants and agrees that it shall promptly reimburse the City for (a) all sums paid to the Contractor by the City as a result of any false, fictitious or fraudulent billings, invoices, contract overcharges, and the like, and (b) all other costs which are incurred by the City as a result of the false fictitious or fraudulent billings, invoices, contract overcharges and the like. The Contractor further covenants and agrees that it shall promptly reimburse the City for all expenses and costs, including but not limited to attorneys' fees and expenses, incurred by the City in recovering any such sums from the Contractor. This Paragraph shall survive termination of the Contract and completion of the work under the Contract.

E. MATERIALS, WORKMANSHIP, AND INSPECTION

62. Materials and Workmanship. The materials used in the work under the Contract shall conform to the requirements of the Plans, Technical Specifications and Standard Details and Specifications, as the same may be applicable. The workmanship shall be equal to the best standard practices. Work of reconstruction and restoration of privately-owned structures adjacent to the Project site shall be as set forth in the Plans and Technical Specifications or otherwise by written agreement with the owner or owners of such structures. Where no requirements are specified for materials or for the methods of testing materials or equipment, such materials or methods shall at least equal the latest standard or tentative specifications of nationally recognized standardizing agencies, such as the American Society of Mechanical Engineers, the latest codes of the National Board of Fire Underwriters or, as they apply, any regulations of the City.

63. Inspection. All of the work of the Contract shall be subject to general direction and inspection of the Project Manager or the Project Manager's designated representatives, and the Contractor shall afford every opportunity for the inspection of materials and workmanship. Authorized representatives of the City shall be permitted access at all reasonable times to all portions of the work, and to such portions of the place of manufacture of fabricated materials as may be necessary for complete inspection. Before beginning work the Contractor shall notify the Project Manager of the type and source of supply of the principal materials which the Contractor proposes to furnish, and, as soon as possible thereafter, shall furnish samples of materials, fixtures, and appliances for approval by the Project Manager. Before removal of any excess excavated material, waste, refuse,

or rubble, etc., from the site, the Contractor shall furnish to the Project Manager a list of certified dump site or landfill locations that are to be utilized for disposal of such waste materials and written verification that permission for the disposal of the waste materials has been obtained. Before beginning the fabrication of materials, equipment or systems, and before shipping materials, equipment or systems of a specified type, the Contractor shall notify the Project Manager in ample time to permit inspection at the place of manufacture or shipping, should the Project Manager so desire. Such materials, equipment or systems shall be delivered to the Project site properly marked for identification, and shall be subject to re-inspection and final acceptance or rejection at the Project site by the City. The Contractor shall deliver materials, equipment and systems to be inspected at the Project site in ample time for such inspection and testing. No materials, equipment or systems shall be incorporated into or used in connection with the work until accepted by the Project Manager, and all materials, equipment or systems rejected by the Project Manager as unsuitable or not in conformity with the Plans or Technical Specifications shall be immediately removed from the work. Unless otherwise specifically provided for, the City shall bear the cost of inspection and testing. All work shall be prosecuted in the presence of the City's Inspector ("Inspector"), and conformity with the requirements of the Contract Documents. The Contractor shall provide for inspection and testing to be carried out during regular working hours unless specifically authorized or directed otherwise by the Project Manager. The presence of the Inspector shall not affect in any way the duty of the Contractor to complete the work in accordance with the Contract Documents, nor be deemed a defense on the part of the Contractor for default or violation of the Contract. The Inspector is not authorized to waive, amend, revoke, alter, enlarge, relax, or release any of the requirements of the Contract Documents.

64. Investigation of Work. If the Project Manager at any time has reason to suspect that the Contractor may have delivered any unsuitable, unfit or otherwise defective work, the Project Manager may order an investigation thereof, and the Contractor shall furnish the necessary labor and equipment for such investigation. If the City finds that any part of the work is defective, the Contractor shall repair, replace or reconstruct such work to the satisfaction of the Project Manager, and the cost thereof and of such investigation shall be the sole responsibility of the Contractor. If the work is found to be in accordance with the Contract Documents, the City will reimburse the Contractor, in accordance with Paragraph 51 above, for the expense of the examination.

65. Defective Work or Material. The Contractor shall remove, at its own expense, any work or material rejected by the Project Manager as unsuitable, unfit, or otherwise defective and not in accordance with the Contract Documents, and shall repair, replace or reconstruct the same without additional compensation. Failure to do so shall be deemed a violation of Contract and shall be subject to the provisions of the Contract concerning violations and defaults. Any omission or failure on the part of the Project Manager to disapprove or reject any work or material shall not be construed to be an approval or acceptance of any such defective work or material. For any work or material that is determined to be defective and not in accordance with the Contract Documents, but which in the sole determination of the Project Manager cannot be remedied or does not require total replacement, the Project Manager shall determine an appropriate credit due the City from the Contractor.

F. CONSTRUCTION REQUIREMENTS

66. Prosecution and Performance of Work. The Contractor's methods for the performance of the work must be those best adapted for the safe, efficient, and expeditious prosecution of the work, with a minimum of interference to adjoining work sites, to adjoining properties, and to public traffic and convenience. The Contractor shall prosecute the work vigorously, without delay, and with such workforces and equipment as shall be satisfactory to the Project Manager. The Contractor shall furnish and supply all labor and materials, in the quantity and of the quality required for the proper and timely performance of the work under the Contract; all such materials shall be of the best kind and quality and subject to the inspection and approval of the Project Manager. The Contractor shall strictly conform to the orders, instructions and directions given by the Project Manager, it being expressly understood and agreed that the decision of the Project Manager on any questions arising in connection with the performance of the work under Contract shall be binding and conclusive upon the Contractor. The Contractor shall supervise and direct the work, and Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of its work under the Contract. Before commencing the work, the Contractor, when required by the Project Manager, shall submit for approval its proposed methods of prosecution of the work, including the maintenance

of both vehicular and pedestrian traffic; underpinning, bulk heading, shoring; sinking foundations; handling spoil; lighting; fencing; street surfaces; drainage; and all other branches of its work operation. Such approval is intended to safeguard the City's interest, but such approval will not be deemed to relieve the Contractor of its obligation or responsibility for the safe and proper conduct of the work. The Contractor shall at all times ensure that its work site, and its Subcontractors' personnel, while performing any part of the work under this Contract, are and remain free of the influence of alcohol or illegal drugs. The Contractor shall at all times enforce good discipline and order among its employees, and shall not employ any unfit Person or anyone not skilled in the task assigned. Any contact by the Contractor or its employees with adjacent property owners, passing motorists or pedestrians, and the general public shall at all times be professional, courteous, and respectful.

67. Right of Way. Where work is constructed on private property in the lines of an unopened street, the City guarantees the Contractor, for access and construction purposes, the area only within the lines of said street. Where work is constructed over private property, not within the lines of any street upon the City plan, the City guarantees the Contractor right-of-way between lines not more than twenty-five (25) feet, each side, beyond the outside lines of the structure to be built, unless otherwise provided for, with right of access only within the lines of this strip and subject to the limitations of existing structures. Where work is constructed within the lines of an open street, the City guarantees the Contractor use of the area only within the lines of the street, and subject to the requirements of the Standard Contract Requirements and Technical Specifications for maintenance of travel, existing structures, and access to abutting properties.

68. Maintenance of Traffic and Access to Property. Traffic of all kinds shall be maintained continuously and access to buildings shall be provided for at all times, except where otherwise specifically permitted by the Contract Documents, or where temporary interference is authorized by the Project Manager, in which case it shall be interrupted only for such time as is necessary to provide temporary substitutes for surfaces disturbed by the construction and to restore street and sidewalk surfaces after the completion of the work. Suitable bridges or other means of access shall be built and maintained to permit owners and occupants to reach their premises. Where necessary, the Contractor shall maintain proper and easy means for passengers to enter or exit public transportation. Where partial occupation of the street is allowed, materials and equipment shall be so placed as to ensure a minimum of interference with traffic; no materials shall be placed on the sidewalk within one foot of the curb line, and a clear sidewalk passage not less than four (4) feet in width shall be maintained at all times. The work shall be so conducted that annoyance to residents and interference with the normal use of the properties will be reduced to a minimum. The flow in gutters and inlets shall be maintained. When access to any adjacent property is temporarily cut off, owing to occupancy of the street by the Contractor, the Contractor shall render every assistance to the owner or occupant in handling materials of every description that must be delivered to or removed from such property, including recyclables, rubbish, and garbage, and such materials shall be taken to or from the nearest accessible point that, in the opinion of the Project Manager, is convenient for handling. No additional compensation will be allowed for the various items of expense noted above in this Paragraph 68.

69. Maintenance of Waterways. In navigable streams all work shall be carried on in full compliance with the requirements of the United States Department of the Army, the Commonwealth, the City and any other governmental or quasi-governmental agency, authority or commission having jurisdiction under Applicable Law. Movement of boats and vessels of all kinds shall be maintained unless the United States Department of the Army or any other governmental or quasi-governmental agency, authority or commission having jurisdiction under Applicable Law shall permit interference, and then only within the limits and times specified. Should the Contractor, during the progress of the work, sink, lose, or throw overboard any material, plant, equipment, machinery, etc., which may be dangerous to or obstruct navigation, the Contractor shall forthwith recover and remove the same. The Contractor shall give immediate notice to the proper authorities of such obstruction, and, if required, the Contractor shall, under the direction of such authorities mark or buoy such obstructions until the same are removed. Upon the completion of any work affecting waterways of any character, all equipment and materials deposited in such waterways shall be removed unless otherwise ordered or permitted, so as to leave an unobstructed channel of the same width and depth and with the banks, retaining structures, or wharves in a condition equal to that existing before the beginning of work.

70. Access to Fire Hydrants and Fire Alarm Boxes. Fire hydrants shall be left at all times clear of obstructions and readily accessible to fire apparatus. No material or other obstructions shall be placed within ten

(10) feet of a fire hydrant. Fire alarm boxes shall be supported and protected and maintained so as to be readily accessible and open to view. Excavation shall be decked or bridged, where necessary, to permit the safe passage of fire apparatus and to give access to fire hydrants and to adjacent buildings for the extinguishing of fires. Where necessary, branch pipes shall be extended from the nozzles of the fire hydrants to the mains. Fire hydrants and any branch pipes shall be protected from freezing, and the fire hydrants (particularly the high pressure type) shall, where necessary, be braced or tied to the connecting pipes to prevent movement under water pressure.

71. Temporary Buildings. Buildings, fences, trailers, and equipment erected or provided by the Contractor shall be neat in appearance. Except as provided in Paragraph 74 below, no advertising matter, other than Project information and the name and address of the Contractor, shall be displayed on the work or any such buildings, fences, trailer or equipment.

72. Danger Signals. The Contractor, at Contractor's own expense, shall erect and maintain all necessary barricades, and danger signs and signals. The Contractor shall keep adequate lights burning from sunset until sunrise, and shall provide security personnel as necessary for the safety of the public. The Contractor shall observe such rules relative to signals and safeguards as the police regulations, harbor regulations, and other Applicable Laws require.

73. Street Closings and Detour Signs. In the event that the work requires the closing of a street or roadway, the Contractor shall first obtain a permit from the City's Department of Streets. When the Department of Streets gives permission to close a street or roadway during Contract operations and to divert the traffic therefrom, the Contractor, at the Contractor's sole expense, shall erect and maintain appropriate traffic and highway barricades, detour signs, and any other necessary traffic signs in order to safely protect vehicular and pedestrian traffic. The Contractor shall notify the Department seven (7) days prior to the date of starting work and one (1) day prior to the date of completion. Copies of these notices shall be sent to the Traffic Engineer of the Department of Streets.

74. Contract Identification Signs. The Contractor shall, unless specified otherwise in the Technical Specifications, at Contractor's own expense, erect and maintain in a prominent position upon the Project site at a location approved by the Project Manager, a suitable sign, plainly lettered with the name and address of the Contractor, the character of the work and the name of the Department under which the Contract is being carried out. No advertising matter other than the signs above noted shall be displayed on the work.

75. Safety and Sanitary Provisions. The Contractor shall provide means and appliances and shall enforce suitable rules for the safe prosecution of the work and for the safety and health of the work force employed on it. The completed portions of the work shall be kept clean and in a sanitary condition. The Contractor shall provide and maintain properly secluded sanitary conveniences, in accordance with existing regulations of the Department of Public Health, for the use of Contractor's work force, and the Contractor shall strictly enforce the exclusive use of them by its work force.

76. Storage Space. Buildings, yards, or sidings that may be required for the delivery or storage of materials shall be provided by and at the cost of the Contractor. The Contractor may not use streets for storing materials unless otherwise specifically authorized in writing by a permit issued by the City's Department of Streets. Upon request of the Project Manager, the Contractor shall furnish a copy of any agreement for the use of a property or building for construction purposes, except where owned by the Contractor.

77. Night Work. Work during the night shall be carried on with due regard to the comfort of, and so as to minimize any disturbance to, nearby residents, and the methods to carry out such work shall be subject to the approval of the Project Manager, who may, if conditions so require, order that no night work be done in specific localities. The Contractor's work force shall refrain from loud noises, calls, whistles, and the operation of air compressors, rock drills, riveting machinery, and blasting between the hours of 7:00 p.m. and 7:00 a.m. unless specifically permitted by the Project Manager.

78. Power and Light. In developed portions of the City, and elsewhere when ordered by the Project Manager, the Contractor shall use either electric, compressed air or internal combustion engine power. When compressed internal combustion engines are used the exhaust shall be muffled. None but electric lights

shall be used in or under buildings or anywhere on the work below the surface of the street.

79. Use of Water. Permission for the use of City water shall be obtained directly from the Philadelphia Water Department. Water may be obtained through a hydrant attachment or as otherwise specified in the Technical Specifications. In all cases, the Contractor shall obtain and use such water in accordance with regulations of the Water Department. If the Contractor shall, at any time, waste water (as determined by the Project Manager) obtained from the Water Department, the Project Manager shall revoke permission for such use. No charge will be made for the use of water actually used for the construction work, unless specifically set forth elsewhere in the Technical Specifications.

80. Prevention of Dust and Smoke.

a. The Contractor shall keep the surface of the sidewalks and streets affected by its work, including decking and temporary paving, in a clean, neat condition. The Contractor shall sprinkle with water or otherwise treat the surface sufficiently to keep down any dust generated during the progress of work. Piles of dirt or other material shall not be left on the surface. The aforementioned requirements are not intended to take the place of the usual duties of the Department of Streets but to supplement them. No fires of any kind or burning of debris on the site or adjacent to it will be permitted; the debris shall be disposed of off the Project site.

b. The Contractor shall comply strictly with the provisions of the Air Pollution Code (Title 3 of The Philadelphia Code, as amended).

81. Explosives. If any blasting is involved in the performance of the Contract, the Contractor must obtain a blasting permit from the Department of Licenses and Inspections. Such permits will be issued only upon approval of the Fire Marshal and posting of bond or Certificate of Insurance covering personal injuries and property damage. Blasting may be done only by blasters duly licensed by the City. Storage of explosives and transportation of explosives to the site also require permits, which are issued by the Department of Licenses and Inspections, subject to prior approval of the Fire Marshal.

82. Work in Freezing Weather. Masonry of all kinds, pointing, grouting, plastering, and other work subject to the action of frost shall not be done when exposed to freezing weather, except under conditions where the Project Manager may specifically direct or permit such work, subject to the heating of materials, the protection of finished work and such other measures as may be deemed necessary. If operations are suspended on account of freezing weather, the entire work shall be properly protected until the resumption of work is permitted. If a suspension of the work on account of freezing weather or from any other cause is necessary, the site shall be cleaned up, left in good order, and continuously maintained by the Contractor during the period of such suspension.

G. SURFACE, SUBSURFACE, AND OVERHEAD STRUCTURES

83. Completeness of Data. The term "structures" used in these Standard Contract Requirements shall apply to all surface, underground, and above-ground structures of whatever character within the Project site or immediately adjacent thereto, including buildings situated in or adjacent to the excavation. Where these structures are shown or indicated on the Plans, the information provided is in accordance with the information in the possession of the Department, but is approximate only. Such data are not warranted or guaranteed by the Department to be either complete or correct, and the Contractor shall and must assume, and adjust its Quote to account for, all risks resulting from conditions in the field that differ from the approximation shown.

84. Support and Protection. All structures, unless specifically designated by the Project Manager to be abandoned or relocated, shall be supported and protected at all times from destruction or injury, including damage from freezing, and maintained continuously in service. Should any injury occur while the work is in progress and the structures are under the protection of the Contractor, the Contractor shall fully restore such structures to as good condition as existed before the injury was done. All such support and protection work, and also such alterations of any structures as the Contractor may carry out for the Contractor's own convenience in executing the work, shall be done without additional compensation, unless otherwise specifically provided for in the Contract Documents. The City makes no covenant, representation or warranty as to the right of the

City or the Contractor to carry out any such support or protection work, or any alterations of any structures for the Contractor's own convenience; all such work being in any and all events subject to the consent and approval of the owner or owners of such structures.

85. Structures Interfering with Construction. If, in the course of the work, the Contractor determines that any of the existing structures occupy space required by the structure or its appurtenances to be constructed under the Contract, or that such structures are so situated as to render it impracticable, in the opinion of the Project Manager, to do the work called for under the Contract in the manner specified, the Contractor shall excavate and uncover the portions of such structures in service and shall notify the Project Manager, who will, if reasonably practicable, arrange for the alteration, relocation or removal of the interfering structures or appurtenances within a reasonable time. The Contractor shall not move nor disturb such structures in any way without prior approval by the owners thereof, and the approval of the Project Manager. Any such action by the Contractor shall be at the Contractor's sole cost, risk and expense. Structures belonging to the public utility companies, which are ordered by the Project Manager to be removed or relocated, will be so removed or relocated and permanent supports placed, in general by their owners without cost to the Contractor. The Contractor, however, shall support and protect them up to the time of their removal, shall co-operate with such owners during the process of relocation, and shall maintain and protect such structures if and when such structures are relocated within the Project site or immediately adjacent thereto. Such work shall be done without additional compensation. Sewers, water pipes, electrical conduits, and other City-owned structures shall be altered, relocated, or reconstructed as shown on the Plans or as may be ordered in the course of the work. Payment for this work will be made at the applicable prices in the Contract unless otherwise specifically provided for. If the Project Manager approves a request by the Contractor to effect a temporary or permanent relocation of structures for Contractor's own convenience, and satisfactory arrangements can be made with the owners thereof, the Contractor may carry out such work at its own expense.

86. Abandonment of Structures. In the case of structures the service of which is permanently abandoned, the Project Manager will designate which such structures or portions of such structures the Contractor may salvage and which the Contractor may abandon in place on the Project site, including in the trench. The Contractor shall remove and deliver to a designated point of storage materials salvaged, and payment therefor will be made at the appropriate prices of the Contract, unless otherwise specifically provided. The Contractor shall allow owners of privately owned structures reasonable facilities for salvaging their property. Structures designated as abandoned shall become the property of the Contractor, and shall be removed from the work, unless the Project Manager has approved abandonment of such structures in place on the Project site.

87. Co-operating with Public Utility Companies and City Departments.

a. The Contractor shall at all times during the performance of the work fully comply with the Underground Utility Line Protection Law (Act 287 of 1974, as amended by Act 121 of 2008), 73 P.S. § 176 et seq., otherwise known as the PA One Call System.

b. The Contractor shall co-operate with other contractors and with the employees, officers, and agents of the City Departments or the various public utility companies which own, operate, or have supervision over the underground or above-ground structures encountered by the Contractor, and shall conform to the requirements of the owners of such structures in regard to their safe maintenance. The Contractor shall give to authorized representatives of the City Departments and public utility companies unrestricted access at all times to the excavation and site to inspect the condition and support of their structures at no additional cost to the City. Suitable arrangements shall be provided to facilitate access to valves and manholes if necessary. Ventilation openings shall be provided where gas is likely to accumulate. Where structures are to be constructed by the Contractor under the facilities of any public utility, the Contractor shall make suitable arrangements with the public utility company for the removal or support and maintenance of such facilities at no additional cost to the City.

88. Gas Pipes. Philadelphia Gas Works ("PGW") will make any necessary alterations to the gas mains or gas service pipes, without expense to the Contractor, unless specifically indicated elsewhere in the Contract Documents. PGW will by-pass the gas service in temporary pipes laid outside such excavation, in advance of the construction work. The mains and services that have been removed may be replaced in their permanent position

after the backfilling has been sufficiently compacted.

89. Traffic Control Apparatus. The Contractor acknowledges that the underground location of conduit and cables for traffic signals at intersecting streets is not ordinarily shown on the Plans for the work. Where traffic signals are indicated on the Plans, but the location of connecting conduit or cables for the signals is not shown, the Contractor shall nonetheless assume that there are underground conduits and cables that may affect or interfere with the performance of its work and the Contractor shall adjust its Quote accordingly. The Contractor shall support and maintain in their present locations, or in approved temporary locations, any existing traffic control masts, signals, apparatus, and their connecting underground or above-ground conduits and cables, in such condition as to permit the uninterrupted functioning of the signals during the progress of the work, on temporary poles if necessary, and in a manner satisfactory to the Department of Streets. If the existing signal apparatus is supported on poles and these poles are moved to a temporary location during the progress of the work, the Contractor shall either erect temporary signal poles in the approximate locations of the original poles and erect the signals thereon, or shall extend the electrical connection to the poles as relocated as may be ordered by the Project Manager. Upon the restoration of surface conditions, the Contractor shall restore the equipment, including underground or above-ground conduits and cables and electrical connections, to its original position and condition. This work, except new masonry, shall be done without additional compensation to the Contractor. Masonry piers will be paid for at the applicable unit prices.

90. Vaults. The City will secure the vacating of vaults interfering with the work without expense to the Contractor; but reasonable time shall be allowed the owners for the removal of materials and of any mechanical or other equipment that may be installed therein. These vaults will be vacated to the extent necessary, in the opinion of the Project Manager, to do the work called for under this Contract, including underpinning. The Contractor shall make arrangements with the owners of such vaults in regard to its occupation thereof and shall give the owners at least two (2) weeks' notice of Contractor's intention to remove or break into the walls.

91. Street Lighting Units. Whenever it is necessary to remove, relocate, or adjust street lighting units, or poles, the work shall be reviewed and approved by the City's Department of Streets – Street Lighting Division. All such street lighting work shall be performed at the sole expense of the Contractor and at no additional cost to the City, unless otherwise pre-approved in writing by the Project Manager and the Street Lighting Division.

H. MISCELLANEOUS PROVISIONS

92. Governing Law. The Contract shall be deemed to have been made in Philadelphia, Pennsylvania. The Contract and all disputes arising under the Contract shall be governed, interpreted, construed and determined in accordance with the laws of the Commonwealth, without giving effect to principles of Commonwealth law concerning conflicts of laws.

93. Binding Upon Contractor's Successors, etc. The Contract shall be binding upon the Contractor's heirs, executors, administrators, and successors and assigns and such successors and assigns shall be responsible for the faithful performance and completion of the Contract work.

94. Amendments; Waiver. The Contract may not be amended, supplemented, altered, modified or waived, in whole or in part, except by a written Amendment, or other writing, signed by the Parties, or as provided in Paragraphs 20 and 21 above concerning cancellation of the Contract by the Contractor and termination for convenience by the City, or as provided in Paragraphs 48 and 49 concerning Change Orders and Disputed Change Orders, respectively. Except to the extent that the Parties may have otherwise agreed in writing in an Amendment, or other writing, no waiver, whether express or implied, by either Party of any provision of the Contract shall be deemed: (a) to be a waiver by that Party of any other provision in the Contract; or (b) to be a waiver by that Party of any breach by the other Party of its obligations under the Contract. Any forbearance by a Party in seeking a remedy for any noncompliance or breach by the other Party shall not be deemed to be a waiver of rights and remedies with respect to such noncompliance or breach.

95. Interpretation and Order of Precedence. If the Technical Specifications, the Proposal, or the

Plans expressly modify any of the terms, conditions, or requirements of these Standard Contract Requirements, or of the Department's Standard Details and Specifications, such Technical Specifications, Proposal or Plans shall supersede the portions of these Standard Contract Requirements or the Department's Standard Details and Specifications with which they conflict. The foregoing to the contrary notwithstanding, the City and the Contractor expressly understand that in no event shall the provisions of Paragraph 4 of these Standard Contract Requirements (with respect to test borings, test piles, and existing underground and above- ground structure locations) be superseded by the Technical Specifications, the Proposal, or the Plans.

96. Integration. The Contract Documents, including these Standard Contract Requirements and the exhibits incorporated by reference therein, contain all the terms and conditions agreed upon by the Parties, constitute the entire agreement between the Parties pertaining to the subject matter of the Contract, and supersede all prior agreements, understandings, negotiations and discussions, whether oral or written, of the Parties (except to the extent specifically set forth therein). No other prior or contemporaneous agreements, covenants, representations or warranties, oral or otherwise, regarding the subject matter of the Contract shall be deemed to exist or to bind any Party or vary any of the terms contained in the Contract.

97. No Joint Venture. The Parties do not intend to create, and nothing contained in the Contract shall be construed as creating, a joint venture arrangement or partnership between the City and the Contractor with respect to the work performed by the Contractor under the Contract.

98. No Third Party Beneficiaries. Nothing in the Contract, express or implied, is intended or shall be construed to confer upon or give to any Person, other than the Parties, any rights, remedies, or other benefits, including, but not limited to, third-party beneficiary rights, under or by reason of the Contract. The Contract shall not provide any third party with any remedy, claim, liability, reimbursement, cause of action or other right other than any such remedy, claim, etc. existing without reference to the term of or the existence of the Contract.

99. Severability and Partial Invalidity. The provisions of the Contract shall be severable. If any provision of the Contract or the application thereof for any reason or in any circumstance shall to any extent be held to be invalid or unenforceable, the remaining provisions of the Contract and the application of such provision to Persons, or in circumstances, other than those to which it is held invalid or unenforceable, shall not be affected thereby, and each provision of the Contract shall be valid and enforceable to the fullest extent permitted by law.

100. Survival. Any and all provisions set forth in the Contract which, by its or their nature, would reasonably be expected to be performed after the termination of the Contract or after full performance of the work under the Contract shall survive and be enforceable after such termination. Any and all liabilities, actual or contingent, which shall have arisen in connection with the Contract shall survive the expiration or earlier termination of the Contract, along with the following: the Contractor's warranty of its work, the Contractor's obligation to indemnify, defend and hold harmless the City, its officers, employees and agents; and the Parties' rights and obligations set forth in Paragraph 31 (Proprietary Rights Indemnity).

101. Controlling and Pertinent Statutes. All statutory citations in the Contract shall refer to the pertinent statute as it may be amended hereafter from time to time.

102. Forum Selection Clause; Consent to Jurisdiction. The Parties irrevocably consent and agree that any lawsuit, action, claim, or legal proceeding involving, directly or indirectly, any matter arising out of or related to the Contract shall be brought exclusively in the United States District Court for the Eastern District of Pennsylvania or the Court of Common Pleas of Philadelphia County. It is the express intent of the Parties that jurisdiction over any lawsuit, action, claim, or legal proceeding shall lie exclusively in either of these two (2) forums. The Parties further irrevocably consent and agree not to raise any objection to any lawsuit, action, claim, or legal proceeding which is brought in either of these two (2) forums on grounds of venue or *forum non conveniens*, and the Parties expressly consent to the jurisdiction and venue of these two (2) forums. The Parties further agree that service of original process in any such lawsuit, action, claim or legal proceeding may be duly effected by mailing a copy thereof, by certified mail, postage prepaid, in the case of the Contractor, to the address specified in the Quote, and in the case of the City, to The City of Philadelphia Law Department, Attention:

City Solicitor at the then-current address of the Law Department.

103. Waiver of Jury Trial. The Contractor hereby waives trial by jury in any legal proceeding in which the City is a party and which involves, directly or indirectly, any matter (whether sounding in tort, Contract or otherwise) in any way arising out of or related to the Contract or the relationship created or evidenced thereby. This provision is a material consideration upon which the City relied in entering into the Contract.

104. Headings. The titles, captions or headings of Paragraphs, sections, exhibits or schedules in or to the Contract are inserted for convenience of reference only, and do not in any way define, limit, describe or amplify the provisions of the Contract or the scope or intent of the provisions, and are not a part of the Contract.

105. Days. Any references to a number of days in the Contract shall mean calendar days, unless the Contract specifies Working Days or business days.

106. Notice. All notices, demands, requests, waivers, consents, approvals or other communications which are required or may be given under the Contract shall be in writing and shall be deemed to have been duly made (a) when received or refused if delivered by hand with receipt given or refused; (b) on the next business day if delivered by a nationally recognized overnight courier service (e.g., Federal Express or United Parcel Service); (c) on the date confirmed for receipt by facsimile if delivered by facsimile; and (d) upon receipt or refusal of delivery if sent by certified or registered United States mail, return receipt requested. In each case notices shall be sent, in the case of notices to the Contractor, to the address or addresses set forth in the Contractor's Quote, and in the case of the City, to the address set forth in the City's Notice to Proceed, to the attention of the Project Manager, or to such other address as either Party may specify to the other by a notice complying with the terms of this Paragraph 106.

I. SPECIFIC LAWS

The following provisions are not intended to limit the applicability of any of the other provisions of the Contract:

107. Labor-Management Relationships; Prevailing Wages. The Contract is subject to Section 17-107, as amended, of The Philadelphia Code, "Contractors: Labor-Management Relationships", and all regulations and procedures adopted thereunder.

a. As required by Section 17-107 of The Philadelphia Code all employees performing work under the Contract shall be paid at least the applicable prevailing wages for the respective occupational classifications designated, as set forth in the minimum wage schedule attached as part of the General Bidding and Contract Requirements, and shall be given at least the applicable presently prevailing working conditions during the entire period of work under the Contract. Such working conditions are those which are given to employees pursuant to a bona fide collective bargaining agreement for the applicable craft, trade or industry in the Philadelphia area on the date the General Bidding and Contract Requirements are issued. The occupational classifications for all employees under the Contract shall be only the specific categories of jobs within a given craft, trade or industry for which a separate hourly wage rate for the Philadelphia area is determined by the Secretary of Labor of the United States, in accordance with the provisions of the Davis-Bacon Act, and which are set forth in the applicable schedule attached to the General Bidding and Contract Requirements. In the event that any Contractor believes that work under the Contract should be performed by employees in occupational classifications omitted from the schedule attached to the General Bidding and Contract Requirements, it shall so advise the Managing Director's Office (the "MDO"), Labor Standards Division, which shall remedy the omission if it agrees.

b. The City may withhold from any sums due to the Contractor under the Contract so much as may be necessary to pay the employees the difference between the wages required to be paid under this Paragraph 107 and the wages actually paid to such employees, and the City may make such payments directly to the appropriate employees.

c. Each Contractor shall require all Subcontractors to comply with and be bound by all of the

provisions of this Paragraph of the Contract and of Section 17-107 of The Philadelphia Code, and the Contractor shall insert the requirements of Section 17-107 in all Subcontracts.

d. Every Contractor and Subcontractor shall keep an accurate record preserved on employee time sheets or time cards showing the name, address, social security number, occupational classification, wages and other benefits paid or provided and number of hours worked for each employee assigned to city-work (as "city work" is defined in Section 17-107(1)(b) of The Philadelphia Code), and such record shall be preserved at the current place of business of the employing Contractor or Subcontractor for two (2) years from the date of the Final Estimate on the Contract. The Contractor shall maintain and make his or her accounting and employment records and records relating thereto available for inspection by authorized representatives of the City, at all reasonable hours, and shall permit such representatives to interview employees during the hours on the job, all without prior notice. Neither the Contractor nor any Subcontractor shall allow any employee or other person to interfere with any such inspection or interview.

e. All Contractors and Subcontractors performing city-work shall, upon request of the City, file with the MDO, Labor Standards Division a certified statement setting forth the name, address, occupational classification, wages and other benefits paid or provided and number of hours worked with respect to each employee performing city work. Such statement shall be made weekly for each preceding weekly period. The certification shall affirm that the statement is correct and complete, that the wages set forth therein are not less than those required by the Contract for city-work and that the occupational classification set forth for each employee conforms with the work performed.

f. Nothing herein shall preclude the payment by the Contractor of wages at rates higher than those specified as the minimum in the applicable schedule attached to the General Bidding and Contract Requirements. However, no increase in any Contract price shall be allowed or authorized on account of the payment of wages in excess of those so specified, or on account of wage increases granted hereafter. No increases above the amounts specified in the applicable schedule attached to the General Bidding and Contract Requirements will be required by any Contract during the term thereof except in the case of an error or omission in such schedule. Such an error or omission shall be called to the attention of the MDO, Labor Standards Division as promptly as possible; but the remedying thereof by the Department shall not constitute grounds for withdrawal of a Quote or cancellation of a Contract, nor for an increase in the Contract price or other claim or recovery against the City, nor a ground for failure or refusal to pay the applicable proper minimum to all employees.

g. The minimum wages required hereby shall be paid unconditionally without any subsequent deduction or rebate of any kind except in accordance with Applicable Law governing payroll deductions for taxes, benefits and collective bargaining charges. Any assignment of wages by an employee for the direct or indirect benefit of the Contractor shall constitute a violation of this Paragraph; and any purported release of rights under Section 17-107 of The Philadelphia Code by an employee shall be void and of no effect.

h. The Parties shall refer to Section 17-107 of The Philadelphia Code, and to the regulations to be issued from time to time by the MDO, Labor Standards Division, for further information concerning the administration of the foregoing requirements of this Paragraph 107. In addition, it shall be the responsibility of all Sellers and Contractors to inform themselves as to all prevailing working conditions, including, without limitation, length of work day and work week, overtime compensation, and holiday and vacation rights.

108. Non-Discrimination; Fair Practices.

a. The Parties acknowledge that they have entered into and perform the Contract under the terms of the Philadelphia Home Rule Charter, as it may be amended from time to time, and in performing the Contract, the Contractor shall not discriminate or permit discrimination against any individual because of race, color, religion or national origin. In addition, the Contractor shall, in performing the Contract, comply with the provisions of the Fair Practices Ordinance of The Philadelphia Code (Chapter 9-1100, as amended) and the Mayor's Executive Order No. 4-86, as each may be amended from time to time, both of which prohibit, among other things, discrimination against individuals because of race, color, sex, sexual orientation, religion, national origin, ancestry, age, handicap (including but not limited to Human Immunodeficiency Virus infection), marital

status, presence of children or source of income, in employment, housing and services in places of public accommodation. In the event of any breach of this Paragraph 108, the City may, in addition to any other rights or remedies available under the Contract, at law or in equity, suspend or terminate the Contract forthwith.

b. In accordance with Act 57 of 1998, 62 Pa.C.S. §3701, as amended, in the hiring of employees for the performance of work under the Contract or any Subcontract, neither the Contractor, nor any of its Subcontractors, nor any Person acting in their behalf shall discriminate, by reason of gender, race, creed, or color, against any citizen of the Commonwealth who is qualified and available to perform the work to which the employment relates. In addition, neither the Contractor, nor any of its Subcontractors, nor any Person acting in their behalf shall in any manner discriminate against or intimidate any employee hired for the performance of work under the Contract on account of gender, race, creed, or color. In addition to any other remedies available to the City, the Contract may be cancelled or terminated by the City and all money due on or to become due under the Contract may be forfeited for a violation of the terms or conditions of this Paragraph 108(b).

109. Employment of Low - and Moderate - Income Persons. The Contract is subject to Section 17-1000, as amended, of The Philadelphia Code, "Employment of Low- and Moderate-Income Persons by City Contractors", and all regulations and procedures adopted thereunder.

a. As required by Section 17-1000 of The Philadelphia Code, for all construction and demolition contracts entered into by the City with a total value in excess of \$150,000 (a "Covered Construction Contract"), the Contractor must certify to the Procurement Department that at least forty percent (40%) of the workers who work on a Covered Construction Contract are low- or moderate-income persons. Apprentices and those working in on-the-job training positions shall be considered workers for the purpose of meeting the requirements of Section 17-1000.

b. A low- or moderate-income person is defined under Section 17-1000 as a person whose income does not exceed more than eighty percent (80%) of the median income for the Philadelphia metropolitan area, as determined or adjusted by the Secretary of Housing and Urban Development pursuant to 42 U.S.C. §5302(a)(20), as amended. A person who no longer meets the income eligibility criteria set forth in Section 17-1000 because of employment by a party to a Covered Construction Contract, but who met the criteria on his or her date of hire, shall be deemed a low- or moderate-income person for three years from the date of hire.

c. Each Contractor shall require all Subcontractors to comply with and be bound by all of the provisions of this Paragraph of the Contract and of Section 17-1000 of The Philadelphia Code, and the Contractor shall insert the requirements of Section 17-1000 in all Subcontracts.

110. Ethics Requirements. To preserve the integrity of City employees and maintain public confidence in the competitive bidding system, the City intends to vigorously enforce the various ethics laws as they relate to City employees in the bidding and execution of contracts to which the City is a party. Such laws are in three categories:

a. Executive Order No. 02-04, which prohibits City employees from soliciting or accepting anything of value from any Person seeking to initiate or maintain a business relationship with the City, including but not limited to any of its departments, boards, commissions or agencies. All City employees presented with gifts or gratuities as indicated in Executive Order 02-04 have been instructed to report these actions to the appropriate authorities. All Sellers, agents or intermediaries who are solicited for gifts or gratuities by City employees are urged to report these actions to the appropriate authorities, including but not limited to the Inspector General.

b. Section 10-102, as amended, of the Philadelphia Home Rule Charter, which prohibits any Quote from being accepted from, or contract awarded to any City employee or official, or any firm in which a City employee or official has a direct or indirect financial interest. All Sellers are required to disclose any current City employees or officials who are employees or officials of the Seller's firm, or who otherwise would have a financial interest in the Contract.

c. The State Ethics Act and the City Ethics Code, which prohibit a public employee from using

his or her public office or any confidential information gained thereby to obtain financial gain for himself or herself, a member of his or her immediate family, or a business with which he or she or a member of his or her immediate family is associated. "Use of public office" is avoided by the employee or official publicly disclosing the conflict and disqualifying himself or herself from official action in the matter, as provided in The Philadelphia Code §20-608, as amended.

111. The Philadelphia Code, Chapter 17-400.

a. In accordance with Chapter 17-400 of The Philadelphia Code, as it may be amended from time to time, Contractor agrees that its payment or reimbursement of membership fees or other expenses associated with participation by its employees in an exclusionary private organization, insofar as such participation confers an employment advantage or constitutes or results in discrimination with regard to hiring, tenure of employment, promotions, terms, privileges or conditions of employment on the basis of race, color, sex, sexual orientation, religion, national origin or ancestry, constitutes, without limiting the generality of Paragraph 32 (Default and Remedies), a substantial breach of the Contract entitling the City to all rights and remedies provided herein or otherwise available at law or in equity.

b. The Contractor agrees to include the immediately preceding subparagraph, with appropriate adjustments for the identity of the parties, in all Subcontracts which are entered into for work to be performed pursuant to the Contract.

c. The Contractor agrees to cooperate with the City's Commission on Human Relations in any manner which the Commission deems reasonable and necessary for the Commission to carry out its responsibilities under Chapter 17-400 of The Philadelphia Code. The Contractor's failure to so cooperate shall constitute, without limiting the applicability of Paragraph 32 (default and remedies), a substantial breach of the Contract entitling the City to all rights and remedies provided herein or otherwise available at law or in equity.

112. Federal Laws. The Contractor shall comply with the provisions of Title VI of the Civil Rights Act of 1964 (42 U.S.C. §§ 2000d – 2000d7), section 504 of the Federal Rehabilitation Act of 1973 (29 U.S.C. § 794), The Age Discrimination Act of 1975, (42 U.S.C. §§ 6101 – 6107), Title IX of the Education Amendments of 1972 (20 U.S.C. § 1681), and 45 C.F.R. Part 92, as they may be amended from time to time, which together prohibit discrimination on the basis of race, color, national origin, sex, handicap, age and religion.

113. Americans With Disabilities Act. Contractor understands and agrees that no individual with a disability shall, on the basis of the disability, be excluded from participation in the Contract or from activities or services provided under the Contract. As a condition of accepting and executing the Contract, Contractor shall comply with all provisions of the Americans With Disabilities Act (the "ADA"), 42 U.S.C. §§ 12101 – 12213, as amended, and all regulations promulgated thereunder, as the ADA and regulations may be amended from time to time, which are applicable (a) to Contractor, (b) to the benefits, services, activities, facilities and programs provided in connection with the Contract, (c) to the City, or the Commonwealth, and (d) to the benefits, services, activities, facilities and programs of the City or of the Commonwealth, and, if any funds for payments by the City or otherwise under the Contract are provided by the federal government, which are applicable to the federal government and its benefits, services, activities, facilities and programs. Without limiting the applicability of the preceding sentence, Contractor shall comply with the "General Prohibitions Against Discrimination," 28 C.F.R. Part 35.130, and all other regulations promulgated under Title II of the ADA, as they may be amended from time to time, which are applicable to the benefits, services, programs and activities provided by the City through Contracts with outside contractors.

114. The Philadelphia Code, Section 17-104. In accordance with Section 17-104, as amended, of The Philadelphia Code, the Contractor, by execution of this Contract, certifies and represents that (1) the Contractor (including any parent company, subsidiary, exclusive distributor or company affiliated with Contractor) does not have, and will not have at any time during the term of the Contract (including any extensions thereof), any investments, licenses, franchises, management agreements or operations in Northern Ireland and (2) no product to be provided to the City under the Contract will originate in Northern Ireland, unless the Contractor has implemented the fair employment principles embodied in the MacBride Principles.

a. In the performance of the Contract, the Contractor agrees that it will not utilize any suppliers, Subcontractors or subconsultants at any tier (1) who have (or whose parent, subsidiary, exclusive distributor or company affiliate have) any investments, licenses, franchises, management agreements or operations in Northern Ireland or (2) who will provide products originating in Northern Ireland unless said supplier, subconsultant or Subcontractor has implemented the fair employment principles embodied in the MacBride Principles.

b. The Contractor agrees to cooperate with the City's Director of Finance in any manner which the said Director deems reasonable and necessary to carry out the Director's responsibilities under Section 17- 104 of The Philadelphia Code. The Contractor expressly understands and agrees that any false certification or representation in connection with this Paragraph and any failure to comply with the provisions of this Paragraph shall constitute a substantial breach of the Contract entitling the City to all rights and remedies provided in the Contract or otherwise available at law (including, but not limited to, Section 17-104 of The Philadelphia Code) or in equity. In addition, the Contractor acknowledges and understands that false certification or representation is subject to prosecution under Title 18 Pa.C.S. §4904, as amended, concerning unsworn falsification to authorities.

115. Steel Products Procurement Act. The Steel Products Procurement Act, 73 P.S. § 1881, et seq., as amended, shall govern payments to the Contractor under the Contract. In seeking payment under the Contract, the Contractor represents, warrants and covenants that only steel products made in the United States as defined by the Steel Products Procurement Act have been used or supplied in the performance of the Contract and all Subcontracts thereunder. Where unidentified steel products are supplied or used under the Contract, the City will not authorize, provide for, or make any payments to the Contractor for such steel products, unless and until the Contractor shall first provide to the Project Manager documentation, including, but not limited to, invoices, bills of lading, and mill certification, attesting that the steel was melted and manufactured in the United States. Where a steel product is identifiable from its face, the City will authorize, provide for, and make payments to the Contractor for such steel products, only after the Contractor shall have submitted a certification, in a form satisfactory to the Project Manager, that the Contractor has fully complied with the requirements of the Steel Products Procurement Act. Where the Project Manager has determined, in writing that a particular steel product is not produced in the United States in sufficient quantities to satisfy the requirements of the Contract, then this Paragraph shall not apply to payments for that steel product. Failure of the Contractor to comply with the Steel Products Procurement Act shall constitute a violation of the Contract which shall entitle the City to exercise all rights and remedies provided to it by the Steel Products Procurement Act and provided to it under the Contract, either at law or in equity.

116. Business, Corporate and Slavery Era Insurance Disclosure. In accordance with Section 17-104, as amended, of The Philadelphia Code, the Seller, after execution of the Contract, will complete an affidavit certifying and representing that the Seller (including any parent company, subsidiary, exclusive distributor or company affiliated with Seller) has searched any and all records of the Seller or any predecessor business entity regarding records of investments or profits from slavery or slaveholder insurance policies during the slavery era. The names of any slaves or slaveholders described in those records must be disclosed in the affidavit.

The Seller expressly understands and agrees that any false certification or representation in connection with this Paragraph and/or any failure to comply with the provisions of this Paragraph shall constitute a substantial breach of this Contract entitling the City to all rights and remedies provided in this Contract or otherwise available in law (including, but not limited to, Section 17-104 of The Philadelphia Code) or equity and the contract will be deemed voidable. In addition, it is understood that false certification or representation is subject to prosecution under Title 18 Pa.C.S.A. Section 4904, as amended, concerning unsworn falsification to authorities.

117. Transparency in Business Act. If this Contract is valued over \$100,000, the following requirements shall apply:

a. After Contractor has been notified of its selection for the contract award and prior to formal written agreement to the Contract, Contractor shall disclose the following information:

1. The Contractor's and each anticipated Subcontractor's prior years of experience performing on City contracts in any capacity during the five calendar years prior to the date the application must be filed.

2. Demographic Data on all individuals employed by the Contractor and each anticipated Subcontractor on the Report Date.

3. Demographic Data on all individuals serving as board members of the Contractor on the Report Date.

4. Demographic Data on all individuals employed for each Labor Source from which workers are likely to be drawn in performance of the Contract. Submission to the Department of Labor of Demographic Data on a Labor Source by any contractor during the previous 6 months shall satisfy the disclosure requirements with respect to such Labor Sources. The Department of Labor shall provides notice no later than one week prior to the time of the opening of bids for each contract of all Labor Sources for which Demographic data has been provided during the previous 6 months.

5. Demographic Data of all employees who will perform work under the Contract.

b. At each renewal term or additional performance period, the Contractor shall submit updated Demographic Data of the individuals performing work on the Contract in the form of a supplemental disclosure. Submission of certified payroll records shall satisfy this disclosure requirement.

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SECTION C - SPECIAL PROVISIONS

C-1.1 GENERAL

- A. Work under this contract shall be governed and done in accordance with the Standard Contract Requirements of the City of Philadelphia and these Specifications.
- B. Contractors will be placed on the official plan holder's list by requesting the electronic bid package documents from the City of Philadelphia – Procurement Department at www.phlcontracts.phila.gov. Only contractors on the official plan holders list will be sent notices of pre-bid meetings, amendments and any other changes or additions to the bid package.

Contractor must sign a Non-Disclosure Agreement (NDA) before picking up contract drawings that contain Security Sensitive Information (SSI). For a copy of an NDA, please contact Lou Fabritiis at lou.fabritiis@phl.org. See paragraph C-1.13J for SSI requirements.

Obtaining partial sets of drawings and specifications will not be permitted. Any oversight, confusion, or lack of knowledge that may result from the Contractor's use of partial sets of documents is not the responsibility of the City. Prior to submission and/or receipt of quotes, each prime contract seller (e.g., General, Electrical, Mechanical, Plumbing) is responsible for ensuring that all parties or subcontractors are aware of all issued as-bid and amendment items/changes.

- C. These specifications have been written keeping brevity in mind and where possible, the use of such expressions as "in such a manner to", "which will be", "so as to", "shall be", as well as articles, prepositions and other parts of speech, have been omitted. However, in any interpretation of these specifications, eliminations are to be supplied by inference.
- D. "Provide" means furnish, fabricate, complete, deliver, install, erect, including labor, materials, equipment, apparatus, appurtenances, expense necessary to complete in place, ready for operations or use under terms of contract documents.
- E. "As shown", "as indicated", "as detailed", "as noted", or similar phrases, refer to contract drawings accompanying specifications.

C-1.2 CHANGE IN AND REFERENCE TO STANDARD CONTRACT REQUIREMENTS

Clause 3 – Qualifications of Seller - Add the following paragraph:

- c. The Airport Engineering Manager shall represent the Operating Commissioner for this quote.

Clause 30 - Insurance – Delete subparagraphs b. and c. and replace with the following (subparagraph a. and d. remain):

- b. Commercial General Liability Insurance.

1. Limit of liability: \$5,000,000 per occurrence combined single limit for bodily injury (including death) and property damage liability; \$5,000,000 advertising injury; \$5,000,000 general aggregate, and \$5,000,000 aggregate for products and completed operations. The City may require higher limits of liability if, in the City's sole discretion, the potential risk warrants.
2. Coverage: Premises operations; Blanket Contractual liability; Personal injury liability; Products and completed operations; Independent Contractors; Employees and volunteers as additional insureds; Cross liability; Broad form property damage (including completed operations); Explosion, collapse and underground hazards; and asbestos abatement liability Coverage (Note: Required for asbestos abatement projects only).

c. Automobile Liability.

1. Limit of Liability: \$5,000,000 per occurrence combined single limit for bodily injury (including death) and property damage liability.
2. Coverage: Owned, non-owned and hired vehicles.

NOTE: Should the required insurance expire or otherwise be terminated, all construction activity shall immediately cease. No work shall be performed on this contract unless such work is covered by the listed insurance. The City shall not pay or otherwise compensate the contractor for any work executed without required insurance. The Project Manager may withhold payment from the Contractor until the Contractor presents proof that the insurance was enforced during the entire billing period.

Clause 33 - Subcontracts – Insert the following between the first and second sentences:

Contractor shall also submit to the Project Manager copies of all subcontract agreements for all Subcontractors who will perform any work on the Contract or who will supply any materials or equipment for the Contract.

Clause 34 - Permits and Licenses - Delete this paragraph and insert the following 4 paragraphs:

- a. The Contractor is required to obtain all permits and licenses required for this project by the City of Philadelphia, and no waiver of licenses and permit fees will be granted.
- b. The Contractor shall obtain all permits, licenses, certifications and pay all fees required by the Federal, State, County or Municipal entities having jurisdiction over any aspect of this project. The Contractor shall make due allowances in his bid for any cost incurred and shall obtain all permits, licenses, certifications and pay all fees in a timely manner. There shall be no contract time extension granted for any contractor omission in this regard.

- c. The Contractor is directed to pay special attention to an Ordinance of the Township of Tinicum, Delaware County, Pa., which is "Ordinance No. 379" entitled "Regulating Drainage and Drainage Permits, Bonds, Fixing Fees; Penalties; Repeals." The Contractor shall inform himself as to the content and terms of the ordinance and comply with all provisions of same and shall make due allowance in his bid for any cost incurred.
- d. The Contractor is directed to pay special attention to Ordinances of the Township of Tinicum, Delaware County, Pa., which are "Ordinance No. 528" entitled "To Govern and Regulate the Grading of Land and Maintenance of Drainage Necessary to Control Soil Erosion: Requiring the Securing of Grading Permits and Providing for the Enforcement Thereof" and "Ordinance 2003-765" entitled "Amending Ordinance No.528, By Changing Article IV, Section 3 to Section 3A, Pertaining to Permit Fees, Adding Section 3B, Establishing Time Limitations for the Expiration of Permits, and Adding Section XI, Repealer." The Contractor shall inform himself as to the content and terms of the ordinances and comply with all provisions of same and shall make due allowances in his bid for any cost incurred.

Clause 53 – Current Estimates – Add the following paragraph:

- g. The Contractor shall prepare an Application for Payment and submit it monthly to the Project Manager. The Application shall be the basis for the current estimate. If an Application is not submitted to the Department of Aviation, the Project Manager may at his discretion prepare a current estimate. The following information shall be provided with each payment application:
 - 1. Copies of certified payrolls for the entire billing period. NOTE: Certified payrolls shall still be submitted weekly to the City's Labor Standards Division.
 - 2. A revised list of current subcontractors and suppliers. If the list has not changed, it must be stated in writing.
 - 3. Copies of payment summaries to M/W/DSBE subcontractors and suppliers per Chapter 17-1600.
 - 4. An updated Master Project Schedule detailing the current status of the project.
 - 5. Copies of daily construction reports during the billing period.

Payment will not be processed until all information listed above is submitted. Failure to provide all the information will result in delaying the payment process.

Clause 74 - Contract Identification Signs - Delete entire paragraph: A job identification sign will not be required.

C-1.3 DRAWINGS

The following drawings accompany these specifications (in the rear of the manual) and are included as part of the contract documents:

-See Drawing No. G-001 for full list of Contract Drawings

C-1.4 CORRELATION AND INTENT OF DOCUMENTS

The Contract Documents are complementary and what is called for by one shall be as binding as if called for by all. The intention of the documents is to include all labor and materials, equipment, supplies, storage and transportation necessary for the proper execution of the work. Material or work described in words that have a well-known technical or trade meaning shall be held to refer to such recognized standards. Interpretation of all contract documents shall lie solely with the Project Manager.

C-1.5 DEFINITION

- A. Project Manager – The Project Manager in charge of the work as defined in the Standard Contract Requirements, paragraph 40, shall be the Airport Engineering Manager. The Project Manager shall have complete charge and management of the contract; may assign assistants and delegate authority to others as necessary. Wherever the term "Project Manager" is used in these specifications, it shall mean the Project Manager as described above or such assistants as may be assigned.
- B. Engineer – The term Engineer as used in these documents shall be a duly authorized representative of the Project Manager as defined under Project Manager. The extent of the Engineer's authority is entirely at the discretion of the Project Manager.
- C. Architect - The term Architect as used in these documents shall be a duly authorized representative of the Project Manager as defined under Project Manager. The extent of the Architect's authority is entirely at the discretion of the Project Manager.
- D. City - Wherever the term "City" is used in the Contract Documents, it shall mean the City of Philadelphia.
- E. Written Notice - Written notice shall be considered to have been duly served if delivered in person to the individual member of the firm for whom it is intended, or to an officer of the corporation, or sent by registered mail, or other recognized delivery services, to the last business address known to him who serves the notice.
- F. Trades - Mechanics and workmen engaged in the work according to their special skills, or firms that hire them for that portion of the work, which requires such skills.
- G. Airport – Wherever the term "Airport" is used in the Contract Documents, it shall mean either the Philadelphia International Airport (PHL) or the Northeast Philadelphia Airport (PNE) as additional detailed in the Contract Documents.

C-1.6 CONSTRUCTION PROCEDURE AND SCHEDULE

- A. The Contractor shall prepare and submit an importable Primavera P6 file, or approved equal, to the Project Manager, a bar chart schedule showing allotment of time for work, which shall be arranged for minimum interference with airport operations within thirty (30) days from Notice to Proceed. This Project Schedule, or a subsequent revision thereof, shall be approved by the Project Manager. The approved schedule shall be updated monthly by the Contractor.
- B. At a minimum, the bar chart Project Schedule shall meet the following requirements:
 - 1. It must be sufficiently detailed to identify all significant activities in a format and at a level of detail that is acceptable to the Owner/Engineer. Activities shall have a maximum duration of fifteen (15) working days, except for non-construction related activities such as procurement and delivery of materials and equipment, or unless otherwise approved by the Owner/Engineer.
 - 2. Activities shall include submittal and review of shop drawings.
 - 3. It shall clearly identify all contractual milestones. The construction duration for any milestone or the entire project shall not exceed the specified contract times.
 - 4. It must be fully coordinated with all Prime Contractors if applicable.
 - 5. It must show any phasing required by contract documents.
 - 6. It must identify the trade responsible for each task.
 - 7. It must contain any necessary constraints dealing with the operations of the Airport.
 - 8. Each activity on the schedule shall be identified with a description and a time for performance of the activity and shall be preceded by all work that must be accomplished prior to that activity.
 - 9. Provide a narrative to discuss progress to date, anticipated progress for the upcoming update periods and potential problem areas. The narrative should include a list of all contract milestones showing planned and currently schedule dates.
 - 10. Provide an importable Primavera P6 file format, or approved equal, electronic copy.
- C. The Contractor shall provide monthly schedule updates to the Project Manager in an importable Primavera P6 file, or approved equal. If the Work is behind the scheduled dates or work is not progressing toward these dates, the Engineer/Owner may require the contractor to take immediate and appropriate action to make up lost time.

- D. The Contractor shall provide a two (2) week “look ahead” schedule, every week as required by the DOA. Each two-week look ahead needs to identify work from the past week of construction, current week of construction and the succeeding week of construction. Each task on the two-week look ahead needs to be identified as shown on bar chart Project Schedule.
- E. It is possible that on certain days or portions of days, due to air traffic conditions, construction will not be permitted in certain areas. The Contractor shall, upon instructions from the Engineer, immediately stop or relocate his operations. No additional payment will be made for these interruptions in the work. Additional extension of work time may be granted as deemed necessary by the Engineer.
- F. Certain demolition or construction operations as defined on the contract documents will not be permitted during normal working hours. It is possible that other operations or portions of the work performed during normal hours may be determined by the Engineer to be detrimental to the normal airport operations. The Contractor shall, upon instructions from the Engineer, immediately stop such operation or work and complete the operation during night time and/or weekend work hours approved by the Engineer. No additional payment or extension of time will be granted for these interruptions or rescheduling of the work.
- G. It is possible that on certain days or portions of days all work may be stopped and all personnel removed from work areas, as directed by federal authorities, due to visits from domestic and/or foreign dignitaries. Visits occur an average of six times a year but may vary due to current events etc. The Contractor shall, upon instructions from the Engineer or Law enforcement personnel, immediately stop or relocate his operations. No additional payment will be made for these interruptions in the work. Additional extension of work time may be granted as deemed necessary by the Project Manager.
- H. Each Prime Contractor shall utilize approved document management solutions such as e-Builder to the full extent of the Engineer/Owner’s discretion. Typical requirements include: submittal packages, RFIs, daily reports, meeting minutes, correspondence, transmittals, drawings, insurance, reports, and logs. Limited training and assistance will be provided by the Project Manager to utilize the approved document management solution.

C-1.7 CONSTRUCTION MANAGEMENT

- A. The Contractor shall submit to the Engineer as directed: manpower breakdowns (daily and by trade including subcontractors), progress reports (daily including the activities of all subcontractors) and any other reports as may be required by the City, State or Federal agencies. Such submissions to the Engineer by the individual Contractors are not necessarily limited to those described, but other certifications shall be submitted, as directed, to

the Engineer such as: supplier material delivery certifications and material testing certifications.

- B. The Engineer will supervise all testing provided by others as required by the technical sections of the specifications, and required by authorities having jurisdiction. The Engineer will witness all such tests, record findings and interpret test reports, keep an accurate record of all tests, inspections conducted, findings and test reports. The Engineer will receive, review, investigate and approve all items submitted by the Contractors, such as unit schedule breakdowns, requests for approval of subcontractors, delivery schedules, material lists and the like.
- C. Upon request of the Engineer, at the end of each normal workweek, the Contractor shall furnish for approval, his proposed operating schedule for the following week. This schedule shall indicate the proposed working hours, the types and locations of operations, and types of equipment to be used. After this schedule has been approved, the Contractor shall not deviate from it without receiving prior permission from the Engineer.
- D. All Prime Contractors shall provide supervision and coordination of their respective subcontractors, vendors and suppliers. Prime Contractors shall provide on-site qualified management staff at all times during all shifts while subcontractors are working on site.

C-1.8 CONSTRUCTION SEQUENCE

Listed are several major operations to complete this project within the time specified. While most of these operations should be followed in the order enumerated, several may be implemented simultaneously.

- A. First Order of Work - Submit insurance, shop drawings, subcontractors, project schedules, emergency contacts, name of job superintendent, emergency electrical contractor, detailed cost breakdown, etc. as required by specifications.
- B. Second Order of Work – Obtain all building and/or construction permits as required and attend preconstruction meeting to review plan of operations and obtain starting date.
- C. Third Order of Work - Contractor shall move all personal tools, equipment, etc. on the site at the location designated by Engineer and begin to perform the installation work in accordance with all applicable codes and regulations.
- D. Fourth Order of Work - Contractor shall complete the reconstruction in accordance with the contract documents including punchlist items.

C-1.9 COORDINATION WITH OTHER WORK

- A. The Contractor shall cooperate fully with other contractors performing work under related contracts, identified in C-1.9D below, and with the Engineer. The Contractor shall carefully adapt scheduling and performance of the work under this contract to accommodate the work under related contracts,

heeding any direction that may be provided by the Engineer. The Contractor shall not commit or permit any action that will interfere with the performance of work by any other contractor. The necessary level of coordination may require, but not be limited to, review of related plans and specifications and meetings with other contractors to plan schedule and coordinate the work.

- B. Any installations being made by others, which necessarily should be made prior to any phase of this work, shall be in place before the Contractor proceeds with the work under his contract, and the Contractor shall coordinate his work schedule to allow for the completion of such installations.
- C. No additional compensation shall be made for any normal delays precipitated by the necessary coordination.
- D. The following is a list of construction projects now under construction and/or will be under construction within the limits of the contract and during the period of this contract. The City has made every effort to include all work scheduled in the area of this contract, however, the City does not guarantee that this list is all inclusive and the Contractor shall cooperate with all other construction in his contract area:

PHL-1644 E Concourse RTU Upgrades

PHL-1991 E Holdroom Improvements

PHL-1984 Restroom Renovations

C-1.10 AIRPORT SECURITY BOUNDARIES

- A. The Airport security boundaries shall not be modified or altered without the prior approval of the Airport Security Manager. Security boundaries for this project include: (1) any fence around or inside the Airport, (2) any wall or barrier between the terminal and the aircraft parking apron, and (3) any door that is access-controlled, i.e., possesses a card reader. The Contractor must submit in writing all requests to modify or alter these boundaries or to make an opening in a security boundary, whether on a temporary or permanent basis, at least 60 days in advance to the Airport Security Manager via the Project Manager for approval. The request must include the objective, the phasing plan for accomplishing the objective, temporary barrier plans, and the plan for security during demolition and/or construction. While the boundary is being modified or altered such that the original physical barrier is no longer intact, the Contractor must provide an Airport-approved security guard on-site to monitor and control access, 24 hours per day, 7 days per week. Temporary barriers to secure openings in the security boundaries may be acceptable in lieu of an on site security guard as long as the temporary barriers provide an equivalent level of protection as the original boundary and have been approved for use by the Airport Security Manager.

- B. Refer to Section 7 of the PHL Security Rules and Regulations for additional security requirements.

C-1.11 ACCESS TO THE SITE

- A. Primary access to the site shall be through Gate 1 on the Cargo City access road (adjacent to Cargo City Building C-2), Security Checkpoint, or gates/doors shown on the drawings and/or approved by the Engineer. All Contractor employees must be Airport-badged or properly escorted to enter through these areas. Only Contractor-owned, insured, and properly labeled vehicles (see paragraph C-1.12C and D) may pass through Gate 1; no privately owned vehicles are permitted.
- B. Secondary site specific access may be granted under a gate agreement. With an approved gate agreement, the Contractor shall be required to supply full time uniformed security for all construction gates or fence openings used by the Contractor for this project for access to restricted areas of the Airport and the Aircraft Operating Area (AOA). He/she shall be responsible for the unlocking and locking of the construction gate, adhere to the Vehicle Inspection Guidelines, and remain on duty until the last person leaves the construction site at the end of the day.
- C. No temporary construction gates in the security boundary fence will be permitted.
- D. Refer to Section 7 of the PHL Security Rules and Regulations for badging regulations and additional security requirements.

C-1.12 VEHICULAR AND EQUIPMENT TRAVEL ON THE AIRPORT

- A. Any Contractor requiring unescorted, vehicular access onto the Airfield Operations Area (AOA) shall be required to first obtain a valid Airport-issued Photo Identification Badge with airside access privileges and successfully pass the Department of Aviation's AOA driving certificate program.
- B. Vehicles not complying with the above are subject to escort by an authorized Airport-badged Contractor employee and vehicle. The ratio for escorting vehicles onto the airfield via Gate 1 is 1:1, which means that one Airport-badged Contractor employee with escort authorization ('E' sticker) can only escort one non-badged employee. The escorted vehicle must follow and stay with the vehicle providing escort at all times. All escorted vehicles must display an "Escort Required" identification sign on both sides of the vehicle. The Contractor shall provide these "Escort Required" signs. See paragraph D.6 of the PHL Rules and Regulations, Section 7.
- C. Any Contractor requiring access to the Movement Area must pass the Airport's Movement Area Driver Training program. No Contractors shall be allowed unescorted access to the Movement Area.
- D. Because of the complexity of Airport operations, it shall be necessary for all Contractors' vehicles to travel over a predetermined route on airport

property. Each vehicle operating in aircraft movement areas shall display in full view a three (3) foot square flag attached to a staff. The flag shall be a checkered pattern of one-foot squares of International Orange and White. If night travel is required for the work, vehicles shall be equipped with roof-mounted, yellow light, rotating beacons.

- E. Contractor vehicles must be painted in company colors, which will coincide with other owned equipment.
- F. Contractor vehicles shall display the company's name and/or logo and an identification number on each side. Numbers or letters shall be at least 3" high and plainly visible. Outline numbers and letters are not permitted. Magnetic and temporary identification panels are not permitted.
- G. All Contractors must submit proof of automobile liability insurance with the appropriate minimums to the Engineer prior to any vehicle entering the AOA.
- H. The Contractor shall be responsible that all his personnel, subcontractors, suppliers, and related personnel adhere to the instructions issued by the Project Manager. All vehicles and equipment shall receive authorization prior to movements on the field at crossings. Flagmen, furnished by the Contractor, shall be located at critical aircraft or vehicle crossings, where directed by the Engineer.

C-1.13 AIRPORT SECURITY

- A. This project is located at Philadelphia International Airport (PHL). The Contractor must be fully cognizant of the work site and its relation to Airport operations, Airport security boundaries, and Airport security rules. Any failure to comply with the security rules and/or direction from the Project Manager, Airport Security Manager, and/or the Airport Operations Superintendent regarding security shall be cause for immediate dismissal from the Airport and/or shutdown of the entire project. In the event of such an incident, the Contractor shall receive no compensation for outstanding work and may be liable for damages and additional claims from the City.
- B. The Airport consists of three security areas: public, sterile, and secure. Each area has its own security requirements. Maintaining the integrity of the boundaries between these areas is critical. The public area is commonly referred to as "landside", the sterile area is commonly referred to as "terminal complex", and the secure area is commonly referred to as "airside". The sterile and secure areas are designated as Security Identification Display Areas (SIDA), and access to these areas requires an Airport-issued Photo Identification Badge or escort by an Airport-approved escort. See paragraph C of PHL Rules and Regulations, Section 7.
- C. Contractor personnel requiring access to non-SIDA areas only will be required to display a Contractor-provided identification badge. In addition, each Visitor being escorted through SIDA or AOA areas must display a

Contractor-provided identification badge. The badge shall meet the following requirements:

1. Wallet size (2-1/8" x 3-3/8")
 2. Laminated plastic
 3. Green background with black letters
 4. Fastening device for attachment to shirt collar or pocket or chain for hanging around the neck
 5. The Department of Aviation will supply lettering detail. These badges will not be valid outside of the project work site.
- D. The Airport Security Department regulates issuance of all Airport-issued Photo Identification Badges. Contractors who require access on a frequent basis to the project work site must apply for SIDA badges. Upon completion of a successful background check and training program, and approval by the Airport Security Manager, an Airport-issued Photo Identification Badge will be issued. Applications for badges can be obtained from the Project Manager. See PHL Rules and Regulations, Section 7 for requirements.
- E. A portion of the Contractor's employees may be granted escort privileges. The Contractor must request a special application for this escort designation to the Airport Security Manager via the Project Manager. Upon approval by the Airport Security Manager, an 'E' sticker will be issued. The Airport Security Department will provide rules for escorting and penalties for failure to comply with these rules (see paragraph D.6 of the PHL Rules and Regulations, Section 7).
- F. The Contractor shall be responsible for monitoring all personnel requiring access to the work site, which shall include his personnel, subcontractors' personnel, other Contractors working in the same construction area, material delivery trucks, authorized visitors to the site, etc. The Contractor shall be held responsible for the admission of any unauthorized personnel into his work area. Anyone found on the work site without the proper identification is subject to arrest by the Airport Police and payment of Federally imposed fine(s).
- G. The cost of each photo identification badge is \$33, which will be paid by the Contractor with a money order payable to the City of Philadelphia. The cost for the fingerprinting is \$32, also made payable to the City of Philadelphia.
- H. All Contractors and subcontractors must certify in writing that they have performed background checks on all of their employees to the extent necessary to ensure the safety and security of the traveling public. This includes non-badged personnel. The Contractor is required to pay all fees for obtaining background checks.
- I. Philadelphia International Airport Escorting Rules and Responsibilities are summarized below:

1. All non-badged “Visitors” such as Union Business agents, materials and equipment salesmen, suppliers, etc. must be escorted by properly badged and authorized personnel. Escorting of a “Visitor” is allowed to take place by escort authorized Blue Badged personnel for short term, legitimate, and business-related reasons only. Each Visitor must wear a Green Contractor badge described in paragraph C-1.13C.
 2. There is a three-week limit on escorting an individual into the SIDA areas of the Airport. Those who have an operational need to access the SIDA areas repeatedly for more than three weeks must submit to the badge application process and obtain a PHL Identification Badge
 3. Employees who lose or forget their ID Badges are NOT considered ‘Visitors’ and cannot be escorted.
- J. Security Sensitive Information (SSI) is selected documents, not limited to Drawings and Specifications that have been classified as SSI. These documents must be controlled in accordance with 49 CFR, part 1520. At PHL, Contractors Employees working with, or having access to SSI for Bid purposes, must sign a Non-Disclosure Agreement (NDA), and complete the required finger printing / Criminal History Record Checks indicated in the agreement. After award, Contractor employees who will work with and create SSI documents generated as part of this project, must have a valid Airport-issued Photo Identification Badge. Persons entrusted with SSI information must not disclose this information to those unauthorized to know the information. Airport Security will provide guidance for the handling and designation of SSI. The following ‘short guide’ is provided for the contractor to establish a baseline for handling SSI associated with his work at PHL. All Contractor/subcontractor personnel shall handle and manage SSI as follows:
1. **Do not leave SSI unattended** on desks, in offices, or any other workplace. Whenever you leave your workplace, remember to check for SSI; be sure to place it in a locked desk drawer or locked file cabinet.
 2. **Control access to SSI** in your work place. Turn off or lock computer when working with SSI before you leave your desk to ensure that no SSI is compromised.
 3. **Only share SSI documents or information with a covered party who has a need to know.** When in doubt, contact the Airport Security. Do not discuss SSI with friends or family unless they are covered parties with a need to know. Do not discuss SSI with colleagues in public places.
 4. **Control transmission of SSI in communications.** If there is a need to discuss SSI over the telephone, make every effort to use a landline and be aware of your surroundings. If it is necessary to discuss SSI in a public place, use common sense and discuss as privately as possible - not within the earshot of other people. If it is necessary to mention SSI

over a cellular phone, take all precautions to discuss sparingly and privately.

5. **Maintain chain of custody between covered parties.** Do not deliver any SSI to anyone by leaving it unattended on his/her desk - personally hand deliver SSI to the intended recipient. You have a duty to make sure that the SSI recipient knows that the document(s) contain SSI so they can take appropriate steps concerning SSI handling protection.
 6. **Maintain confidentiality.** When carrying or delivering SSI, place in an unmarked folder or envelope.
 7. **Do not take SSI home or remove from controlled environments.** Do not take SSI work, either hard or soft-copy, home without written permission from Airport Security. If you do take SSI home, always keep the SSI on your person (ideally in a locked briefcase) during transit and protect as you would in your office.
 8. **Password-protect all SSI documents** sent via e-mail. Do not include the password in the body and/or e-mail introduction forward. Passwords shall conform to the following minimal guidelines: Six character minimum length; at least one letter capitalized, contain at least one number; and not be a word in the dictionary.
 9. Mark all SSI documents with a protective marking in the header and a distribution limitation statement in the footer. When in doubt whether a document should be marked SSI, contact Airport Security.
 10. Do not post SSI on your Internet or Intranet web sites without prior approval. It is your duty to be diligent in observing any SSI that erroneously appears and contact the appropriate parties to have it removed.
 11. Properly dispose of all SSI in your possession that you no longer need (e.g., extra copies, obsolete versions, etc.) by using a shredder or cutting manually to less than ½ inch. SSI on electronic media should be destroyed so as to render the media unusable and preclude its reconstruction.
- K. Construction work in a Customs and Border Protection controlled area requires an additional 'seal' on the Airport-issued Photo Identification Badge prior to work commencement. To obtain this 'seal', an application must be made through the Customs and Border Protection Badge and Identification Office on the 3rd Floor of Terminal A-West.

C-1.14 SAFETY GEAR & PLAN

Contractor shall provide "safety" orange retro-reflective or lighted (required for all work performed during the hours of darkness) safety vests for personnel working on/or near roadways and airfield. Contractor shall also equip personnel with working flashlights equipped with a "safety" orange/red wand when working in above stated area. The above is to be provided in addition to

the standard OSHA required construction safety gear. Contractor shall also provide and maintain a site specific safety plan for all phases of work

C-1.15 SPECIAL RULES AND REGULATIONS

The Contractor shall coordinate all his activities with the Engineer, except for emergency situations when he shall follow the instructions of the Engineer or the Airport Operations officials. Work on the airfield shall be carefully scheduled or commence only upon prior approval from the Engineer.

C-1.16 REFERENCE SPECIFICATIONS

Where reference is made to acceptable standards or specifications of workmanship, methods or materials by the use of Federal Government, City of Philadelphia, Commonwealth of Pennsylvania or technical societies, the current edition, together with amendment revisions of supplements adopted and in effect on the date of invitation for bids shall apply.

C-1.17 MATERIAL AND EQUIPMENT APPROVALS

- A. Where manufacturer's name, brand or trademark is referenced to, it has been selected to establish a standard of quality for the materials required. Materials of different manufacture considered to be equal to the materials specified will receive full consideration and shall be subject to approval of the Engineer before being incorporated in the work. The contract price shall in all instances be based only upon materials specified. A list of material suppliers shall be submitted to the Engineer for approval.
- B. It is the Contractor's responsibility to furnish all literature, test results, calculations, etc. for review of substituted material or equipment. Any redesign necessary in order to accommodate an "approved equal" will be paid by the Contractor or deducted from his payment estimate.

C-1.18 PROCUREMENT OF CRITICAL MATERIALS

If the Contractor anticipates that there may be delays in the procurement of certain materials he shall notify the Engineer upon receipt of the Award Notice. In order to expedite the delivery of these materials, the Engineer may issue a Notice to Order Critical Materials to the Contractor after execution of the contract and before a Notice to Proceed is given to start work.

C-1.19 STOCKPILE

All stockpiled material shall not be stored closer than 75 feet from the edge of any active taxiway or 250 feet from the centerline of an active runway and may not penetrate an imaginary surface off each runway end on a slope of 34 to 1. Material shall be sufficiently constrained to prevent any wind erosion.

C-1.20 AIR POLLUTION CONTROL

- A. No burning will be permitted on the site.

- B. It will be the Contractor's responsibility to control dust by an approved means. No separate payment will be made and the Contractor shall make due allowance in his bid to cover these non-productive costs.

C-1.21 TEMPORARY DRAINAGE

- A. The Contractor will be required to ensure at all times adequate drainage from his area of operations include dewatering runoff. The Contractor shall also provide water pollution and erosion control in accordance with Pennsylvania Department of Transportation Form 408, Sections 845.1, 845.2 and 845.3.
- B. All drainage ditches and culverts draining Airport and adjacent property shall be maintained and kept unobstructed at all times. If, in the opinion of the Engineer, the drainage of any area in the vicinity of the site is obstructed or retarded due to the Contractor's performance or negligence, the Contractor shall immediately remedy the cause of such obstruction or retardation at no additional cost to the City.

C-1.22 BARRICADES AND WARNING LIGHTS OR SIGNS

- A. The Contractor shall furnish, place and maintain barricades, direction and warning signs, red flags, battery powered red lights, and flagmen to adequately protect the work under construction from damage to protect the traveling public from accident and/or unnecessary inconvenience.
- B. Red lights shall continuously flash and have a minimum intensity of four (4) candles and a flash rate of 55 to 75 flashes per minute with a 10% flash duration.
- C. All construction areas shall be separated from air operations areas by portable, water-filled plastic low profile / jersey type barricades with alternating orange and white stripes as shown on the plans. Barricades shall be a minimum of eight (8) feet in length and shall be placed with no separation between the next barricade. Each barricade shall have two (2) red flashing lights as described above.
- D. All booms on cranes shall be identified by painting the top twenty (20) feet white and international orange in five (5) foot sections. Flags and 12-volt red flashing lights will also be required. All booms shall be lowered when not in operation.
- E. Steel plates, if required by the Engineer, shall be 3/4" thick minimum, adequately sized to safely span open excavations and secured in place.
- F. The Contractor will not be paid separately for furnishing, placing or relocating, and maintaining barricades, lights, danger signals, etc. and he shall make due allowance in his bid, in the applicable items of work, to cover these non-productive costs.

C-1.23 PROTECTION OF UTILITIES

- A. The Contractor shall exercise special care when working near existing utility installations such as lights, ducts, structures, underground trench laid cables, cable marker pads, water lines, underground oil lines, railroads and other installation, to ensure that no damage is done to them and that the underground wiring to such utilities is not damaged or rooted out, or pipelines broken or punctured.

If the Contractor damages any installation, he shall repair the damaged item to the Engineer's satisfaction at the Contractor's expense. At the Engineer's discretion, repairs will be done continuously on a 24-hour a day basis until completed. The Contractor shall submit for approval the name of an electrical contractor who shall be available on a 24-hour a day basis to affect any repairs as may be necessary due to Contractor error.

- B. Prior to any excavation or demolition work, the Contractor must contact the PA One-Call System, Inc. (1-800-242-1776) and comply with the provisions of PA Act 287 of 1974, as amended by Act 187 of 1996. The Contractor shall also identify all overhead lines, notify and comply with the applicable utility company's clearance requirements. The Contractor shall contact the Pennsylvania One-Call System (1-800-242-1776) no less than 3 working days and no more than 10 working days prior to starting any excavation and shall provide written notice to the Engineer that contact has been made.

All costs associated with protection of utilities, including compliance with the provisions of PA Act 287 of 1974 as amended by Act 187 of 1996 shall be included in the price bid for each item as shown on the bid proposal. No separate payment will be made.

C-1.24 FENCES, OFFICE, SHEDS AND STORAGE AREA

- A. The Contractor shall provide enclosures, fences, barricades, or other devices where necessary, or as directed, to prevent access to the site or danger to the public, as approved by the Engineer.
- B. N/A
- C. The Contractor shall be responsible for the care and protection of his materials, equipment and work.
- D. Upon completion of his work, the Contractor shall remove all temporary construction from the site.
- E. A plan showing the entire plot and area designated for use of the Contractor shall be prepared by the Contractor and approved by the Engineer. Refer to Contract Drawing Nos. G-003 through G-019 for general project layouts, haul routes, staging and project phasing.

C-1.25 RODENT CONTROL

The Contractor shall take precautions against the influx of rats, mice, and other pests. He shall engage a reputable exterminating firm to give regular service.

Such extermination shall comply with the regulations of the Department of Public Health.

C-1.26 PARKING VEHICLES

Parking for the Contractor's personnel will be the responsibility of the contractor.

C-1.27 PROGRESS PHOTOGRAPHS

As the work progresses, the contractor shall take record photographs. The record photographs shall be submitted on a weekly basis and submitted with contractor construction report using e-Builder, or other approved document management solution. Contractors shall cooperate with the project team who may photograph the construction area as required.

C-1.28 SANITARY FACILITIES

The Contractor shall provide and maintain in proper working order and in clean and sanitary condition adequate sanitary facilities which shall include but not be limited to privacy enclosures, toilet tissue, paper towels, waste receptacles and daily janitorial services for these facilities. The Contractor shall enforce use of these facilities by all personnel. Evidence to the contrary will require removal, disinfecting and reconstruction of work defaced. Use of existing Airport facilities is not allowed.

C-1.29 CONSTRUCTION CONFERENCES

Job conferences will be held on a regular weekly basis or as otherwise instructed by the Project Manager. Attendance by the Contractor's project manager or responsible representative is mandatory. Minutes will be recorded and distributed. Any corrections or comments to the minutes shall be made within one (1) week.

C-1.30 ERRORS OR OMISSIONS

- A. Should any bidder find discrepancies, duplications or omissions in the documents or have doubt as to the meaning expressed by the documents, he shall make inquiry in writing at once to the Engineer prior to bid date.
- B. Should there be any changes, corrections or clarifications to the Bid Documents, deemed necessary by the Engineer, written addenda will be issued accordingly. Addenda thus issued by the Engineer will be a part of the Contract Documents. No oral, telephone or letter instructions will be considered as having effect upon the Contract Documents; addenda only shall constitute change to them.

Bidders are urged to make early examination of Bid Documents and make inquiries about them if necessary to allow Engineer ample time to analyze such inquiries and to issue addenda when necessary, even though prices may not be determined until late in the bidding period.

- C. Contractor shall notify Engineer in writing regarding any necessary items that may have been omitted from the specifications or drawings or both,

and any irregularities, discrepancies or duplications between drawings and specifications according to the evident intent. In case of such errors or omissions, the Contractor shall not proceed with the work in uncertainty, but shall consult Engineer regarding proper intent and revise it if necessary.

- D. Where conflicts exist in the plans or specifications, the most stringent will be expected from the contractor. Bid accordingly.

C-1.31 LIMIT OF WORK

Limit of work is as shown on the drawings or as set by the Project Manager.

C-1.32 START OF WORK

The Contractor will be issued a written "Notice to Proceed".

C-1.33 TIME TO COMPLETE

Work required to be performed under this contract shall be completed in **1,107 Calendar Days** from the date of the Notice to Proceed. Liquidated damages will be assessed if the work is not completed as noted. A winter shutdown notice will be issued by the Engineer when requested by the Contractor, providing both parties agree that such shutdown is warranted. No time will be charged to the project during any approved winter shutdown.

C-1.34 OFFICE FOR ENGINEER

A field office will not be required for the Engineer.

C-1.35 LINE AND GRADE

The City will provide horizontal control points and benchmarks for vertical control. From these basic points, the Contractor shall supply all survey work necessary to perform the work to the line and grades shown on the drawings.

C-1.36 WATER SUPPLY

The City, within their facility and where available, will provide water required for the work free of charge to the Contractor. Within the Airport property, no permit is required. Permit is required for use of hydrants outside of the Airport property and adjacent to the highway. The Contractor must install and maintain the necessary temporary lines and connections removing same after the completion of each workday, and leaving all existing service lines in a condition satisfactory to the Engineer. The location of the water service nearest to the site can be examined by the Contractor by visiting the site.

C-1.37 RUBBISH

The Contractor shall provide covered metal cans in sufficient quantity for accumulation of rubbish and garbage from lunch cans and the like of all employees of all Contractors at the site. The Contractor shall instruct his employees to deposit their garbage and trash in these containers and not elsewhere about the site; and also not to use the containers for construction scraps, rubbish, trash and surplus materials. The Contractor shall empty these containers daily and haul the rubbish to a legal disposal site off Airport property.

C-1.38 CLEAN-UP

- A. The Contractor shall intermittently remove waste and rubble so that at no time shall there be undue accumulations. Upon completion, the Contractor shall dress up all areas affected by his work.

The Contractor shall provide dumpsters or other containers for the removal of construction trash and debris. The Contractor is responsible for ensuring that dumpsters or other containers are properly covered at all times to contain trash and debris in windy conditions.

- B. Spillage of earth or other materials on all existing paved surfaces shall be cleaned up immediately by all Prime Contractors.

Each Prime Contractor shall be responsible for their trash and the removal of same on a daily basis.

C-1.39 FINAL ACCEPTANCE

The Contractor shall perform and complete his work accordingly to the Contract Documents without fault or defect of any kind. When this condition of completion exists, the Contractor shall request final inspection and the Engineer will make the inspection promptly thereafter, recording any incomplete or defective work that he may discover on a punchlist. The Contractor shall then remedy each punchlist item and make the work conform to the Contract Documents in every instance. The Contractor shall then request inspection of all punchlist items.

C-1.40 PENNSYLVANIA SALES TAX

Unless an exemption is available under applicable law, materials, equipment and supplies to be furnished under this contract may be subject to the Pennsylvania and Philadelphia sales and use tax. THE BIDDER/CONTRACTOR IS SOLELY RESPONSIBLE FOR: (i) CONDUCTING AN INVESTIGATION TO DETERMINE BIDDER'S/ CONTRACTOR'S TAX LIABILITY AND (ii) THE PAYMENT OF ALL TAXES REQUIRED BY LAW.

C-1.41 TAX IDENTIFICATION NUMBER FOR CONTRACTORS, SUBCONTRACTORS AND SUPPLIERS

All prime contractors and subcontractors employed to perform work on this project, and all suppliers doing business in the City of Philadelphia who furnish any equipment, supplies or other materials in connection with this project, must possess a City of Philadelphia Business Tax Number. All such Tax Numbers must be submitted to the Project Manager with the subcontractor/supplier approval request. No subcontractor or supplier will be considered for approval without a City Business Tax Number. City Business Tax Numbers can be obtained in Revenue Dept., 1401 JFK Blvd., Municipal Services Building, Concourse Level, Philadelphia, PA 19102.

The City Controller's Office is mandated to review vendor payments prior to issuance and withhold said payments if non-compliance exists.

A CITY OF PHILADELPHIA TAX ACCOUNT NUMBER IS REQUIRED FOR ALL CONTRACTORS AND SUBCONTRACTORS. PLEASE INSERT IN THE SPACE PROVIDED ON THE BID INVITATION.

C-1.42 CUTTING, WELDING, OPEN FLAME AND SPARK PRODUCING EQUIPMENT

Before approval of any burn permit at the Philadelphia International airport by the Department of Aviation, the job superintendent shall inspect the work area and confirm that the necessary precautions have been taken to prevent fire in accordance with NFPA 51B and the Fire Code of Philadelphia.

General Precautions

- Sprinklers, where provided, in service (verified by Department of Aviation)
- Cutting and welding equipment in good repair and cylinders properly secured
- Protect gas hoses from physical damage and clear of the public area
- Extinguishing equipment on site shall have current inspection tags issued by a certified Fire Extinguishing Inspection Company
- Cutting and welding area shall be well ventilated and by-product gases shall be vented to unoccupied areas
- Electric arc welding, resistance welding and other similar welding equipment shall comply with Article No. 630 of the 1993 NEC
- Only one day's supply of acetylene on site
- City permit required to use acetylene cylinders exceeding 200 cubic feet net gas capacity

Within 35 Feet of Work

- Floors swept clean of combustibles
- Combustible floors wet down, covered with damp sand, metal or other shields
- All wall and floor openings covered with non-combustible covers
- Non-combustible covers suspended beneath work to collect sparks
- Remove combustibles or provide non-combustible protective shields for combustibles

Work on Enclosed Equipment - (Tanks, containers, ducts, dust collectors, etc.)

- Equipment cleaned of all combustibles
- Containers purged of all flammable vapors

Fire Watch

- Provide a responsible person(s) solely assigned the duties of constantly watching for accidental fires in the areas affected by the operation
- To be provided during, and 3 hours after, operation
- To include adjoining floors, rooms and spaces affected by the operation

- Supplied with the following extinguishing equipment:
 - a. One portable pressurized water extinguisher at 2A minimum
 - b. One portable dry chemical extinguisher rated at 30BC minimum (No ABC rated extinguishers allowed) or:
 - c. One portable CO2 extinguisher rated at 10BC minimum
- Notification to Airport Communications Center (3111 on any airport phone) of any fire at the site, whether controlled or not. Airport Fire Department will respond and investigate to determine severity of hazard.

The Contractor is to obtain the approval and signature of the Project Manager prior to the issuance of a burn permit. The burn permit shall be distributed to the Airport Fire Department, Communications Center and Operations Office at least 24 hours prior to any operation.

Penalties shall be assessed according to the Philadelphia Fire Code; \$300.00 fine and/or 90 days imprisonment for each violation or failure to comply.

C-1.43 OEO Compliance

The Contractor is required to report all payments to Minority, Woman, Disabled, and Disadvantaged Owned Business Enterprises subcontractors monthly to the Office of Economic Opportunity (OEO). If you have any questions, please contact OEO at 215-683-2000.

The OEO Monthly Summary Report is immediately following the Burn Permit located on the next page.

C-1.44 DELETION OF WORK

The Engineer shall reserve the right to delete any or all portions of the contract work, as deemed necessary for the best interest of the City without compensation to the Contractor.

C-1.45 INFORMATION

Information regarding any portion of this bid package can be obtained by submitting a request for information on www.phlcontracts.phila.gov. All questions must be received in writing. All questions will be answered by Amendment and issued to all approved sellers. Sellers asking questions via telephone will not receive direct responses.

C-1.46 PRE-BID MEETING

The time and date of the non-mandatory, virtual Pre-Bid Meeting will be distributed to all plan holders and conducted via Microsoft Teams.

BURN PERMIT

PHILADELPHIA INTERNATIONAL AIRPORT NOTICE OF FLAME CUTTING/WELDING

LOCATION: _____

CONTRACTOR: _____

HOURS: _____

DATE: _____

NAME OF FIRE WATCHER: _____

NOTE: All burn activity is to be supervised 3 hours after termination of operation.

Operations, Communications Center, Fire Department, Engineering, Job Control and FM Global are to be notified of all burn activity.

Operations fax #: (215) 937-6873

Communications Center fax #: (215) 937-6882

Fire Department fax #: (215) 492-1258

Engineering fax#: (215) 937-6734

Job Control fax #: (215) 937-6898

FM Global fax #: (888) 201-9263

Sent By: _____

Received By: _____

FAILURE TO COMPLY WITH THESE REGULATIONS WILL RESULT IN A \$300.00 FINE AND/OR 90 DAYS IMPRISONMENT.

*City of Philadelphia
Office of Economic Opportunity*

POST AWARD COMPLIANCE REVIEW FOR M/W/DSBEs			
DATE:	BID#	BID OPENING DATE:	REPORT NO. _____ (i.e. 1,2 or 3)
PROJECT NAME:		CONTRACT#	CONTRACT AMOUNT
COMMITMENT TO MBE	COMMITMENT TO WBE	COMMITMENT TO DSBE	DATE WORK BEGINS
PRIME CONTRACTOR NAME:			
ADDRESS:			
CONTACT:		PHONE#	FAX #:
SUBCONTRACTOR NAME:			
MBE _____		WBE _____	DSBE _____
ADDRESS:			
CONTACT:		PHONE#	FAX #:
SCOPE OF WORK:			
MONTH/YEAR	PAYMENTS TO FIRM	% OF TOTAL PAYMENT	YEAR TO DATE AMT PAID
JAN	\$	%	
FEB	\$	%	
MAR	\$	%	
APR	\$	%	
MAY	\$	%	
JUN	\$	%	
JUL	\$	%	
AUG	\$	%	
SEP	\$	%	
OCT	\$	%	
NOV	\$	%	
DEC	\$	%	

TOTAL (SERVICE OR PURCHASE) SUBCONTRACT VALUE IS: \$ _____

*ATTACH COPIES OF CANCELLED CHECKS, SUBCONTRACTS AND INVOICES FROM SUBS

SIGNATURE

DATE

C-1.47 SUBMITTALS, SHOP DRAWINGS AND APPLICATIONS FOR PAYMENT

e-Builder, a web-based software program, will be used to track all submittals, shop drawings and applications for payment. Contractor will be provided login information. Contractor will be required to upload PDF documents that shall contain a Submittal Data Form. Each Submittal Data Form shall indicate the bid item number, specification section, paragraph, drawing reference and submittal identification number. Submittal identification numbers shall be assigned sequentially by specification section. The Project Manager will review and provide approval status on e-Builder, or other approved document management solution. Contractor agrees to execute field directives, change orders or other project/contract related documents, via DocuSign for electronic signature and/or approval as transmitted by Project Manager.

C-1.48 RECORD DRAWINGS

The Contractor shall submit two (2) complete copies of the contract drawings with changes indicated in red and a record .PDF drawing to include any field directives and change order work, referencing sketches, elevations, locations and any other completed as-bid scope changes.

C-1.49 PARTIAL CERTIFICATION OF PROJECT FUNDING

It should be understood and agreed by this bidder that funding for this project will be partially certified. It should be further understood that additional funding is subject to councilmatic appropriation of funds. Should the City fail to appropriate the necessary additional funds for this project, the Contract for that portion of the work not funded shall terminate automatically, without penalty, cost or liability to the City.

C-1.50 SPILL NOTIFICATION PROCEDURE

Airport regulations require immediate notification to the Airport when any amount of fuel or regulated substance* is spilled or released on Airport property. In addition, any spill (regardless of quantity) that enters a storm drain must also be reported to the Pennsylvania Department of Environmental Protection (PADEP) and the National Response Center. The Airport will make the notification to PADEP and the National Response Center after being notified of the release by the contractor.

*The following substances are regulated under Pennsylvania environmental regulations and require notification:

- All petroleum hydrocarbon products used at the Airport including jet fuels, gasoline, and diesel fuels, heating oil, hydraulic fluid, transmission fluid, etc.
- Ethylene glycol-based anti-freeze and deicing fluids
- Releases of placarded non-petroleum substances.

To report a spill or release of any quantity fuel or regulated substance, call the Airport Communications Center at 215-937-3111.

All spills of any size shall be promptly and properly cleaned up.

PLEASE POST "THE SPILL NOTIFICATION PROCEDURE" ON-SITE. It is located on the following page.

**SPILL NOTIFICATION PROCEDURE FOR ALL TENANTS
PHILADELPHIA INTERNATIONAL AIRPORT
UPDATED AS OF JULY 2013**

Airport regulations require the immediate notification of Airport Operations when any amount of fuel or regulated substance is spilled or released anywhere on Airport property

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SEP	\$	%	
OCT	\$	%	
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TOTAL (SERVICE OR PURCHASE) SUBCONTRACT VALUE IS: \$ _____

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- All petroleum hydrocarbon products used at the Airport including jet fuels, gasoline, and diesel fuels, heating oil, hydraulic fluid, transmission fluid, etc.
- Ethylene glycol-based anti-freeze and deicing fluids
- Releases of placarded non-petroleum substances.

To report a spill or release of any quantity fuel or regulated substance, call the Airport Communications Center at 215-937-3111.

All spills of any size shall be promptly and properly cleaned up.

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**SPILL NOTIFICATION PROCEDURE FOR ALL TENANTS
PHILADELPHIA INTERNATIONAL AIRPORT
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To report a spill or release of any quantity of fuel or regulated substance call the Airport Communications Center at:

215-937-3111

All spills regardless of quantity shall be promptly and properly cleaned up.

SECTION 7 - AIRPORT SECURITY

A. PURPOSE

PHL has adopted, maintains and enforces an Airport Security Plan ("ASP"), as mandated by the U.S. Department of Homeland Security by and through its Transportation Security Administration ("TSA"). These security Rules and Regulations are adopted in support of the ASP for the safety and security of all those who enter and utilize PHL and those who violate these Rules and Regulations or applicable federal regulations will be subject to the appropriate penalty indicated herein.

B. COMPLIANCE REQUIREMENTS

1. All persons using the Airport (as defined in Section 1 of these Rules and Regulations) are subject to the security program and these security rules and regulations, as amended from time to time.
2. No one may, or cause another person to, tamper or interfere with, compromise, modify, or attempt to circumvent any security system, measure or procedure implemented pursuant to, or in association with, the ASP.
3. **Penalty for Noncompliance.** Persons who violate security regulations and procedures, including those set forth herein may:
 - i. Be denied future access to the Secured, Air Operations, SIDA or Sterile Areas;
 - ii. Have their access or driving privileges and/or Airport Identification Badge (PHL ID Badge or PHL Security Badge) suspended for up to 30 days;
 - iii. Have their access or driving privileges and/or PHL ID Badge permanently revoked; and/or
 - iv. Be fined or otherwise penalized in accordance with applicable regulatory measures.

C. DESCRIPTION OF AIRPORT AREAS

1. **Public Areas** (sometimes referred to as "Landside") are normally accessible to the General Public. They include public portions of all Terminal Buildings, parking lots, and Airport roadways. See Exhibit 7-1.
2. **The Security Identification Display Area ("SIDA")** is that portion of the Airport in which each person is required by the Airport Operator to

continuously and prominently display Airport issued or Airport approved identification between the neck and waist on the outermost garment unless that person is under an Airport approved escort. See Exhibit 7-1.

3. **Restricted Areas** are those parts of the Airport not open to the public and include, but are not limited to, baggage make up areas, passenger and cargo loading ramps, hangar areas, runways and taxiways. Restricted areas are a part of the SIDA. See Exhibit 7-1.
4. **The Air Operations Area** ("AOA") is the portion of the Airport designed and used for landing, taking off or surface maneuvering of Aircraft. The AOA is that area contained within the security boundary established by buildings and chain link fencing along the perimeter of the Airport. It includes all aircraft movement areas i.e. runways, taxiways etc., aircraft parking areas, loading ramps and safety areas used by commercial aircraft and any adjacent areas that are bounded by the outer service road. The Air Operations Area is a part of the SIDA. See Exhibit 7-1.
5. **The Secured Area** (sometimes referred to as "Airside" and including the Restricted, SIDA and AOA areas) is that area of the Airport where access is controlled by a system, method, or procedure to control authorized access and deny access to unauthorized persons. At PHL, the Secured Area is comprised of that portion of the Air Operations Area bordered on the north by the perimeter fence line and Terminal and cargo buildings (as well as associated cargo facility ramps), on the east by the grass area adjacent to the "F" Ramp, on the South by the Outer Service Road, and on the west at the intersection of the Deicing Apron and the Outer Service Road. The Secured Area therefore includes all the baggage tunnels, the east and west aprons, as well as the fuel loading and truck parking apron. See Exhibit 7-1. The boundary of the Secured Area may be changed, from time to time, either temporarily or permanently.
6. **The Sterile Area** (sometimes referred to as "Terminal") is the portion of the Airport that provides passengers access to board aircraft and to which access is controlled through the screening of persons and property. It includes the area past Security Screening at Terminals/Concourse A West, A East, B, C, D, E and F. See Exhibit 7-1.

D. PROCEDURES FOR ACCESS TO RESTRICTED AREAS

1. Security Screening

- a. **Who Must be Screened.** Persons desiring to enter the Secured Area, AOA, SIDA or Sterile Area are subject to, and consent to, security screening, questioning, inspection and search of their persons and accessible property as required by law and must comply with the

system, measures or procedures being applied to control access as defined in these rules.

- b. **Random Screening of Badgeholders.** Badgeholders may be subject to random screening and searches by the TSA or other appointed authority at any time while attempting to access, or in, restricted areas.
- c. **Inspection of Badges.** Anytime an individual with a PHL ID Badge attempts to pass through a federally regulated checkpoint or a staffed perimeter security checkpoint, the individual responsible for checking PHL ID Badges will stop the individual; verify/compare the photograph on the badge to the person; and check the badge's expiration date.
- d. **Handling Invalid Badges.** If the person attempting to pass the checkpoint does not match the photograph on his/her PHL ID Badge, or if the PHL ID Badge is expired, altered, or counterfeit, the person responsible for checking the PHL ID Badge will:
 - 1. Deny that person access to the restricted area;
 - 2. Confiscate the PHL ID Badge; and
 - 3. Immediately report the incident to the Airport Police at (215) 937-6711 or the Airport Security Department at (215) 937-5452.

2. General Requirements for Access

- a. The only persons authorized to enter restricted areas are:
 - i. Authorized and properly identified PHL personnel, tenants, tenant employees, and airline employees assigned a duty or aviation activity or who have an operational need to be in a particular area;
 - ii. Passengers, who under appropriate supervision, are entering to enplane or deplane an aircraft;
 - iii. Persons under appropriate supervision or escort as discussed in Section D.6. below;
 - iv. Those having prior written PHL authorization; and
 - v. Properly identified FAA, TSA, or DHS employees or representatives.

- b. **Removal of Unidentified and Unauthorized Persons.** Unidentified and unauthorized persons in the Secured, Sterile, SIDA or Air Operations Areas may be detained or removed by the Airport Director or his duly authorized representative, Airport Police or the TSA.

3. Approved Identification for Unescorted Access to Restricted Areas:

- a. Valid Airport ID indicating that individual has unescorted access privileges to that area; or
- b. In the case of aircraft crewmembers, dressed in the full uniform of his/her company, a photo ID issued by an authorizing airline; or
- c. In the case of an FAA Aviation Safety Inspector conducting his/her assigned duties, an FAA Form 110 A in his/her possession; or
- d. TSA identification badges worn by authorized TSA agents.

4. Airport Badge Description/Authorization

- a. PHL issues four (4) different colored PHL ID Badges to identify personnel and designate their access privileges based on their need to be at a given work station (See Exhibit 7-2):

Color	Access Authorization	Escort Privileges	Expiration
BLUE	Unescorted access to areas of the Sterile, Secured, SIDA and Air Operations Areas where badgeholder has an operational need to be	-Indicated by PHL issued escort designation -Authorized to escort in Sterile Area, Secured Area, SIDA and AOA	Expires in two (2) years
RED	Access to Sterile Area only, i.e. Non-SIDA/Non-Secured Areas; no access to AOA	None	Expires in two (2) years
YELLOW	Temporary unescorted access badge issued to contractors giving them access to areas of the Sterile, Secured, AOA and SIDA areas where they will be working	-Authorized to escort individuals within AOA work area only -May not escort vehicles through a gate or within the AOA	Expires in one (1) year
WHITE	Access to Airport Employee Parking Lot only	None	Expires in one (1) year

b. **Specialized Media Access Identifiers**

1. PHL has developed and implemented the following special badge media access identifiers to improve recognition of individuals who have an operational need to enter or leave areas of operation in a quick and efficient manner in order to uphold the safety and security of the airport environment:

- i. **Law Enforcement Officer (“LEO”) Identification**

- Issued to local Airport and Federal Law Enforcement Personnel who have been authorized to carry a firearm into the AOA, SIDA, Secured and Sterile areas;

- Distinguished by a solid red line at the top of the badge and a red box below the expiration date.

- ii. **Aircraft Rescue and Firefighting (“ARFF”) Personnel**

- Issued to ARFF personnel who must access the AOA, SIDA, Secured and Sterile areas in the event of an emergency;

- Distinguished by solid orange line at the top of the badge and an orange box below the expiration date.

- iii. **Emergency Response Personnel**

- Issued to Airport employees, law enforcement and emergency response personnel who must access the AOA, SIDA, Secured and Sterile areas in the event of an emergency.

- Distinguished by yellow/gold box on the Airport Expiration Date.

2. **FAA Aviation Safety Inspector Identification**

- FAA Aviation Safety Inspectors possessing FAA Form 110A have unescorted access to those portions of the SIDA in which it is necessary for them to conduct their assigned duties of inspection.

- FAA Aviation Safety Inspectors must have Form 110A in their possession at all times.

- Restriction on Use of Form 110A.** While Form 110A is considered an official identification medium while in secured areas, it does not provide an inspector access to areas that are not being inspected. Access to other secured areas must be gained through local airport procedures.

3. **Airline Carrier Identification Media**

- (a) Flight crewmembers who are in uniform and wearing their air carrier issued identification medium readily visible at waist level or above may access the following portions of the Secured Area:
 - i. The immediate vicinity of the aircraft to which the flight crew is assigned;
 - ii. The flight crew operations/flight office, or its equivalent; and
 - iii. Points in between as authorized by PHL.
- (b) If there is an operational need for cabin crew members to have unescorted access to the area within the immediate vicinity of the aircraft to which the crew is assigned, the flight crew operations/flight office or points in between, the ASC or his/her designee may approve such access.

4. **TSA Inspection Authority**

The TSA may enter and be present within Secured areas, the AOA and SIDA without access media or identification media issued or approved by an airport operator or aircraft operator in order to inspect or test compliance or perform other such duties as TSA may direct pursuant to applicable federal law.

5. **Prohibited Items in Restricted Areas of the Airport**

- a. Those persons entering or who are within the Restricted Area may not possess or carry any items, (except liquids and gels that are allowed through employee access points), that the TSA prohibits from carriage through Screening Checkpoints or in carry-on luggage unless those items are required for job-related activities.
- b. A list of items prohibited by the TSA, including, but not limited to, sharp objects; sporting goods; guns and firearms; martial arts and self defense items; tools; explosive materials, flammable items and disabling chemicals or other dangerous items, is available on the TSA website at www.tsa.gov. The TSA will update the prohibited items list from time to time as necessary.
- c. Those who possess or carry items otherwise prohibited by the TSA into or within the Restricted Area for job related purposes, particularly tools relating to authorized construction projects, are prohibited from leaving

said items unattended unless they are secured in a room or storage area inaccessible to screened passengers.

- d. Violators will be fined a minimum of \$100.00 and their access privileges may be suspended or permanently revoked depending on the severity of the incident.

6. Badgeholders' Responsibilities

a. PHL Identification Badge Display

1. All individuals requiring unescorted access to the secured area of the Airport must wear their PHL ID Badges at waist level or above, prominently displayed and readily visible on their outer clothing.
2. The PHL ID Badge is the sole property of the Airport and badgeholders may not alter the appearance of the PHL Identification Badge by covering up the picture or applying or wearing tenant ID badges, objects, stickers other than those authorized by the Airport, or other encumbrance over the PHL ID Badge.
3. Badgeholders must immediately have the PHL ID Badge replaced if it is damaged in any way i.e. the badgeholder's name, badgeholder's picture, company name, or badge expiration date becomes indistinguishable or the badge is torn or split in any way.

b. Proper Use of PHL Identification or Access Medium

1. **Badge Must be Used for Purpose Issued.** No person may use, allow to be used or cause to be used, any airport-issued or airport-approved access medium or identification medium that authorizes the access, presence or movement of persons or vehicles in Secured, Air Operations or SIDA Areas in a manner other than that for which it was issued by the Airport;
2. **Use of Another Person's Badge Prohibited.** PHL ID Badgeholders are prohibited from using another person's PHL Identification Badge or providing their PHL ID badge to any other person for the purpose of unescorted access to a restricted or secured area;
3. **Badge Must be Valid.** Badgeholders are responsible for renewing their badges before they expire and may not use or attempt to use an expired or otherwise invalid badges to access the restricted area;
4. **Badge for Use during Designated Work Hours for Job-Related Purposes.** Off-duty badgeholders traveling on commercial airline

flights may not use PHL Identification badges or access media to bypass or escort others around the TSA security screening checkpoint process;

5. **“Piggybacking” or “Tailgating” Prohibited.** Badgeholders must ensure that door or gates that they open are securely closed behind them and must not allow anyone else to enter behind them without that person utilizing his/her own PHL issued identification or access media. Propping open or leaving a direct access point unattended will result in an alarm and subsequent response by the Philadelphia Police and/or the Airport Operations Department. **Penalty:** Any person who gains or allows another person unauthorized access into the Secured Area and Air Operations Areas by “piggybacking” or “tailgating,” which involves holding a gate or door open for someone to allow him or her to enter a secured or restricted area without using his or her PHL ID Badge, as described in the TSA approved SIDA training program, will be subject to the penalties in Section B herein and/or a monetary fine in accordance with the schedule in Appendix G and may be denied future access to the Secured, Air Operations or Sterile Areas;
6. **Swiping of Badges in Elevators.** Badgeholders who gain access to a restricted area via an elevator must ensure that each unescorted person on the elevator swipes his/her own PHL Identification Badge and gets a green light on the card reader before proceeding.

c. **Challenge Responsibilities**

1. **Badge Challenge Requirement**

- a. **When to challenge.** Any PHL badgeholder who has unescorted access to the AOA, SIDA and Secured Areas that identifies a person who is not visibly or properly displaying a PHL ID badge must challenge that individual in order to ascertain his/her identity.
- b. If a badgeholder feels that challenging someone would endanger his/her safety, he/she must immediately contact Airport Police at (215) 937-6711 or the Airport Security Department at (215) 937-5452, observe the person while on the phone, if possible, and provide a description of the person and his/her location.

2. **Badge Challenge Procedure**

- a. The challenger should proceed as follows:

- i. Approach the individual in question and request to verify his/her ID Badge;
 - ii. Do not touch, grab, or threaten the individual in question;
 - iii. If the individual is unable to produce a PHL ID Badge, immediately contact the Airport Security Department by radio or by phone at (215) 937-5452 or the Airport Police by radio, or by phone at (215) 937-6711;
 - iv. The Airport Security Department or Airport Police will take appropriate action to identify the violator;
 - v. Violators will be immediately escorted out of the secured area by the responding enforcement personnel.
- b. PHL will maintain a record of each violation for a minimum of 180 days.

3. Badge Challenge Compliance

Badgeholders must cooperate and immediately present their identification badges when challenged.

d. Responsibility for Reporting Suspicious Activity

- i. All badgeholders, including airport personnel, tenants, vendors, contractors and their employees must immediately report any suspicious activity to Airport Police at (215) 937-6711.
- ii. **Suspicious activities include:** surveillance of the airport, including videotaping, photographing and note taking; persons exhibiting unusual behaviors; persons asking unusual questions or questions about airport security; persons or vehicles in the same location for an extended period of time; persons wearing improper clothing for their job or the weather; unattended bags, etc.

7. Procedures for Escorting Individuals through Restricted Areas

- a. **Who May be Escorted.** (1) Persons who do not have unescorted access authorization to the SIDA, Secured, Restricted, Sterile or Air Operations Areas who have been fully vetted through the airport process and have a

short term operational need to be in those areas, including but not limited to contractors, subcontractors etc.; and (2) New employees that have a PHL badge appointment slip or an "in process" authorization slip in their possession and a valid, government-issued picture identification.

- b. **Restriction on Escorting those with Lost or Stolen Badges.** An individual who has reported his/her PHL ID Badge lost or stolen may be escorted **only if** the individual: (i) has scheduled an appointment to have the badge replaced; and (ii) has a PHL badge appointment slip in conjunction with a photo ID in his/her possession while under escort.
- c. **Those Who May Not Be Escorted.** (1) Individuals who have been denied a PHL ID badge because of a disqualifying crime; (2) individuals who have failed the Airport's vetting process; or (3) individuals whose badges are no longer valid, i.e. their badges are expired or have been confiscated, or whose access privileges have been suspended due to a violation.
- d. **Who May Escort.** (1) Those possessing a blue PHL ID Badge with a proper airport-issued escort designation or a law enforcement officer badge are permitted to escort individuals or vehicles in the Sterile, Secured, Air Operations and/or SIDA areas; and (2) those possessing yellow badges may escort individuals in the AOA work area only.
- e. **Escorting Rules and Responsibilities.** Prior to being authorized to escort others, potential escorts must sign the "Escorting Rules and Responsibilities" section of the PHL Security Badge Application stating that they understand the escort policy rules, responsibilities and consequences for noncompliance and will be held responsible in accordance with the penalties listed therein. See Exhibit 7-3. **Escorting shall be for business purposes only.**
- f. **Control of Escortee.**
 - 1. Authorized individuals being escorted must remain under the immediate sight and control of the person performing the escort at all times while in a Secured or Sterile Area. Controlled escort access is established through: (i) the escort having direct eye contact or being no greater than 10 feet away from the individual(s) being escorted while he or she is within the Sterile Area, and/or Secured Area; and (ii) the escort being able to monitor the person being escorted in a manner sufficient to identify whether the escorted individual is engaged in actions other than those for which escorted access was granted.
 - 2. Prior to escorting anyone into a Secured or Sterile area, the escort shall inform the escortee that he/she must remain in direct eye contact with or be no greater than ten (10) feet away from the escort and that

should they get separated, escortee must stop, locate a white courtesy phone, call the operator at 3111 or the police dispatch at (215) 937-6711, and advise the operator or dispatcher of his/her name, location, and the name of his/his designated escort.

- g. **Escortee Responsibilities.** If an escortee gets separated from his/her escort, the escortee shall immediately stop, locate a white courtesy phone, call the operator at 3111 or contact Airport Police dispatch at (215) 937-6711, advise the operator or dispatcher of his/her name, location and the name of his/her designated escort and wait until his/her escort or a law enforcement officer is able to locate him or her.
- h. **Loss of Control of Escortee.** If an escort loses control of the individual(s) he or she is escorting or those being escorted engage in activities other than those for which access was granted, that escort must contact the Airport Operator at 3111 or Airport Police at (215) 937-6711 immediately.
- i. **Points through which Escorting may be initiated.** All authorized escorting in the main terminal facility must take place through Gate V01 (or other authorized, access controlled gate) or through a security-screening checkpoint.
- j. **Number that May Be Escorted.** Authorized escorts may only escort one (1) person at one time through Gate VO1 (or other authorized, access controlled gate) or up to three (3) individuals at one time through a security screening checkpoint into a Secured or Sterile area, unless otherwise authorized by the ASC.
- k. **Escorting in Cargo Areas.** All escorting in the airport's cargo facilities or in Cargo City is at the discretion of the Airport Security Coordinator ("ASC") and must be based on an operational need. Up to three (3) individuals may be escorted at one time in cargo areas.
- l. **Escort Authorization Limits.** Each tenant must determine which of its employees should be granted escort authorization. Currently, PHL will grant up to 25% of each tenant's blue badge population escort authority. PHL may elect to grant escort authority to more than the allotted 25% limit if the tenant has a justifiable operational requirement to exceed the 25% limit. Escort authorization limits are subject to change at any time.
- m. **Maintenance of Escort List.** Each tenant must keep its escort list current and available for review and notify the ASC or his/her authorized designee immediately, at (215) 937-5452, if an employee's escort authorization has been revoked. If an employee's escort authorization is revoked, the employer or employee must return that badge to PHL so that the escort

designation may be removed from the badge. A tenant's failure to properly maintain its escort list may result in the revocation of escort authority for the entire company.

- n. **Tenant Responsibility for Ensuring Escorts Know Procedures.** Each tenant must ensure that its escorts know the actions that they or other authorized individuals are required to take if the individuals being escorted engage in activities other than those for which access is granted.

8. Vendor/Contractor Access to Restricted Areas

Vendors or contractors requiring access to a Restricted, Sterile or Secured area must: (i) be sponsored by the Division of Aviation ("DOA"), an air carrier or a tenant that will certify that the vendor or contractor has legitimate business at PHL; and (ii) comply with PHL security Rules and Regulations in order to retain airport security privileges.

E. TENANT RESPONSIBILITIES

1. **Security, Safety and Passenger Handling Program.** Aircraft operators/Air Carrier Tenants must have a written, TSA approved, security, safety and passenger handling program.
2. **Dissemination of Information to Employees.** Each air carrier, tenant, vendor or contractor is responsible for disseminating airport security rules, regulations and procedures and any changes made to them and ensuring their employees' compliance with those rules, regulations and procedures and will certify, upon request, to PHL that all employees have received the same.
3. **Security Doors.** Tenants shall be responsible for security doors located in their leased areas. Tenants who fail to control unauthorized access into the Secured Area or AOA through doors located in tenant leased space may be subject to monetary fines in accordance with the schedule in Appendix G and may be subject to TSA civil penalties.
4. **Seeking Prior Written Approval Before Making Modifications.** Tenants must seek written approval and authorization before making modifications including making changes to security boundaries, fencing, access control systems or any audio/visual media/surveillance equipment. The Tenant seeking that approval must agree to share the feeds of that equipment, in a format that is acceptable to the DOA, with the Airport.

5. Fines and Penalties.

- a. Airport Tenants, Air Carriers or Airport Users could potentially be subject to a monetary fine for their employees' failure to comply with federal and airport Rules and Regulations.
- b. Fines or monetary penalties assessed against PHL by the TSA or other regulatory agency, after all appeals have been exhausted, for infractions or violations of applicable TSA regulations, may be passed on to the airline/tenant involved or equally assessed between the airline/tenant and PHL. PHL has the sole responsibility, in its discretion, to contest or not contest fines.
- c. All tenants agree to cooperate fully with PHL in any investigation into a possible security violation.

6. **Reporting Suspicious Activity.** All Airport personnel, tenants, vendors or contractors and their employees must immediately report any suspicious activity to Airport Police at (215) 937-6711.

F. PHL ID BADGE PROCEDURES

1. Determination of Eligibility for Issuance of a PHL Identification Badge

- a. **TSA Authorization.** Before PHL can issue a PHL identification badge to a new employee, the TSA must complete a Security Threat Assessment ("STA") and authorize the issuance of an identification badge to that individual. If approved, PHL will issue a PHL ID Badge to the individual allowing access to those portions of the Airport where the employee has an operational need and is authorized to be.
- b. **ASC Determination.** The ASC, or his/her designee will evaluate each request for a PHL ID Badge to determine if there is an operational need for the applicant to have access to a restricted or secured area on a regular basis.
- c. **Government Employees.** Employees of federal, state and local government agencies who as a condition of their employment have been subjected to an employment investigation that includes a criminal history background check and who have a need for regular access to restricted areas of the Airport will be issued a PHL ID Badge which authorizes access to the restricted area. Their governmental agency identification badges will be accepted as verification that a prior employment check has been completed.

- d. **Requests for Change of Access.** Once an access request has been approved, all subsequent access requests (change of access) must be submitted to the ASC or his/her designee in writing.

2. Applicant Responsibilities

- a. Submit to a Security Threat Assessment;
- b. Submit to a fingerprint-based Criminal History Records Check (CHRC);
- c. Complete a PHL Security Badge Application and submit it to the PHL Badging Office;
- d. Complete SIDA training prior to obtaining and when renewing a PHL Security Badge;
- e. Complete airfield driver's training course for the operation of vehicles on the airfield in accordance with FAR 139, if required to operate a vehicle on the airfield; and
- f. Complete airport customer service training prior to obtaining and when renewing a PHL Security Badge; and
- g. Comply with any other PHL and/or TSA requests and/or requirements.

3. Employer or Sponsoring Company Responsibilities

- a. **Ensure Compliance with Application Process.** Air Carriers are required to ensure that their employees (including flight crew members) and other airport tenants sponsored by air carriers submit to the Airport application process, which includes a STA and a CHRC.
- b. **Background Checks.** PHL reserves the right to require that Airlines or Tenants perform the required employment background checks for their contractors or agents, and not to delegate this authority to their contractors or agents. The Airline or Tenant will be held responsible for ensuring these checks are completed in accordance with federal regulations.
- c. **Designation of Authorized Signers.** Each Air Carrier, Tenant, Vendor, Contractor or Sponsoring Agent must designate an authorized signer who will serve as the primary point of contact for Airport Security and is responsible for signing for fingerprints, CHRC, PHL ID Badges, vehicle permits, access changes, access control reporting and any other business relating to Airport Security. PHL reserves the right to determine the number of authorized signers each company may have.

- d. **Requirements for Authorized Signer Designation.** All authorized signers must: (i) be fingerprinted and cleared via the STA process and CHRC; (ii) attend SIDA training; (iii) attend PHL authorized signer's training and are subject to comparison against TSA watch lists.
- e. **CHRC Certified Signature and Sponsorship Letters.** Each authorizing company or sponsor must submit a signed Fingerprint-based CHRC Certified Signature Letter and/or CHRC Company Sponsorship letter that: (i) authorizes a direct employee or a sponsored company employee to proceed with the fingerprint process; and (ii) certifies that there is an operational need for the applicant to have unescorted access. All Authorizing Signers signatures must be authentic. Stamped, photocopied or facsimile signatures will not be accepted.

4. Security Threat Assessment

- a. **Purpose.** The TSA checks each applicant against its databases to determine whether there are any outstanding immigration, terrorist or federal open wants or warrants pending against a potential employee.
- b. **Application.** The PHL Security Badge Application must be signed by the applicant and include: (1) applicant's legal name, including first, middle and last; any applicable suffix and any other names used previously; (2) current mailing address, including residential address if different from the current mailing address and all other residential addresses for the previous five years; (3) date and place of birth; (4) social security number; (5) gender; (6) country of citizenship and if naturalized in the United States, date of naturalization and certificate number; (7) alien registration number, if applicable; and (8) Privacy Act Notice.
- c. **PHL's Responsibility.** PHL must submit each applicant's background information to the American Association of Airport Executives (AAAE) Transportation Security Clearinghouse, which acts as a conduit between the airport and the TSA.

5. Authentication of Applicant's Identity

Prior to fingerprinting an applicant PHL must authenticate the identity of the applicant by reviewing two (2) forms of identification, one of which must be a government-issued picture identification. The TSA has determined that the documents listed in Exhibit 7-4 may be used to establish identity.

6. Criminal History Records Check

- a. **Requirement.** The Airport must ensure that no individual is granted unescorted access authority unless the individual has undergone a fingerprint based Criminal History Records Check (CHRC) that does not disclose that he or she has a disqualifying criminal offense listed in Exhibit 7-5.
- b. **Subsequent Recurrent CHRC.** The Airport may perform subsequent recurrent CHRCs on badgeholders with access to secured areas who are required to complete a CHRC by federal regulations.
- c. **Fingerprint Application**
 - 1. Prior to being fingerprinted, each applicant will be required to complete and sign a PHL Security Badge application that includes the following:
 - i. A statement that the individual signing the application does not have a disqualifying criminal offense;
 - ii. A statement informing the individual that Federal Regulations under 49 C.F.R. § 1542.209 (1) impose a continuing obligation to disclose to the Airport within 24 hours if that individual is convicted of any disqualifying criminal offense that occurs while he/she has unescorted access authority; and
 - iii. A statement confirming that the information the applicant has provided is true, complete and correct and is provided in good faith and that a knowing and willful false statement on the application can be punished by fine, imprisonment or both.
- d. **Disqualifying Criminal Offenses**

An individual has a disqualifying criminal offense if the individual has been convicted or found not guilty of by reason of insanity, of any of the disqualifying crimes listed in Exhibit 7-5 in any jurisdiction during the 10 years before the date of the individual's application for unescorted access authority, or while the individual has unescorted access authority.

e. Determination of Arrest Status

When a CHRC reveals that an individual seeking unescorted access authority, who is not covered by a certification from an Air Carrier, has been arrested for any disqualifying criminal offense listed above without indicating a disposition the following must occur:

1. The ASC or his/her designee must investigate the arrest to determine whether it involves a disqualifying offense;
2. If there is no disposition, or if the disposition did not result in a conviction or a finding of not guilty by reason of insanity of one of the offenses listed in Exhibit 7-5, unescorted access may be authorized;
3. PHL maintains the discretion to restrict, terminate or deny unescorted access authority when necessary to maintain the integrity of the Airport Security Plan.

f. Notification of Disqualification

The ASC will do the following prior to making a final decision to deny unescorted access to an individual because of a disqualifying offense:

1. Inform the applicant in writing with a Disqualifying Crime Letter that the FBI criminal record revealed information that would disqualify him/her from receiving a PHL ID Badge or restrict his/her unescorted access authority;
2. Provide the applicant with a copy of the FBI record, if he/she requests it in writing;
3. Will deny unescorted access authority if an applicant does not notify the Airport of his/her intent to correct the information revealed in the CHRC or provide documentation to refute or correct the information within 30 days of receipt of the Disqualifying Crime Letter.

g. Corrective Action by Applicant

1. An applicant has thirty (30) days from receipt of the letter to notify the Airport in writing of his/her intention to correct or provide case disposition information to assist the Airport in making a final decision;
2. An applicant must provide a revised/corrected FBI Criminal Investigation Record or a certified true copy of the disposition information from the appropriate municipal or government court;

3. The ASC or designee will review the information provided prior to making a final decision regarding the applicant's unescorted access.

h. Limitations on Dissemination of Results of CHRC

The ASC or designee will not disseminate the results of the CHRC to anyone other than:

- i. The individual to whom the results pertain or that individual's authorized representative;
- ii. Authorized officials of other Airport Operators who are determining whether to grant unescorted access to the individual under this part;
- iii. Aircraft operators who are determining whether to grant unescorted access to the individual or authorize the individual to perform screening functions; and/or
- iv. Others designated or authorized by the TSA.

i. Procedure for Obtaining Copies of CHRC Results

1. Requests for copies of the results of a Criminal History Records Check must be submitted in writing to:

PHL Fingerprint Copy Request
Attention: Safety and Airport Security Coordinator
Airport Security Department
Philadelphia International Airport, Terminal D/E Philadelphia,
PA 19153;

2. Employees must include a legible photocopy of one government issued photo-identification with their request; and
3. Copies of records requested by an employee will be sent to the address on file at PHL for that employee.

j. Continuing Responsibility to Report Disqualifying Criminal Offenses.

1. Each individual with unescorted access authority who is convicted or found guilty by reason of insanity for a disqualifying criminal offense must:
 - i. Report the offense to the Airport Security Department at (215) 937-5452 or ASC at (215) 937-5462; and

- ii. Surrender the SIDA access medium to the issuer within 24 hours of the conviction or the finding of not guilty by reason of insanity.
- 2. If information becomes available to PHL, Air Carrier, Tenant or Contractor indicating that an individual with unescorted access has a disqualifying criminal offense:
 - i. The Air Carrier, Tenant or Contractor must report the offense to the Airport Security Department at (215) 937-5452 or ASC at (215) 937-5462 within twenty-four (24) hours of the conviction or finding of not guilty by reason of insanity;
 - ii. The ASC must determine the status of the conviction; and
 - iii. If a disqualifying offense is confirmed, the ASC shall immediately revoke any unescorted access authority.

k. Certification by Aircraft Operators

PHL will accept CHRC Certification from an Aircraft Operator for its employees and contractors seeking access authority. If PHL accepts a certification from an Aircraft Operator, the ASC may not require the Aircraft Operator to provide a copy of the criminal history record check completed by the Aircraft Operator.

7. Fees

- a. The ASC or designee must ensure payment for all fingerprints in a form and manner currently approved by the TSA and PHL;
- b. The TSA currently requires a fee to conduct a CHRC for each individual. Fee amounts are available through the Airport Security Department and are subject to change.

8. Recordkeeping

- a. The ASC or his/her designee will maintain and control the following information until 180 days after the termination of an individual's unescorted access authority.
 - i. Employment history investigation files, including the criminal history results portion or appropriate certifications for investigations conducted before December 6, 2001;
 - ii. Certifications provided by Air Carriers on or after December 6, 2001;

- iii. Badging information including social security number; date of birth; description/physical characteristics including height, weight, color of hair and eyes, sex and ethnic origin; home address; driver's license number (if applicable); badge issue date; criminal history record information;
 - iv. Signed STA application and any communications with the TSA regarding the individual's application.
- b. **Confidentiality.** PHL will maintain all records in a manner that protects the confidentiality of the individual.

9. **Accountability Procedures**

a. **General Accountability Procedures**

- i. **PHL's Responsibilities.** PHL is responsible for control, accountability and issuance of PHL ID Badges.
- ii. **Tenant Accountability.** Each tenant or company is required to: (1) provide the PHL ID Badging Office with an authorized/certified signature letter to be kept on file at the PHL ID Badging Office; (2) keep a record of its active authorized badgeholders and the corresponding expiration date for each badge; (3) immediately notify the Airport Security Department at (215) 937-5452 of a change in an employees status, i.e. extended sick leave, reassignment, suspension, termination, abandonment of position, etc.; (4) immediately notify the Airport Security Department at (215) 937-5452 when an employee reports a PHL ID Badge as being damaged, lost, stolen or otherwise invalidated; (5) retrieve and return expired or invalid PHL ID Badges from employees who are resigning or terminated.
- iii. **PHL Reservation of Right to Audit Tenants' Badge Records.** PHL reserves the right to audit tenants' badge records at any time, without prior authorization or notification.

b. **Badge Reconciliation Audit**

- 1. **Frequency.** The ASC or his/her designee will conduct an audit of all active badges that allow access to the AOA, Sterile and/or Secure Areas annually or whenever there is a reason to suspect that the PHL Badge Identification System has been compromised;
- 2. **Process.** (i) The ASC or designee will send an active badge list to each tenant with employees who have unescorted access for reconciliation purposes; and (ii) Each tenant must review the list and return a completed

reconciled list to the Airport Security Department with all relevant updated information regarding an employee's employment and access status;

3. **Determination of the Need for New or Revalidated Identification.** If the ASC or designee determines that 5% or more of issued media are unaccounted for (lost, stolen or destroyed) the badge system is deemed to have been compromised and new or revalidated identification must be issued within a year of that determination. Only PHL ID Badges that have been issued and are not expired, and which are available for use by anyone in possession of the media are to be counted toward the base number against which the lost, stolen or unaccounted for percentage will be taken. The base number of auditable ID media does not include previously issued media or those that have been destroyed by PHL.

c. **Lost, Stolen or Destroyed ID Media**

- i. **Reporting Responsibility.** If a PHL ID Badge is lost, stolen, or destroyed, the badgeholder must immediately notify the Airport Security Department at (215) 937-5452. Lost, stolen or destroyed PHL ID Badge reports may be made by telephone, seven days a week, 24-hours a day.
- ii. **Lost or Stolen Badge Limitation.** Lost or stolen PHL ID badges can only be reported for active and current employees, not for employees that resigned, transferred, terminated or otherwise left employment at the Airport and failed to return the PHL ID Badge. Badges belonging to former employees must be reported as terminated or unaccounted for.
- iii. **Termination of Access.** Upon notification of a lost, stolen, destroyed or unaccounted for card PHL will terminate all access associated with that badge and note the badge record accordingly.
- iv. **Reapplication for PHL ID Badge.** A badgeholder whose card has been lost, stolen, or destroyed must:
 - a. Submit a fully completed application for reissuance;
 - b. Schedule an appointment with the PHL Badging Office for reissuance; and
 - c. Pay up to a \$100 replacement fee as determined by the ASC or his/her designee. The replacement fee will be increased in \$50 increments with each subsequent occurrence. The penalty cannot be billed to the employer without the express written authorization of the Employer's Authorized Signer.

d. **Confiscation of Badges**

1. **PHL Ownership of Identification Badge.** The PHL Identification Badge is the sole property of the Airport and must be returned upon expiration, an employee's separation from employment or upon demand.
2. **Penalty for Violation of Rules and Regulations.** PHL may restrict access privileges and confiscate Airport Identification Badges of badgeholders who violate Airport Rules and Regulations. Violators may also receive a monetary fine and be required to re-attend the SIDA Training Class.
3. **Penalty for Inappropriate Conduct on Airport Premises.** PHL reserves the right to restrict access privileges and confiscate Airport Identification Badges of badgeholders who engage in inappropriate conduct, which includes but is not limited to, using offensive or threatening language and/or gestures; insubordination; refusing to cooperate with law enforcement; tampering or interfering with the Airport's access control system; interrupting or disrupting airport operations; or damaging airport property.
4. **Confiscation of Badge for Conviction of Crimes Committed on Airport Property.** PHL will permanently revoke the PHL identification badge and all access privileges of any badgeholder who is convicted of a misdemeanor or felony committed on airport property.
5. **Confiscation of Badge for Conviction of Disqualifying Crime.** Badgeholders are obligated to report to the ASC or his/her designee within 24 hours if they have been convicted, plead no contest, or found not guilty by reason of insanity of any of the disqualifying crimes listed in Exhibit 7-5. Their PHL Identification Badges will be deactivated and confiscated immediately.
6. **Reinstatement.** The ASC or his/her Designee will determine reauthorization of the individual's access privileges pending the violator's completion of SIDA training, reissuance of Employer/Company justification for clearance and timely payment of any fines incurred by PHL.

e. **Employment Termination and Expired ID Media**

- i. **Mandatory Return of Expired Badges.** Whenever employment status is terminated or the badgeholder transfers to another station, or there is no longer an operational need for a badgeholder to have access to the AOA, SIDA, Secured or Sterile Areas, the PHL Identification Badge must be returned to the PHL ID Badging Office.

ii. **Penalty for Failure to Return Badges.**

1. Both the employer and employee will each be charged \$100 for any employee PHL ID Badge not returned to the DOA within 10 days of expiration or the employee's separation;
2. PHL will not reissue an identification badge to an employee who has not accounted for a previously issued badge and is hired by another tenant at PHL;
3. No additional badges will be issued to any employees of companies that have reached their total allotment of unaccounted for media. The allotments are as follows:

COMPANY BADGE TOTAL	UNACCOUNTED FOR LIMIT
100 plus	3% of badge total
51-100	5 badges
16-50	3 badges
1-15	1 badge

G. **VEHICLE ACCESS REQUIREMENTS**

1. **Liability Insurance and Registration Requirement**

- a. Every organization requiring vehicular access to the AOA is required to:
 1. Have, and provide proof of, automobile liability insurance covering liability arising from the maintenance and use of all owned, non-owned, hired, leased and rented trucks, automobiles, with a minimum combined single limit of Five Million Dollars (\$5,000,000.00);
 2. List the City of Philadelphia Division of Aviation as an additional insured in its automobile insurance policy; and
 3. Be registered with the Airport Operations Department.
- b. Organizations may contact the Airport Operations Department at (215) 937-6914 for the appropriate forms and specific requirements.
- c. An updated insurance list of authorized operators and vehicles will be maintained at Gate VO1 and other authorized access controlled gates.

2. **Issuance of Permits for Access to the Airfield**

The CEO reserves the right to issue Motor Vehicle Operating Permits for the Airfield.

3. **Vehicle Access Procedures**

a. **Proper Identification and Authorized Driver Required.** All vehicles seeking to access the AOA must be properly identified, i.e. painted in company colors that coincide with other owned equipment with the company's name and/or logo and an identification number in 3" high, plainly visible, letters and/or numbers on the vehicle's sides or preapproved by DOA Operations and operated by an individual authorized by PHL to access the AOA.

b. **Vehicles Subject to Inspection.** Vehicles seeking to access the AOA may be subject to inspection of the interior of the vehicle including the area under the seats and glove compartments; truck bed/cargo areas; and the undercarriage of the vehicle. Any large open containers, including large trash bags and trash cans found in the vehicle will also be inspected. Vehicles may also be subject to search while in the AOA.

c. **Screening of Vehicle Operators and Passengers.** The driver and all occupants attempting to access the AOA are subject to screening and must have valid identification in their possession.

- i. If a vehicle operator is attempting to access the AOA through Gate VO1 or other authorized access controlled gate, **the driver and each badged occupant in the vehicle must swipe his/her PHL ID Badge at the access reader.**

-If the badge reader displays a green light, the gate arm and gate will open;

-If the badge reader displays a red light for the driver's PHL ID Badge, the attendant will reference the stop list to determine if the PHL ID Badge has been reported lost or stolen. If the PHL ID Badge does not appear on the list, the attendant will contact the Airport Security Department at (215) 937-5452 and establish the status of the PHL ID Badge.

- If the Airport Security Department advises that the PHL ID Badge is valid: (a) the Badge will be returned; (b) access will be granted; and (c) the attendant will direct

the holder of the defective Badge to go to the PHL ID Badging Office to determine the problem and/or receive a new Badge.

- If Airport Security Department advises that the PHL ID Badge is invalid, the attendant shall confiscate the PHL ID Badge and deny access to that individual.
- ii. If the gate is not equipped with a card reader the driver and occupants must present their PHL ID Badges to the guard for inspection.

4. **Vehicle Escort Requirements and Procedures**

- i. Vehicle Escorting shall be for business purposes only.
- ii. Motor Vehicles that provide an escort into the Secured Area, must be authorized to operate in that Area;
- iii. Persons driving the escorting motor vehicle must: (1) have a blue badge with escort authorization; (2) have completed the airport's driver's training program; and (3) must have a driving privilege identifier on his/her PHL ID Badge;
- iv. Drivers who are only authorized to drive in non-movement areas, as indicated by a "D" designation on a green background on their PHL ID Badges, may only escort vehicles that will remain in the non-movement areas;
- v. Drivers possessing movement area driver's authorization, identified with a "D" designation on an orange background on their PHL ID Badges, may escort vehicles in both the movement and non movement areas;
- vi. All vehicles must be escorted through Gate VO1 or other authorized access controlled gates that may be installed in the future or through the security screening checkpoint;
- vii. Drivers providing escort are required to exit the airfield and register at Gate VO1 or whichever other authorized, access controlled gate through which they entered by swiping their PHL ID Badge at the reader;
- viii. The driver of the vehicle that is under escort must provide the guard with his/her driver's license and vehicle information.

- ix. Only one (1) motor vehicle containing one (1) person can be escorted at one time, unless otherwise authorized by the ASC.
- x. Drivers of motor vehicles being escorted must stay with the motor vehicle until it leaves the Secured Area.
- xi. The escorted vehicle must follow and stay with the vehicle providing escort at all times while under escort.
- xii. A written record of escorted vehicles is maintained at Gate VO1 or other authorized, access controlled gate.
- xiii. Prior to escorting a vehicle into the AOA, an escort shall inform his/her escortee that, should they get separated, escortee must immediately stop the vehicle; call Airport Police dispatch at (215) 937-6711; advise the dispatcher of his/her name, location and the name of his/her designated escort; and wait until his/her escort or a law enforcement officer is able to locate him or her.
- xiv. If an escortee gets separated from his/her escort, the escortee shall immediately stop the vehicle and contact Airport Police dispatch at (215) 937-6711, advise the dispatcher of his/her name, location and the name of his/her designated escort and wait until his/her escort or a law enforcement officer is able to locate him or her.

5. **Contractor Vehicular Access and Insurance Requirements**

- i. Unless otherwise authorized by the DOA, all contractor's Motor Vehicles requiring access to the AOA will be required to utilize Gate VO1, other authorized, access controlled gate, or a gate designated by the DOA that is controlled by a DOA lock and key.
- ii. All contractor Motor Vehicles shall be escorted by an individual possessing a blue PHL ID Badge.
- iii. Gate VO1 and other authorized access controlled gates will be staffed by a security guard who will deny any unauthorized access and notify PHL Systems Control of any such attempt.
- iv. Gate VO1 and other authorized, access controlled gates are for vehicular traffic only and no pedestrian access will be allowed.
- v. Any (i) contractor, construction manager or other party engaged by the Airline or (ii) subcontractor or other party engaged by a contractor, construction manager or other party that is engaged by Airline, in either case, to perform any construction, renovations or

repairs at the Airport shall obtain and maintain in full force and effect during any construction period:

- a. A commercial general liability insurance policy in minimum limits, unless otherwise specified, of \$1,000,000.00 per occurrence for bodily injury and \$1,000,000.00 per occurrence for property damage.
- b. An automobile liability insurance policy covering owned, non-owned and hired vehicles in minimum limits, unless otherwise specified, for \$1,000,000.00 per person, \$1,000,000.00 per occurrence for bodily injury and \$1,000,000.00 per occurrence for property damage liability \$5,000,000.00 if in Airfield Area.
- c. A worker's compensation policy affording statutory coverage and containing statutory limits and employer's liability insurance at limits of \$100,000.00 per accident/\$100,000.00 each employee/\$500,000.00 policy limit.
- d. Professional liability insurance shall be maintained when any architect or engineer performs directly or indirectly, work for or on behalf of Airline at Airport or involving Airline's operations and/or the Total Airline Lease Premises with a \$1,000,000.00 policy limit.

H. AIRPORT SECURITY PERIMETER FENCE

1. PHL has established a perimeter around the secured areas of the airport and is formed by various facilities and non-scalable structures connected with a chain-linked fence.
2. A clear zone, designated by signage, is established and maintained on each side of the perimeter fence.
3. The clear zone area is to be kept free and clear of any vehicles, equipment, dollies, etc., to ensure that they are not to be used for improper purposes.
4. The CEO or his authorized representative may remove unidentified or unauthorized vehicles parked in the "no parking zones" along the perimeter fence at the owner's expense. Violators may be subject to a monetary fine in accordance with the schedule in Appendix G.
5. The CEO or his authorized representative may remove and/or dispose of stored materials and unattended equipment left in the clear zone at the

owner's expense. Violators may be subject to a monetary fine in accordance with the schedule in Appendix G.

EXHIBIT 7-1

DIAGRAM SHOWING DESIGNATION OF AIRPORT AREAS

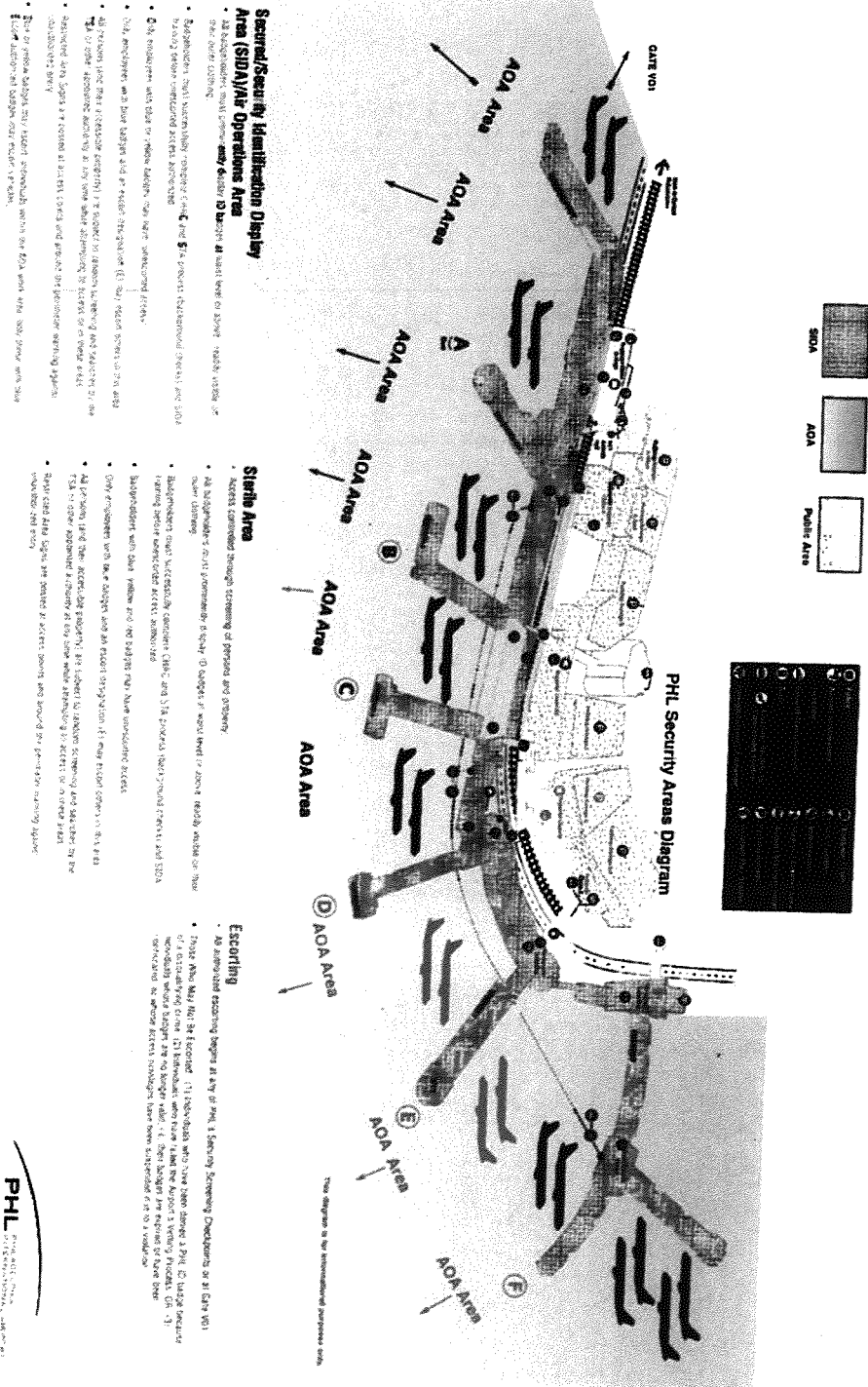


EXHIBIT 7-2

PHL ID BADGE

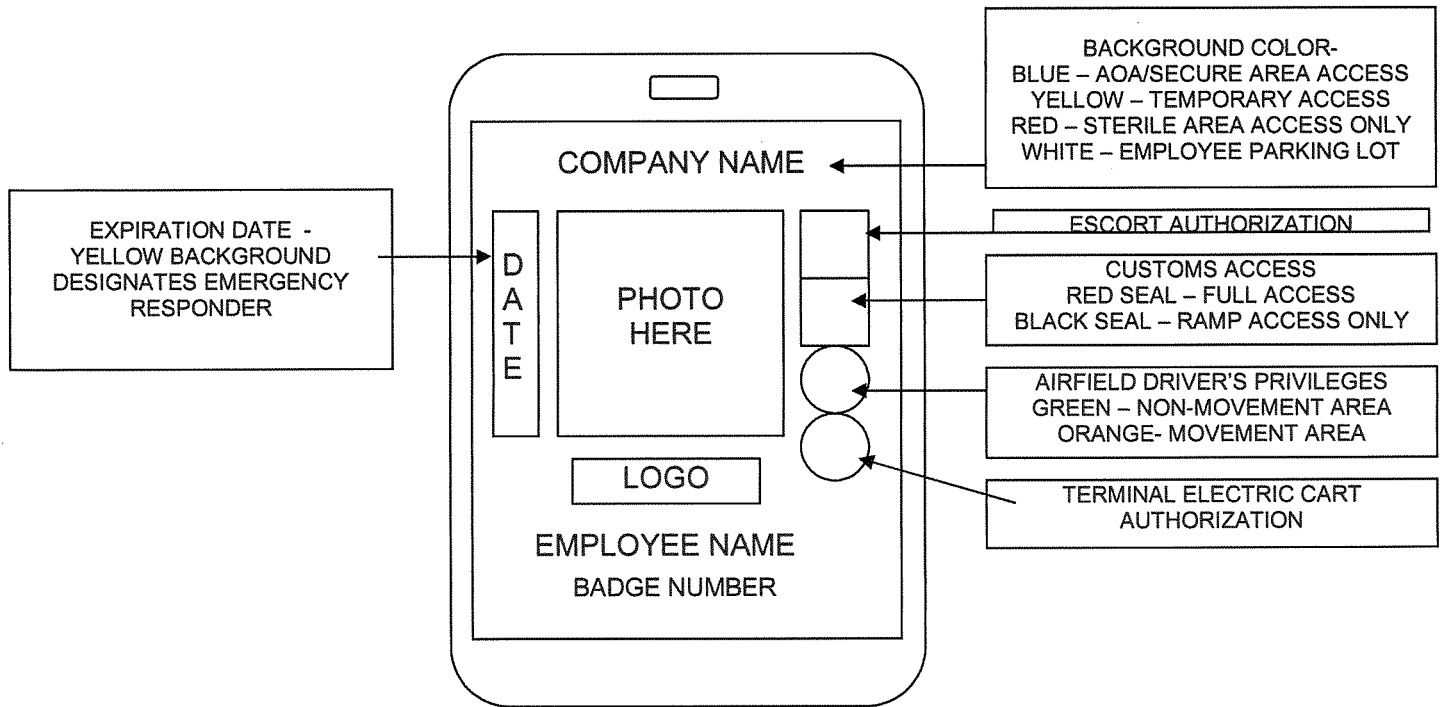


EXHIBIT 7-3

ESCORTING RULES AND RESPONSIBILITIES SECTION OF THE PHL SECURITY BADGE APPLICATION

17. Escorting Rules and Responsibilities

1. All non badged "Visitors" must be escorted at PHL.
2. Escorting of a "Visitor" is allowed to take place by authorized Blue Badged Personnel for short term, legitimate, business related reasons only.
3. Employees who lose or forget their ID Badges are not considered "Visitors" and cannot be escorted.
4. A limited number of BLUE badged employees, who demonstrate a routine operational need, will be granted ESCORT privileges.
5. ONLY Blue Badge Escort Authorized personnel may escort individuals into the Secure, Sterile and Restricted areas of the airport.
6. Red and Yellow badges MAY NOT ESCORT in the SECURE, STERILE, or SIDA areas of the airport.
7. Yellow badges may escort unbadged individuals in the non-secure section of the AOA area of the airport.
8. Authorized Escorting can only begin at Security Screening Checkpoints of Gate V01.
9. ESCORT Authorized Blue Badge Holders are designated with an Airport applied "E" sticker on the face of their Badges, or with a Solid Red Line that identifies a Law Enforcement Officer.
10. ESCORT Authorized Blue badge holders may only ESCORT Three (3) people at any given time. Vehicle Escorts may only ESCORT One (1) person at a time. The ESCORT must take full responsibility for the Visitor(s) and must explain Airport and Escorting Rules to the Visitor(s).
11. Visitors under escort must be under direct control of the authorized escort at all times. This means they must remain within 10 feet and in the direct line of sight of their escort at all times.
12. Authorized escorts must notify Airport Police if they lose control of their "Visitor(s)."
13. Authorized Escorts are responsible to report any suspicious activity to airport police immediately.

FAILURE TO FOLLOW ALL AIRPORT ESCORTING RULES WILL RESULT IN VIOLATION PENALTIES, AS LISTED BELOW:

- 1st offense: minimum of \$100 monetary fine, removal from the secured and restricted area and loss of Escort Privileges until successful SIDA and Escort retraining is completed.
- 2nd offense: a minimum of \$100 monetary fine, removal from the secured/restricted area and loss of Escort Privileges. SIDA retraining will be required.
- 3rd offense: will result in complete loss of access privileges at PHL.

I hereby affirm that I understand the rules and responsibilities with regard to the PHL escort policy. I understand that if I violate any of these rules, I will be held responsible in accordance with the violation penalties listed above.

Name: _____ Date: ____/____/____

DOA Approval: _____ Date: ____/____/____

EXHIBIT 7-4

TSA APPROVED LIST OF DOCUMENTS THAT MAY BE USED TO VERIFY IDENTITY

-Valid driver's license or ID card issued by a State or outlying possession of the United States provided it contains a photograph or information such as name, date of birth, gender, height, eye color, and address; -Driver's license issued by a Canadian government authority. -ID card issued by Federal, State, or local government agency or entity provided it contains a photograph or information such as name, date of birth, gender, height, eye color, and address; -U.S. Passport (unexpired or expired); -School ID card with photograph; -Voter's registration card; -U.S. Military card or draft record; -Military dependent's ID card; -U.S. Coast Guard Merchant Mariner Card; -Native American tribal document; -Certificate of Naturalization (USCIS Form N-550 or N-570);	-Certificate of U.S. Citizenship (USCIS Form N-560 or N-561); -Permanent Resident Card or Alien Registration Receipt Card with photograph (USCIS Form I-151 or I-551); -Unexpired Refugee Travel Document (USCIS Form I-571); -Unexpired foreign passport, with I-551 stamp or attached Form I-94 indicating unexpired employment authorization; -Unexpired Temporary Resident Card (USCIS Form I-688); -Unexpired Employment Authorization Card (USCIS Form I-688A); -Unexpired Employment Authorization Document issued by USCIS that contains a photograph (USCIS Form I-688B); -Unexpired Reentry Permit (USCIS Form I-327); -School record or report card; clinic, doctor or hospital record; or day-care or nursery school record for persons under the age of 18 who are unable to present a document listed above.

EXHIBIT 7-5

DISQUALIFYING CRIMINAL OFFENSES

-Forgery of certificates, false making of aircraft and other aircraft registration violation pursuant to 49 U.S.C. 46306; -Interference with air navigation pursuant to 49 U.S.C. 46308; -Improper transportation of a hazardous material pursuant to 49 U.S.C. 46312; -Aircraft piracy pursuant to 49 U.S.C. 46502; -Interference with flight crewmembers or flight attendants pursuant to 49 U.S.C. 46504; -Commission of certain crimes aboard aircraft in flight pursuant to 49 U.S.C. 46506; -Carrying a weapon or explosive aboard aircraft pursuant to 49 U.S.C. 46505; -Conveying false information and threats pursuant to 49 U.S.C. 46507; -Aircraft piracy outside the special aircraft jurisdiction of the United States pursuant 49 U.S.C. 46502 (b); -Lighting violations involving transporting controlled substances pursuant to 40 U.S.C. 46315; -Unlawful entry into an aircraft or airport area that serves air carriers or foreign air carriers contrary to established security requirements pursuant to 49 U.S.C. 46314; -Destruction of an aircraft or aircraft facility pursuant to 18 U.S.C. 32; -Murder;	-Assault with intent to murder; -Espionage; -Sedition; -Kidnapping or hostage taking; -Treason; -Rape or aggravated sexual abuse; -Unlawful possession, use, sale, distribution or manufacture of an explosive or weapon; -Extortion; -Armed or felony armed robbery; -Distribution of, or intent to distribute, a controlled substance; -Felony arson; -Felony involving a threat; -Felony involving: (1) willful destruction of property; (2) importation or manufacture of controlled substance; (3) burglary; (4) theft; (5) dishonesty, fraud or misrepresentation; (6) possession or distribution of stolen property; (7) aggravated assault; (8) bribery; or (9) illegal possession of a controlled substance punishable by a maximum term of imprisonment for more than 1 year; -Violence at international airports pursuant to 18 U.S.C. 37; or -Conspiracy or attempt to commit any of the criminal acts listed here.

The TSA may update the Disqualifying Criminal Offenses List from time to time. The most current list is available on the TSA website at www.tsa.gov.

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PHL Changed Conditions Affecting Security Guidelines

Purpose:

The Security and Systems Technology Department has developed guidelines in an effort to educate and assist stakeholders on the importance of regulatory compliance with the Airport Security Program (ASP) in conjunction with the Transportation Security Administration (TSA) Regulations. The PHL ASP is the standard operating procedure document that describes in detail all PHL security boundaries, doors, gates, activities, policies and procedures. These guidelines will provide a better understanding of the mandated process and regulatory requirements.

The Security and Systems Technology Department strongly recommends their involvement and encourages the use of these guidelines during the initial design review phase of all PHL projects to determine the impact or involvement of Security related issues at PHL. Our involvement in the initial review will assist you in taking a proactive approach to ensure that your project is not impacted or delayed by regulatory or security system issues.

Explanation:

TSA Regulation 49 CFR 1542.107 requires a written proposal or formal notification from the Airport Security Coordinator (ACS); referred to as a Changed Condition Affecting Security, anytime changes affect boundaries between levels of security at PHL, either temporarily or permanently.

- Public area to Sterile Area (concourses)
- Public area to Secured Area
- Sterile Area to Secured Area
- Public area outside perimeter security fence to AOA (Air Operations Area)
- AOA (Air Operations Area) to Secured Area

The regulation reads: PHL must notify the TSA when changes occur to the *“Layout or physical structure of any area under the control of the airport operator, airport tenant, aircraft operator, or foreign air carrier used to support the screening process, access, presence, or movement control functions required under part 1542, 1544, or 1546.”*

A Changed Condition Affecting Security request must be submitted to TSA and approved by TSA in advance if:

The change being made may affect the physical security or current security conditions or processes at PHL. Examples of these changes are as follows (this is not an exclusive list):

- Changes or modifications to any and all terminal doors or airfield vehicle or pedestrian gates that enter the Sterile Area, Secured Area, or AOA that could be accessed by the public
 - o Includes adding new doors/gates or modifications to or closing existing doors/gates (even if the change is temporary).
- Changes or modifications that affect the Access Control System, such as adding, moving, or removing card readers on Security Doors
 - o Includes removing power to readers/doors/gates for any length of time to facilitate other construction or maintenance issues, such as moving of conduit, change of wiring, HVAC etc.
- Adding or removing openings that lead to the Restricted Area
 - o Adding a new roll up door in a cargo building that directly accesses the AOA or cutting an opening in a wall that could provide public access to the Restricted Area. As with the doors, this includes any openings made on the Concourses leading to the Secured Area or public area, as well as openings to the Secured Area from public or Sterile Area)
 - o Adding, altering, or removing sections in the perimeter security fence.
- Changes that affect the Security Screening Checkpoint in the Terminal or Midfield Checkpoints on the Airfield
 - o Construction projects or events that may, at any time, impact the normal operation of checkpoints.

Time lines:

Construction, Engineering and Maintenance Planners play a significant and vital role, assisting the Security and Systems Technology Department to provide adequate information to TSA in order to proceed with a proposal that will result in timely approval for projects.

The time frame required to develop and submit Changed Conditions Affecting Security or amendments is dependant on what the project involves, new construction or modifications to existing items, length of the project, what security items/areas are impacted by the project, emergency repairs or preventative measures. The following are some of the general time lines that you should be aware of and should be calculated into your project planning:

Temporary Changes

- Once information is received by the Airport Security Coordinator (ASC) most Changed Conditions Affecting Security submissions can be developed and submitted to TSA within 2 to 5 business days, this is in addition to the 30 days required by TSA. This is dependent on the complexity of the project.
- Approval from TSA is dependant on their workload; it is suggested that you allow 30 days for submission, review and approval.
- In order to develop a clear proposal for TSA, we request clear drawings indicating changes to be made (before and after drawings) that include:
 - o A clear and concise plan for the project, such as appropriate drawings or written descriptions of security-related items. These include but are not limited to:
 - Authorized and accurate permanent door/gate number(s)
 - Location of access control devices, including but not limited to; card readers, emergency door release pull-boxes and silver door release buttons
 - Clearly marked construction/temporary walls
 - Security measures that will be in place during construction
 - Overview of project schedule including dates/times of changes and duration of process.
- In some instances, a minimal amount of information is all that is required to develop the proposal and drawings may not be necessary.

Failure to adhere to any of the required notification periods or processing times may result in a violation of the regulations, non-compliance of the ASP, or delay the start or completion of a project.

Permanent Changes

- Permanent changes that alter the Airport Security Program (ASP) must be submitted in the form of an amendment to the TSA no less than 45 days in advance of the effective date of expected substantial completion. This does not include the 5 to 7 days, as noted below, for the ASC to develop the submission.
- Once all information is received by the Airport Security Coordinator (ASC) most amendment submissions can be developed and submitted to TSA within 5 to 7 business days. This is dependent on the complexity of the project. If all prudent project information is not received it will delay the submission of the amendment to TSA, which may delay the start of your project.

- An amendment is a submission process that is more involved than developing a Changed Condition Affecting Security and will involve extensive detailed project information, schedules, and/or drawings. The Aviation Security Department can assist you in defining what will be required for submission purposes.

Failure to adhere to any of the required notification periods or processing times may result in a violation of the regulations, non-compliance of the ASP, or delay the start or completion of a project.

Maintenance Repairs and/or Preventative Maintenance

Emergency Repairs:

- TSA understands the urgency for immediate emergency repairs for security purposes due to malfunctioning or broken equipment within our airfield and terminal, however, notification is still required.
- Specific details of the door or gate number and a summary of the problem is required in addition to:
 - Security measures that will be in place during construction or repair
 - Time estimates for duration of corrective repairs.

Preventative Maintenance:

If performing preventative maintenance that will impair or impact any security related door, gate, or security equipment, or use of, you must do the following:

Provide a written request with specifics of the project. Your request must include the following:

- Specific details of the door or gate
- A summary of the work to be completed
- Security measures that will be in place during construction or repair
- Time estimates for duration of corrective repairs.

For Maintenance projects that are planned in advance:

A project plan with the following must be submitted 30 days in advance of the expected start date of the project. You must include the following details:

- A clear and concise plan for the project, including appropriate drawings or written description of security-related items including but not limited to:
 - Authorized and accurate permanent door/gate number(s)
 - Location of access control devices, including but not limited to: card readers, emergency door release pull-boxes and silver door release buttons
 - Clearly marked construction/temporary walls
 - Security measures that will be in place during construction
 - Overview of project schedule including dates/times of changes and duration of process.
- In some instances, a minimal amount of information is all that is required to develop the proposal and drawings may not be necessary.

Failure to adhere to any of the required notification periods or processing times may result in a violation of the regulations, non-compliance of the ASP, or delay the start or completion of a project.

Conclusion:

Please notify the Security and Systems Technology Department immediately if a Changed Condition Affecting Security is identified, or contact them in advance to review the project design so they can assist your department in determining the possible impacts to security or security systems that may be included in your project design. They will be able to identify what will be required for submission to TSA for review.

The contacts for Changed Conditions Affecting Security are as follows:

1. Jason Sankey, Airport Security Manager, 215-937-1842 or jason.sankey@phl.org
2. Joseph Bullock, Alternate Airport Security Coordinator, 215-937-5452 or joseph.bullock@phl.org
3. Jason Clagg, Alternate Airport Security Coordinator, 215-937-5452 or jason.clagg@phl.org

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SECTION 011100 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of City Standard Contract Requirements, Supplemental to City Standard Requirements, Special Provisions and Division 1 Sections apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification:

1. The intent of this project is to enhance passenger convenience, security and safety during enplanement / deplanement by removing and replacing existing passenger boarding bridges and upgrading gate capabilities at Terminal D for a new generation of aircraft via a terminal-wide re-striping effort as summarized in the table below:

PBB EQUIPMENT SCHEDULE						
GATE	PROPOSED EQUIPMENT					
	PBB MFG. / MODEL	FIXED WALKWAY MFG. / LENGTH	PCAIR SIZE (TONS)	GPU SIZE	CABLE HOIST	POTALBLE WATER
D2	(N) A3-60/119-125R	N/A	(R) 60	(R) 90 KVA	(N) YES	(N) SI-2400
D4	(N) A3-60/119-125R	N/A	(R) 60	(R) 90 KVA	(N) YES	(N) SI-2400
D6	(N) A3-60/119-125R	N/A	(R) 60	(R) 90 KVA	(N) YES	(N) SI-2400
D8	(N) A3-68/141-125R	N/A	(R) 60	(R) 90 KVA	(N) YES	(N) SI-2400
D10	(N) A3-68/141-125R	N/A	(R) 60	(R) 90 KVA	(N) YES	(N) SI-2400
D11	(N) A3-72/150-125R	(N) 25' - SIZE "BB"	(R) 60	(R) 90 KVA	(N) YES	(N) SI-2400
E2	(N) A2-49/70-125R	(N) 34' - SIZE "BB"	(R) 60	(N) 90 KVA	(N) YES	(R) SI-2400
D12	REMOVE GATE FROM SERVICE					

The PBB replacement work noted in the table above also includes consideration of foundation renovations, access and security system upgrades at each gate, and line striping upgrades at all Gates in Terminal D and at Gate E2 in Terminal E.

2. Project Location: Philadelphia International Airport (PHL), Terminals D and E.

B. Project will be constructed under one contract:

1. General Contractor

1.3 USE OF PREMISES

- A. General: Limit use of premises to construction activities at designated gates on Concourses D and E. The contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of Project.

1. Confine operations to areas within contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
2. Repair damage caused by construction operations.

1.4 WORK UNDER OTHER CONTRACTS

- A. Cooperate fully with contractors with work on other projects so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract.

1.5 SPECIFICATION AND DRAWINGS

- A. Specifications forming a part of the contract documents are listed in the table of contents of this project manual.
- B. Drawings forming a part of the contract documents are identified on the drawing cover sheet.
- C. All of the specifications and drawings listed are part of the contract documents for each of the prime contracts. Each Prime Contractor shall review all drawings and all specification divisions to determine the full scope of his work.

1.6 LAYOUT

- A. The general construction contractor shall as soon as practical, verify the locations of the various work, and establish exact locations of various features by marks on existing construction as a guide for all trades.

1.7 MEASUREMENTS

- A. Obtain measurements from parties responsible for other sections of the work as soon as possible to take necessary field measurements and field check dimensions previously obtained so that the various parts of the work will fit.

1.8 MUTUAL COORDINATION OF TRADES

- A. All contractors and/or sub-contractors responsible for work defined by individual sections of the specifications shall, jointly and severally, coordinate their various sections of work as to scheduling, installation procedures, shop drawings, and installation of all related materials.
- B. Responsibility for enforcing coordination requirements and close adherence to time schedules of subcontractors rests with the prime contractor.

1.9 REFERENCE STANDARDS AND INDUSTRY SPECIFICATIONS

- A. Unless otherwise specified, any material or operation specified by reference to published specifications of a manufacturer, society, association, code or other published standard, shall comply with requirements of the listed document which is current on the date of the receipt of bids.
- B. In case of a conflict between referenced document and specifications, specifications shall govern. In case of a conflict between referenced documents, the one having more stringent requirements shall govern.
- C. Furnish, when requested by the engineer, an affidavit from manufacturer certifying that materials or products delivered to the project meet requirements specified. Such affidavit shall not relieve the contractor from responsibility of complying with any added requirement of the specifications.
- D. When referenced standard or industry specification refers to installation, obtain copies of such standard or specification before starting operations. At least one copy of each such standard or specification shall be maintained at the site in good condition and readily accessible until completion of work. All personnel in charge of operations to be performed in accordance with such standards or specification shall be held to have acquainted themselves with all such documents insofar as they may be applicable to the work.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 CONSTRUCTION, DEMOLITION & LAND CLEARING TRACKING FORMS

- A. The DOA's current standards require the Contractor to provide proof they are in compliance with the following construction © and demolition (D) waste diversion goals:
 - 1. 75% diversion of total C&D waste for landside and airside projects, by weight.
 - 2. 50% diversion of total C&D waste for all other projects, by weight.
- B. To Demonstrate compliance, all contract Primes must provide the DOA PM information on the recycling services that will be used for construction and demolition waste at the start of the project, and with each pay application as the project progresses. Invoices, weight tickets and/or manifests documenting tonnage of recycling and waste must be provided with the completed forms accompanying each pay application.
- C. Sample Construction & Demolition Waste Tracking Forms that will be used to comply with this contract requirement are provided in Exhibit 1.

PHILADELPHIA INTERNATIONAL AIRPORT
REPLACEMENT OF PASSENGER BOARDING BRIDGES – PHASE III

BID 6648
PHL-1943.14

Construction, Demolition, and Landclearing Waste Management Tracking Forms
Construction, Demolition and Landclearing Waste

Legend

User-Entered
Read-Only

Convert pounds to tons	
pounds	
tons	

Breakdown of CO&L Waste Produced On-Site															
Material Type	Material Weight (tons)	Recycled Weight (tons)	% Recycled	Recycling Facility Name and Location	Reused On Site Weight	% Reused on Site	Reused Off Site OR Stockpiled: Weight (tons)	% Reused or Stockpiled	Location of Reuse OR Location of Stockpile	Landfill Weight (tons)	% Landfill	Landfill Name and Location	Managed Otherwise Weight (tons)	% Managed Otherwise	Notes
AIRSIDE / LANDSIDE INFRASTRUCTURE	Aesthetically Impacted Excavated Material		0%			0%		0%			0%			0%	
	Airfield Guidance Sign and Base		0%			0%		0%			0%			0%	
	Asphalt Pavement		0%			0%		0%			0%			0%	
	Barbed Wire		0%			0%		0%			0%			0%	
	Chain Link Fence		0%			0%		0%			0%			0%	
	Concrete / PCC Pavement		0%			0%		0%			0%			0%	
	Concrete Barrier for Fence		0%			0%		0%			0%			0%	
	Drainage Pipe		0%			0%		0%			0%			0%	
	Drainage Structure Castings		0%			0%		0%			0%			0%	
	Drainage Structures		0%			0%		0%			0%			0%	
	Earth, Soil, Dirt		0%			0%		0%			0%			0%	
	Landscape Debris		0%			0%		0%			0%			0%	
	Reclaimed Asphalt Pavement (RAP)		0%			0%		0%			0%			0%	
	Rock, Stone, Gravel		0%			0%		0%			0%			0%	
	Silt Fence		0%			0%		0%			0%			0%	
	Underdrain Cleanouts		0%			0%		0%			0%			0%	
	Underdrain Pipe		0%			0%		0%			0%			0%	
	Vehicle Service Road Sign		0%			0%		0%			0%			0%	
	Brick / Masonry		0%			0%		0%			0%			0%	
TERMINAL / INTERIOR PROJECTS	Carbounat		0%			0%		0%			0%			0%	
	Carpet		0%			0%		0%			0%			0%	
	Ceiling Tiles		0%			0%		0%			0%			0%	
	Drywall		0%			0%		0%			0%			0%	
	Ferrous Metal (iron, steel, etc.)		0%			0%		0%			0%			0%	
	Flooring		0%			0%		0%			0%			0%	
	Glass		0%			0%		0%			0%			0%	
	Packaging		0%			0%		0%			0%			0%	
	Paper		0%			0%		0%			0%			0%	
	Plastic		0%			0%		0%			0%			0%	
ELECTRICAL	Roofing		0%			0%		0%			0%			0%	
	Wood		0%			0%		0%			0%			0%	
	2" Conduit		0%			0%		0%			0%			0%	
	Constant Current Regulators		0%			0%		0%			0%			0%	
	Counterpoise Wire		0%			0%		0%			0%			0%	
	Duct Bank		0%			0%		0%			0%			0%	
	Embedded Base Can		0%			0%		0%			0%			0%	
	Handhole Box		0%			0%		0%			0%			0%	
	Lighting Cable		0%			0%		0%			0%			0%	
	Light Fixture and Base Cans		0%			0%		0%			0%			0%	
	Other (specify):		0%			0%		0%			0%			0%	
	Other (specify):		0%			0%		0%			0%			0%	
	Other (specify):		0%			0%		0%			0%			0%	
	Other (specify):		0%			0%		0%			0%			0%	

PHILADELPHIA INTERNATIONAL AIRPORT
REPLACEMENT OF PASSENGER BOARDING BRIDGES – PHASE III

BID 6648
PHL-1943.14

Construction, Demolition, and Landclearing Waste Management Tracking Forms
Construction, Demolition and Landclearing Waste

Breakdown of CD&L Waste Produced On-Site															
Material Type	Material Weight (tons)	Recycled Weight (tons)	% Recycled	Recycling Facility Name and Location	Reused On Site Weight	% Reused on Site	Reused Off Site OR Stockpiled Weight (tons)	% Reused or Stockpiled	Location of Reuse OR Location of Stockpile	Landfill Weight (tons)	% Landfill	Landfill Name and Location	Managed Otherwise Weight (tons)	% Managed Otherwise	Notes
Other (specify):			0%			0%		0%			0%			0%	
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Other (specify):			0%			0%		0%							
Sub-Totals (Suitable Materials)	0.00	0.00	0%		0.00	0%	0.00	0%		0.00	0%		0.00	0%	
Hazardous Materials (specify):			0%			0%		0%			0%			0%	
Hazardous Materials (specify):			0%			0%		0%							
Hazardous Materials (specify):			0%			0%		0%							
Hazardous Materials (specify):			0%			0%		0%							
Hazardous Materials (specify):			0%			0%		0%							
Hazardous Materials (specify):			0%			0%		0%							
Sub-Totals (Hazardous Materials)	0.00	0.00	0%		0.00	0%	0.00	0%		0.00	0%		0.00	0%	
Totals	0.00	0.00	0%		0.00	0%	0.00	0%		0.00	0%		0.00	0%	

Exhibit 1: Construction&Demolition Waste Tracking Form Example

END OF SECTION 011100

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SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of City Standard Contract Requirements, Supplemental to City Standard Requirements, Special Provisions and Division 1 Sections apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order
- B. Types of allowances include the following:
 - 1. Lump-sum allowances for specific work as defined on the bid tab(s).
 - 2. Additional Corrective Work allowances for additional work as directed and approved by the Engineer.

1.3 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Engineer of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Engineer's request, obtain proposals for each allowance for use in making final selections. Include recommendations that re relevant to performing the Work.
- C. Purchase products and systems selected by Engineer from the designated supplier.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders, if required by Owner.
- B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

- C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

- A. Coordinate allowance items with other portions of the Work.

1.6 LUMP SUM ALLOWANCES

- A. Lump Sum Allowances shall be used for pre-defined products and materials furnished, as directed by the Owner, including taxes, freight, and delivery to Project Site.
- B. The funds contained in the Lump Sum allowance are for the sole discretionary use of the Owner. All Contractor requests to utilize the allowance funds must be supported by proposals in the form specified for change orders.
- C. A Field Directive shall be issued by the Engineer authorizing use of the Lump Sum Allowance funds.

The value of the Field Directive authorizing use of the Lump Sum Allowance is inclusive of any and all costs related to providing the requested service (i.e Training), product, and/or materials, including but not limited to all related trade labor, job-site supervision, equipment rentals and consumable materials.

- D. Markups to cover the Contractor's costs for project and home office management, project and home office overhead, insurance, bonds, and profit, relative to the services, products and/or materials supplied and/or work are excluded and shall not be permitted. All aforementioned markups shall be included as part of the Contractors Base Bid Contract Sum and excluded from any work described by this Lump Sum Allowance.

No additional markup costs will be allowed unless reviewed and approved by Owner prior to purchase and installation.

- E. At Project closeout, any unused lump sum allowance balance will be returned to the Owner by Change Order.

1.7 ADDITIONAL CORRECTIVE WORK ALLOWANCES

- A. The Additional Corrective Work allowance will be used for work items identified, reviewed, approved, and authorized by the Engineer. These funds shall not be used to correct deficient work installed by the Contractor.
- B. The funds contained in the Additional Corrective Work allowance are for the sole discretionary use of the Owner. All Contractor requests to utilize the allowance funds must be supported by proposals in the form specified for change orders.

- C. Additional Corrective Work Allowances shall include cost to Contractor for products and materials furnished, as directed by the Owner, including taxes, freight, and delivery to Project Site. Allowance shall also include any and all costs related to installation of products and materials, including but not limited to all trade labor, job-site supervision, equipment rentals and consumable materials.

The Contractor may add 20% markup to the cost of labor, 15% markup to the cost of products and materials furnished and 8% markup for any subcontractors required to compete the work under this allowance. Stated markups are the maximum allowed and are subject to negotiation and agreement between the Owner and Contractor.

Markups for Contractor cost for project and home office management, project and home office overhead, insurance and bonds, and profit related to products and materials supplied under this Corrective Work Allowance are excluded from work negotiated, accepted and performed as part of this allowance, and shall be deemed to have been included by the Contractor as part of the as-bid allowance value as contained in the Base Bid Contract Sum.

- D. A Field Directive will be issued by the Engineer authorizing use of funds from the additional corrective work.
- E. At Project closeout, any unused corrective work allowance balances will be returned to the Owner by Change Order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

1. General Contract (PHL-1943.14)
 - a. Lump Sum Allowance No. 1: Spare/Critical Parts - \$100,000.00
 - b. Lump Sum Allowance No. 2: O&M Onsite Training - \$75,000.00

- c. Lump Sum Allowance No. 3: Programming & Door Testing - \$25,000.00
- d. Lump Sum Allowance No. 4: Additional Corrective Work - \$100,000.00

END OF SECTION 012100

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of City Standard Contract Requirements, Supplemental to City Standard Requirements, Special Provisions and Division 1 Sections apply to this Section.

1.2 SUMMARY

- A. This section includes administrative and procedural requirements for substitution.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order
- B. Related Requirements
 - 1. Section 01600 “Product Requirements” for requirements for submitting comparable product submittals for products by listed manufacturers

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to contractor or Owner.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of form provided in Project Manual.

2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of engineers and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.

- e. Requested substitution is compatible with other portions of the Work.
- f. Requested substitution has been coordinated with other portions of the Work.
- g. Requested substitution provides specified warranty.
- h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. See Division 1 Section "Quality Requirements" for submitting test and inspection reports.
- C. See Division 1 Section "Closeout Procedures" for submitting warranties, project record documents, specifications, and construction photographs.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Engineer's responsive action.
- B. Informational Submittals: Written information that does not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.

1.3 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- B. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- C. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Engineer.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- E. Deviations: Highlight, encircle, or otherwise specifically identify deviations from the Contract Documents on submittals.

- F. Additional Copies: Provide six additional copies for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
 - 1. Additional copies submitted for maintenance manuals will be marked with action taken and will be returned.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals received from sources other than Contractor.
 - 1. Transmittal Form: Use AIA Document G810.
- H. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

1.4 CONTRACTOR'S USE OF ENGINEER'S CAD FILES

- A. General: At Contractor's written request, copies of Engineer's CAD files will be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:
 - 1. CAD files will be available for each discipline upon signing and acknowledgement of CAD release form.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.

3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Manufacturer's catalog cuts.
 - e. Wiring diagrams showing factory-installed wiring.
 - f. Printed performance curves.
 - g. Operational range diagrams.
 - h. Compliance with specified referenced standards.
 - i. Testing by recognized testing agency.
 4. Number of Copies: Submit three copies of Product Data, unless otherwise indicated. Engineer will return two copies. Mark up and retain one returned copy as a Project Record Document.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Notation of coordination requirements.
 - j. Notation of dimensions established by field measurement.

- k. Relationship to adjoining construction clearly indicated.
 - l. Seal and signature of professional engineer if specified.
 - m. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 48 inches.
3. Number of Copies: Submit six copies of each submittal.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
 - 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Engineer will retain two Sample sets; remainder will be returned.

- E. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location.
 - 1. Number of Copies: Submit three copies of product schedule or list, unless otherwise indicated. Engineer will return two copies.
- F. Submittals Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in Division 1 Section "Payment Procedures."
- H. Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."
- I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. **[Use CSI Form 1.5A.]** Include the following information in tabular form:
 - 1. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Engineer will return two copies.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Engineer will not return copies.
 - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 1 Section "Project Management and Coordination."
- C. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.

- E. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- F. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- G. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- H. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- I. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- J. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- K. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- L. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."

- Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- S. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Statement on condition of substrates and their acceptability for installation of product.
 - 2. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
- T. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- U. Material Safety Data Sheets (MSDSs): Submit information directly to Owner; do not submit to Engineer.
 - 1. Engineer will not review submittals that include MSDSs and will return them for resubmittal.

2.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 1. Furnish as Submitted
 2. Furnish as Corrected
 3. Revise and Resubmit
 4. Rejected
- C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION 013300

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. See Divisions 2 through 16 Sections for specific test and inspection requirements.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Engineer.
- C. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.

- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespeople of the corresponding generic name.
- I. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Engineer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Reports: Prepare and submit certified written reports that include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.

5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- C. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.5 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.

- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and regulations governing the Work.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.6 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.

3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
- D. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- F. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.

4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- G. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.7 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with the Contract Document requirements for Division 1 Section "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

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SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.

- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.
- D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list.

ADAAG	Americans with Disabilities Act (ADA)
CFR	Code of Federal Regulations
CRD	Handbook for Concrete and Cement
FED-STD	Federal Standard (See FS)
FS	Federal Specification
FTMS	Federal Test Method Standard (See FS)
UFAS	Uniform Federal Accessibility Standards

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

SECTION 015000 - TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. See Division 1 Section "Summary of Work" for division of responsibilities for temporary facilities.
- C. See Division 1 Section "Execution Requirements" for progress cleaning requirements.
- D. See Divisions 2 through 16 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.2 DEFINITIONS

- A. Permanent Enclosure: As determined by Engineer, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Engineer, testing agencies, and authorities having jurisdiction.
- B. Water Service: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.4 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.5 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch-thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch-OD line posts and 2-7/8-inch- OD corner and pull posts.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 9-gage, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts, with 1-5/8-inch- OD top and bottom rails. Provide **concrete or galvanized steel** bases for supporting posts.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. Heating Equipment: Unless Owner authorizes use of permanent heating system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate temporary facilities where they will serve Project adequately and result in minimum interference with performance of the Work and adjacent airport activity after the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Water Service: Use of Owner's existing water service facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
 - 1. Where installations below an outlet might be damaged by spillage or leakage, provide a drip pan of suitable size to minimize water damage. Drain accumulated water promptly from pans.
- C. Sanitary Facilities
 - 1. Toilets: Use of Owner's existing toilet facilities will be permitted, as long as facilities are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- D. Heating [**and Cooling**]: Provide temporary heating [**and cooling**] required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- B. Project Identification and Temporary Signs: Provide Project identification and other signs. Install signs to inform public and individuals seeking entrance to Project. Unauthorized signs are not permitted.
 - 1. Provide temporary, directional signs for construction personnel and visitors.
 - 2. Maintain and touchup signs so they are legible at all times.
- C. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
- D. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- B. Site Enclosure Barrier/Fence: Before construction operations begin, furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.
 - 1. Extent of Barrier/Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.
- C. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
- C. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section "Closeout Procedures."

END OF SECTION 015000

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.
- B. See Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout.
- C. See Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.2 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.3 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use CSI Form 13.1A.
 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable: Retain and edit requirements below that are necessary and not included in the Supplementary Conditions.
 - a. Statement indicating why specified material or product cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.

- I. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
 3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Engineer cannot make a decision on use of a proposed substitution within time allocated.
- B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 1. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Engineer will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
 - b. Use product specified if Engineer cannot make a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.

2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
 3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Engineer will make selection.
 5. Where products are accompanied by the term "match sample," sample to be matched is Engineer's.
 6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

3. **Products:** Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. **Manufacturers:** Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. **Available Products:** Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
6. **Available Manufacturers:** Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
7. **Product Options:** Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
8. **Basis-of-Design Product:** Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
9. **Visual Selection Specification:** Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. **Standard Range:** Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Engineer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. **Full Range:** Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Engineer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. **Conditions:** Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect Contractor's Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.
 - 7. Correction of the Work.
- B. See Division 1 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Engineer promptly.

3.4 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 1. Make vertical work plumb and make horizontal work level.

2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.

3.5 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 1. Remove liquid spills promptly.

2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.6 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.7 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.8 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

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SECTION 017329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
- B. See Divisions 2 through 16 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1.2 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Engineer's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.3 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

1.4 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.

- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 017329

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Final cleaning.
- B. See FAA General Provisions Section 90 "Measurement and Payment" for requirements for Applications for Payment for Substantial and Final Completion.
- C. See Divisions 2 through 16 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.

9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in heat and other utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, which must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
 2. Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will

notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - k. Remove labels that are not permanent.

- I. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Replace parts subject to unusual operating conditions.
 - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.
 - p. Leave Project clean and ready for occupancy.
- C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017700

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SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected site elements.

1.2 DEFINITIONS

- A. Remove and Discard: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Protect in Place: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

- A. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.
- B. Predemolition: Show existing conditions of adjoining construction and site improvements, including finish surfaces, which might be misconstrued as damage caused by selective demolition operations.

1.4 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

- C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 PROJECT CONDITIONS

- A. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.
 - 1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Owner. Owner will remove hazardous materials under a separate contract.

1.6 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.
- E. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
- B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Arrange to shut off indicated utilities with utility companies.
 - 2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Comply with requirements for access and protection specified in Division 1 Section "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

3.4 SELECTIVE DEMOLITION

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of

hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area off-site.
5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

- D. Existing Items to Remain:** Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition [and cleaned] and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General:** Except for items or materials indicated to be [recycled,] reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
1. Comply with requirements specified in Division 1 Section "Construction Waste Management."
- B. Burning:** Do not burn demolished materials.

- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

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SECTION C-105 - MOBILIZATION

105-1.1 DESCRIPTION:

- A. This item of work shall consist of, but is not limited to, work and operations necessary for the movement of personnel, equipment, material and supplies to and from the project site for work on the project except as provided in the contract as separate pay items.

105-2.1 MOBILIZATION LIMIT:

- A. Mobilization shall be limited to 5 percent of the total project cost.

105-3.1 POSTED NOTICES:

- A. Prior to commencement of construction activities, the Contractor must post the following documents in a prominent and accessible place where they may be easily viewed by all employees of the prime Contractor and by all employees of subcontractors engaged by the prime Contractor: Equal Employment Opportunity (EEO) Poster “Equal Employment Opportunity is the Law” in accordance with the Office of Federal Contract Compliance Programs Executive Order 11246, as amended; Davis Bacon Wage Poster (WH 1321) - DOL “Notice to All Employees” Poster; and Applicable Davis-Bacon Wage Rate Determination. These notices must remain posted until final acceptance of the work by the Owner.

105-4.1 ENGINEER/RPR FIELD OFFICE:

- A. An Engineer/RE field office is not required.

105-5.1 BASIS OF MEASUREMENT AND PAYMENT.

- A. The work and incidental costs covered under this item shall be paid for at the Contract lump sum for “Mobilization”. Partial payments will be made in accordance with the following:
 - a. With first pay request, 25%
 - b. The remaining 75% will be prorated throughout the duration of the contract

105-6.1 PAYMENT WILL BE MADE UNDER:

- A. See Bid Item No. 1 (C-105 Mobilization)

105-7.1 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

B. Office of Federal Contract Compliance Programs (OFCCP)

- a. Executive Order 11246, as amended
- b. EEOC-P/E-1 – Equal Employment Opportunity is the Law Poster
- c. United States Department of Labor, Wage and Hour Division (WHD)
- d. WH 1321 – Employee Rights under the Davis-Bacon Act Poster

END OF SECTION C-105

SECTION X-102 - AIRFIELD TEMPORARY CONSTRUCTION ITEMS

102-1.1 DESCRIPTION:

- A. This item consists of furnishing all labor, materials and equipment for temporary construction items necessary for the safe and proper execution of work and not otherwise included in other contract bid items. The Contractor will be expected to supply and utilize the items listed below and other items contained in the contract documents. Temporary construction items to be provided include, but are not limited to the following: flaggers, portable floodlighting, steel plates for temporary covering of excavations and structures as required, construction cones, low profile construction barricades with 360 degree Solar Light, water filled barriers with 360 degree Solar Light (to secure work limits), test pitting, man power and equipment as needed to keep all areas free of debris.

102-2.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. Airfield Temporary Construction Items not covered under other pay items within this specification will be paid for at the contract lump sum price bid. This price and payment shall be full compensation for all work related to this item.
 - a. See Bid Item No. 2 (X-102 Airfield Temporary Construction Items)
 - b. The contractor shall submit a breakdown of all bid items and costs included in the lump sum value.

END OF SECTION X-102

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SECTION X-103 - SECURITY REQUIREMENTS DURING CONSTRUCTION

103-1.1 DESCRIPTION

- A. This item shall consist of all labor and materials necessary to establish a secure perimeter around the construction site as directed by the Engineer in the field to abide by requirements of the plans and to provide personnel to maintain secure worksites for the duration of the project. Work shall be completed in accordance direction provided by Airport and PHL Representatives. The Contractor shall also reference the General Construction and Safety Notes, and the Project Phasing Plans included as part of the Contract Drawings in addition to all PHL Security Requirements.

103-2.1 SECURITY REQUIREMENTS OVERVIEW

- A. It is the Contractor's responsibility to become familiar with the various aspects of security at the airport to which the scope of work is assigned which may include review of 49 CFR 1542, *Transportation Security Administration, Department of Transportation, PHL Security (found at www.ecfr.gov)*. Any violation by the Contractor and any subsequent fines imposed due to the violation of security requirements at the airport will be the responsibility of the Contractor.

103-2.2 DEFINITION OF TERMS:

- A. Air Operations Area (AOA). The portion of an airport designed and used for landing, taking off or surface maneuvering of airplanes (includes aprons, taxiways, and runways) and enclosed by a security fence or line of building which is not open to the public.
- B. Challenge Procedure. The responsibility of approved contractor personnel that have been granted access to the AOA to contact, approach, or point out to appropriate authorities representing the airport any individual or vehicles present on airport property without proper approval or identification as outlined in the contract documents.
- C. Escort. An individual approved for escort authority, who may accompany authorized personnel or vehicles onto the project worksite.
- D. Restricted Area. Includes any area not approved for access by the contractor.
- E. Transportation Security Administration (TSA). An agency of the United States Federal Government (Executive Branch) responsible for Civil Aviation Security through the enforcement of regulations (under Title 49) designed to safeguard Civil Aviation Operations against acts of violence or acts of unlawful interference. TSA is responsible for the safety and security of passengers, flight crews, ground operations personnel, and the general public.

- F. Worksite. The largest area within which designated contractor worksite supervisor can maintain visual and radio contact of all workers and activities. A single construction project may be comprised of a single worksite or numerous worksites.
- G. Worksite Supervisor. The person assigned by the Contractor to a worksite in a restricted public area responsible for ensuring compliance by all Contractor and Subcontractor personnel to all safety and security rules and regulations established by the PHL Representative and as summarized within the contract documents. Each worksite supervisor (or a designated alternate) must be present at the worksite at all times while work is in progress.

103-3.1 PROJECT SPECIFIC REQUIREMENTS:

- A. The project shall require that all procedures for escorting, worksite access, and security be followed as outlined through notes contained within the plan set as well as through coordination with PHL Representatives. The following requirements are specific to the project scope of work:
- B. ESCORTS. The airport will not provide AOA escorts. The contractor must provide radios to select designated personnel associated with this project's construction and acquaint them with the proper procedures in communicating potential security threats to designated airport personnel.
- C. APPROVED PERSONNEL LIST. The contractor shall provide the PHL Representative with a current list of all employees working on the airport. The list shall be maintained current by the contractor and applies to both the contractor and subcontractors. The list must also highlight designated worksite supervisors and approved alternates for quick reference. Contractor staff members should be prepared to present proper identification to verify their employment and authorized use of vehicles on the worksite at any request by the PHL Representative or by other designated airport personnel.
- D. SITE ACCESS. The contractor must make certain that all construction activity stays confined to designated haul routes, access points, staging areas, worksite, and other coordinated locations described within the contract documents. Any personnel found in locations other than those approved as a component of this project may be considered in violation of security requirements and may face penalties and or immediate shutdown as a result.

103-4.1 METHOD OF MEASUREMENT:

- A. The contractor shall submit a breakdown of all bid items and costs included in the lump sum value mentioned in Item 103-5.1.

103-5.1 BASIS OF PAYEMENT:

- A. Security requirements during construction will be paid for at the contract lump sum price bid. This price and payment shall be full compensation for all work related to this item.
 - a. See Bid Item No. 3 (X-103 Security Requirements During Construction)

END OF SECTION X-103

SECTION P-101 - SURFACE PREPARATION

101-1.1 DESCRIPTION

- A. This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

101-2.1 EQUIPMENT AND MATERIALS

- A. All equipment and materials shall be specified here and in the following paragraphs or approved by the Engineer. The equipment shall not cause damage to the pavement to remain in place.

101-3.1 CONSTRUCTION

- A. Removal of existing pavement.
 - a. The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.
- B. Concrete pavement removal.
 - a. Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement. The pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the Engineer.
 - b. The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. Spall and underbreak repair shall be in accordance with the plans. Any underlying material that is to remain in place, shall be recompact and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor's expense.
- C. Asphalt pavement removal:
 - a. Not used.
- D. Repair or removal of Base, Subbase, and/or Subgrade.
 - a. Not used.

101-3.2 PREPARATION OF JOINTS AND CRACKS PRIOR TO OVERLAY/SURFACE TREATMENT

- A. Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the Engineer. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant per ASTM D6690. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8 inch (3 mm), not to exceed 1/4 inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

101-3.3 REMOVAL OF FOREIGN SUBSTANCES/CONTAMINATES PRIOR TO REMARKING

- A. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the Engineer in the field during construction.
- B. High-pressure water may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the Engineer that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the Engineer.
- C. Removal of foreign substances shall not proceed until approved by the Engineer. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

101-3.4 CONCRETE SPALL OR FAILED ASPHALTIC CONCRETE PAVEMENT REPAIR

- A. Repair of concrete spalls in areas to be overlaid with asphalt:
 - a. Not used.
- B. Asphalt pavement repair:
 - a. Not used.
- C. Cold Milling
 - a. Not used.

101-3.5. PREPARATION OF ASPHALT PAVEMENT SURFACES PRIOR TO SURFACE TREATMENT

- A. Not used.

101-3.7 MAINTENANCE

- A. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the Engineer. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 PREPARATION OF JOINTS IN RIGID PAVEMENT PRIOR TO RESEALING

- A. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the RPR, that the method used cleans the joint and does not damage the joint.
- 101-3.9 PREPARATION OF CRACKS IN FLEXIBLE PAVEMENT PRIOR TO SEALING.

101-3.8.1 REMOVAL OF EXISTING JOINT SEALANT

- A. All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other tools as necessary. Resaw joints removing no more than 1/16 inch (2 mm) from each joint face. Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

101-3.8.2 CLEANING PRIOR TO SEALING

- A. Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface-dry prior to installation of sealant.

101-3.8.3 JOINT SEALANT

- A. Joint material and installation will be in accordance with DOA approved joint sealant:
 - a. *Dow Corning 890-SL Self-Leveling Silicone Joint Sealant*

101-4.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. Accepted work through approval of the Engineer will not be paid separately but shall be considered incidental to the inclusive Lump Sum bid price per the gate(s) associated with

this type of work as part of the PBB replacement and associated equipment improvements. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item. No separate payment shall be made.

101-5.1 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.
- B. Advisory Circulars (AC)
 - a. AC 150/5380-6 Guidelines and Procedures for Maintenance of Airport Pavements.
- C. ASTM International (ASTM)
 - a. ASTM D6690 Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF SECTION P-101

SECTION P-620 - RUNWAY AND TAXIWAY MARKING

620-1.1 DESCRIPTION

- A. This item shall consist of the preparation and painting of numbers, markings, and stripes on the surface of runways, taxiways, and aprons, in accordance with these specifications and at the locations shown on the plans, or as directed by the Engineer. The terms “paint” and “marking material” as well as “painting” and “application of markings” are interchangeable throughout this specification.

MATERIALS

620-2.1 MATERIALS ACCEPTANCE

- A. The Contractor shall furnish manufacturer’s certified test reports, for materials shipped to the project. The certified test reports shall include a statement that the materials meet the specification requirements. This certification along with a copy of the paint manufacturer’s surface preparation; marking materials, including adhesion, flow promoting and/or floatation additive; and application requirements must be submitted and approved by the Engineer prior to the initial application of markings. The reports can be used for material acceptance, or the Engineer may perform verification testing. The reports shall not be interpreted as a basis for payment. The Contractor shall notify the Engineer upon arrival of a shipment of materials to the site. All material shall arrive in sealed containers that are easily quantifiable for inspection by the Engineer.

620-2.2 MARKING MATERIALS

- A. Table 1. Marking Materials:

Paint				Glass Beads	
Type	Color	Fed Std. 595 Number	Application Rate Maximum	Type	Application Rate Minimum
I	White	37925	115 ft ² /gal	I	7 lb/gal
I	Yellow	33538 or 33655	115 ft ² /gal	I	7 lb/gal
I	Black	37038	115 ft ² /gal	I	7 lb/gal
I	Red	31136	115 ft ² /gal	I	7 lb/gal

- B. Paint.

- a. Paint shall be in accordance with the requirements of this paragraph. Paint colors shall comply with Federal Standard No. 595. Type I. Waterborne. Paint shall meet the requirements of Federal Specification TT-P-1952F, Type I. The non-volatile portion of the vehicle for all paint types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis. [The acrylic resin

used for Type III shall be 100% cross linking acrylic as evidenced by infrared peaks at wavelengths 1568, 1624, and 1672 cm-l with intensities equal to those produced by an acrylic resin known to be 100% cross linking.

- b. Reflective media. Glass beads for white and yellow paint shall meet the requirements for Federal Specification TT-B-1325D Type I, Gradation. Glass beads for red and pink paint shall meet the requirements for Type I, Gradation. Glass beads shall be treated with all compatible coupling agents recommended by the manufacturers of the paint and reflective media to ensure adhesion and embedment. Glass beads shall not be used in black and green paint. Type III glass beads shall not be used in red and pink paint.
- c. Retroreflectivity shall be measured by a portable retroreflectometer according to ASTM E1710 and the practices in ASTM D7585 shall be followed for taking retroreflectivity readings with a portable retroreflectometer and computing measurement averages. A vehicle-mounted retroreflectometer may also be used.

CONSTRUCTION METHODS

620-3.1 WEATHER LIMITATIONS

- A. Painting shall only be performed when the surface is dry, and the ambient temperature and the pavement surface temperature meet the manufacturer's recommendations in accordance with paragraph 620-2.1. Painting operations shall be discontinued when the ambient or surface temperatures does not meet the manufacturer's recommendations. Markings shall not be applied when the wind speed exceeds 10 mph unless windscreens are used to shroud the material guns. Markings shall not be applied when weather conditions are forecasts to not be within the manufacturers' recommendations for application and dry time.

620-3.2 EQUIPMENT

- A. Equipment shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, a bead dispensing machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.
- B. The mechanical marker shall be an atomizing spray-type or airless type marking machine with automatic glass bead dispensers suitable for application of traffic paint. It shall produce an even and uniform film thickness and appearance of both paint and glass beads at the required coverage and shall apply markings of uniform cross-sections and clear-cut edges without running or spattering and without over spray. The marking equipment for both paint and beads shall be calibrated daily.

620-3.3 PREPARATION OF SURFACES

- A. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other contaminants that would reduce the bond between the paint and the pavement. Use of any chemicals or impact abrasives during surface preparation shall be approved in advance by the Engineer. After the cleaning operations, sweeping, blowing, or rinsing with pressurized water shall be performed to ensure the surface is clean and free of grit or other debris left from the cleaning process.
 - a. Preparation of new pavement surfaces. The area to be painted shall be cleaned by broom, blower, water blasting, or by other methods approved by the Engineer to remove all contaminants, including PCC curing compounds, minimizing damage to the pavement surface.
 - b. Preparation of pavement to remove existing markings. Existing pavement markings shall be removed by water blasting or by other methods approved by DOA, minimizing damage to the pavement surface. The removal area may need to be larger than the area of the markings to eliminate ghost markings. After removal of markings on asphalt pavements, apply a fog seal or seal coat to 'block out' the removal area to eliminate 'ghost' markings.
 - c. Preparation of pavement markings prior to remarking. Prior to remarking existing markings, loose existing markings must be removed minimizing damage to the pavement surface, with a method approved by the Engineer. After removal, the surface shall be cleaned of all residue or debris.
- B. Prior to the application of markings, the Contractor shall certify in writing that the surface is dry and free from dirt, grease, oil, laitance, or other foreign material that would prevent the bond of the paint to the pavement or existing markings. This certification along with a copy of the paint manufactures application and surface preparation requirements must be submitted to the Engineer prior to the initial application of markings.

620-3.4 LAYOUT OF MARKINGS

- A. The proposed markings shall be laid out in advance of the paint application. The locations of markings to receive glass beads shall be shown on the plans

620-3.5 APPLICATION.

- A. A period of 30 days shall elapse between placement of surface course or seal coat and application of the permanent paint markings. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the engineer.
- B. Paint shall be applied at the locations and to the dimensions and spacing shown on the plans. Paint shall not be applied until the layout and condition of the surface has been approved by the Engineer.

- C. The edges of the markings shall not vary from a straight line more than 1/2 inch (12 mm) in 50 feet (15 m), and marking dimensions and spacing shall be within the following tolerances:

Marking Dimensions and Spacing Tolerance

Dimension and Spacing	Tolerance
36 inch (910 mm) or less	±1/2 inch (12 mm)
greater than 36 inch to 6 feet (910 mm to 1.85 m)	±1 inch (25 mm)
greater than 6 feet to 60 feet (1.85 m to 18.3 m)	±2 inch (50 mm)
greater than 60 feet (18.3 m)	±3 inch (76 mm)

- D. The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate shown in Table 1. The addition of thinner will not be permitted.
- E. Glass beads shall be distributed upon the marked areas at the locations shown on the plans to receive glass beads immediately after application of the paint. A dispenser shall be furnished that is properly designed for attachment to the marking machine and suitable for dispensing glass beads. Glass beads shall be applied at the rate shown in Table 1. Glass beads shall not be applied to black paint or green paint. Glass beads shall adhere to the cured paint or all marking operations shall cease until corrections are made. Different bead types shall not be mixed. Regular monitoring of glass bead embedment and distribution should be performed.

620-3.6 APPLICATION-PREFORMED THERMOPLASTIC AIRPORT PAVEMENT MARKINGS

- A. Preformed thermoplastic pavement markings:

- a. Not used

620-3.7 CONTROL STRIP

- A. Prior to the full application of airfield markings, the Contractor shall prepare a control strip in the presence of the Engineer. The Contractor shall demonstrate the surface preparation method and all striping equipment to be used on the project. The marking equipment must achieve the prescribed application rate of paint and population of glass beads (per Table 1) that are properly embedded and evenly distributed across the full width of the marking. Prior to acceptance of the control strip, markings must be evaluated during darkness to ensure a uniform appearance.

620-3.8 RETRO-REFLECTANCE

- A. Reflectance shall be measured with a portable retro-reflectometer meeting ASTM E1710 (or equivalent). A total of 6 reading shall be taken over a 6 square foot area with 3 readings taken from each direction. The average shall be equal to or above the minimum levels of all readings which are within 30% of each other.

Minimum Retro-Reflectance Values

Material	Retro-reflectance mcd/m ² /lux		
	White	Yellow	Red
Initial Type I	300	175	35
Initial Type III	600	300	35
Initial Thermoplastic	225	100	35
All materials, remark when less than ¹	100	75	10

¹ Prior to remarking determine if removal of contaminants on markings will restore retro-reflectance

620-3.9 PROTECTION AND CLEANUP

- A. After application of the markings, all markings shall be protected from damage until dry. All surfaces shall be protected from excess moisture and/or rain and from disfiguration by spatter, splashes, spillage, or drippings. The Contractor shall remove from the work area all debris, waste, loose reflective media, and by-products generated by the surface preparation and application operations to the satisfaction of the Engineer. The Contractor shall dispose of these wastes in strict compliance with all applicable state, local, and federal environmental statutes and regulations.

620-4.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. The work of placing permanent pavement markings (Black, Yellow, White, and Red Paint with reflective media as required) performed in accordance with the specifications and accepted by the PHL Representative shall be considered incidental to the scope of work associated with each respective PBB replacement where this work is required per the contract documents.
- B. The work of placing permanent pavement markings (Black, Yellow, White, and Red Paint with reflective media as required), not completed as part of each PBB replacement, performed in accordance with the specifications and accepted by the PHL Representative shall be at the lump sum unit price bid.

620-6.1 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only:
- B. ASTM International (ASTM):
- a. ASTM D476 Standard Classification for Dry Pigmentary Titanium Dioxide Products
 - b. ASTM D968 Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive
 - c. ASTM D1652 Standard Test Method for Epoxy Content of Epoxy Resins
 - d. ASTM D2074 Standard Test Method for Total, Primary, Secondary, and Tertiary Amine Values of Fatty Amines by Alternative Indicator Method
 - e. ASTM D2240 Standard Test Method for Rubber Property - Durometer Hardness
 - f. ASTM D7585 Standard Practice for Evaluating Retroreflective Pavement Markings Using Portable Hand-Operated Instruments
 - g. ASTM E303 Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
 - h. ASTM E1710 Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
 - i. ASTM E2302 Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer
 - j. ASTM G154 Standard Practice for Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for Exposure of Nonmetallic Materials
 - k. Code of Federal Regulations (CFR)
 - l. 40 CFR Part 60, Appendix A-7, Method 24
Determination of volatile matter content, water content, density, volume solids, and weight solids of surface coatings
 - m. 29 CFR Part 1910.1200 Hazard Communication
 - n. Federal Specifications (FED SPEC)
 - o. FED SPEC TT-B-1325D Beads (Glass Spheres) Retro-Reflective

p. FED SPEC TT-P-1952F Paint, Traffic and Airfield Marking,
Waterborne

q. FED STD 595 Colors used in Government Procurement

C. Commercial Item Description

a. A-A-2886B Paint, Traffic, Solvent Based

D. Advisory Circulars (AC)

a. AC 150/5340-1 Standards for Airport Markings

b. AC 150/5320-12 Measurement, Construction, and Maintenance of Skid
Resistant Airport Pavement Surfaces

END OF SECTION P-620

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SECTION X-108 - Bollards

108-1.1 DESCRIPTION

- A. The work specified in this section consists of repairing and/or furnishing and installation of concrete filled pipe bollards in concrete footings at locations designated by the Engineer. Also included are the preparation, submittal and approval of the repair and/or installation as deemed required.

MATERIALS

108-2.1 Concrete:

- A. All materials, additives, admixtures, submittals, tests, proportioning, mixing, etc. required for the construction of work specified under this item shall meet the requirements of PA DOT CLASS A concrete.

108-2.1 Steel Pipe:

- A. Steel Pipes shall be 12" inches minimum in diameter, Schedule 40, meeting the requirements of ASTM A 53.

108-2.3 Paint:

- A. Bollards shall be painted safety yellow. Paint shall be reflective, commercial grade, glossy, no-lead, rust-inhibiting, and primer made for exterior use.

108-2.4 Joint Material:

- A. Pre-molded joint filler and joint sealing material shall meet the requirements of Dow Corning 890-SL Silicone Joint Sealant.

108-3.1 CONSTRUCTION METHODS

- A. Existing concrete-filled bollard shall be repainted to safety yellow, (Yellow 33538 or 33655) or DOA approved equal. The repainted bollard must be approved by DOA. The Contractor shall install barricades and cones as required to protect the repainted bollards.
- B. Proposed concrete-filled bollard shall be painted to safety yellow, (Yellow 33538 or 33655) or DOA approved equal. Concrete-filled pipe shall be set plumb at the required depth as shown on the typical detail. Concrete shall be thoroughly compacted around the bollard and shall have a smooth finish slightly higher than the ground and sloped to drain away from the bollard. Bollards shall not be disturbed in any manner within seven (7) days after

installation is completed. The Contractor shall install barricades and cones as required to protect the repaired or newly installed bollards.

- C. Where bollards are to be installed in existing concrete pavement, the perimeter of the area to be excavated shall be sawcut to the full depth of the existing section as prescribed in the Contract Document.
- D. All excavated materials shall be legally disposed of off-site and the area surrounding the bollard(s) immediately swept clean to the Engineer's satisfaction.

108-4.1 TYPICAL CONSTRUCTION DETAILS

- A. Details are provided in the construction bid document plan set. In specific conditions, as required, the Engineer will generate and provide repaint options as the project develops during the life of this contract. Under no circumstances shall the Contractor begin construction without approved drawings and site plans indicating the details and limits of work as approved by the Engineer.

108-5.1 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. The items covered by this section shall be considered incidental to the Contractor within the scope of work associated with each respective PBB replacement where this work is required per the contract documents.
 - a. Installation of Bollards: Proposed bollard installation shall be the number of each proposed in locations identified in the plan set and installed by the Contractor. Any pavement to remain that was damaged by negligence on the part of the Contractor, based on the decision of the RE, shall not be paid for.
 - b. Repair of Existing Bollards: Repair of existing bollards (new paint) shall be the number of each proposed in locations identified in the plan set or as directed by the RE during construction confined to the gates included in the scope of work associated with this project.

108-6.1 TESTING AND MATERIALS REQUIREMENTS

- A. ASTM A 53
 - a. Specification for Pipe, Steel, Black and Hot Dipped Zinc-Coated, Welded and Seamless.

END OF SECTION X-108

SECTION 032000 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel reinforcement bars.
2. Mechanical splice couplers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Mechanical splice couplers.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Statements: For testing and inspection agency.

B. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.
- C. Material Test Reports: For the following, from a qualified testing agency:
 1. Steel Reinforcement:
 - a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.
 2. Mechanical splice couplers.
- D. Field quality-control reports.
- E. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage and to avoid damaging coatings on steel reinforcement.
 1. Store reinforcement to avoid contact with earth.
 2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
 3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
 4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

2.2 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A615/A615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- C. Mechanical Splice Couplers: ACI 318 Type 1, same material of reinforcing bar being spliced; tension-compression type.
- D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.
 - 1. Finish: Plain ASTM A884/A884M, Class A, Type 1, epoxy coated, with less than 2 percent damaged coating in each 12-inch wire length.

2.3 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
 - 2. Stagger splices in accordance with ACI 318.
 - 3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
 - 4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 - 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
 - 1. Steel-reinforcement placement.
 - 2. Steel-reinforcement mechanical splice couplers.
 - 3. Steel-reinforcement welding.
- C. Manufacturer's Inspections: Engage manufacturer of structural thermal break insulated connection system to inspect completed installations prior to placement of concrete, and to provide written report that installation complies with manufacturer's written instructions.

END OF SECTION 032000

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SECTION 030130 - MAINTENANCE OF CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bonding agents.
2. Patching mortar (Concrete Spall Repair)
3. Structural Crack Repair: Epoxy crack-injection materials.
4. Non-Structural Crack Repair
5. Corrosion-inhibiting materials.
6. Epoxy Coating

1.2 UNIT PRICES

A. Work of this Section is affected by unit prices.

1. Unit prices apply to authorized work covered by estimated quantities.
2. Unit prices apply to authorized additions to and deletions from the Work as authorized by Change Orders.

B. General: Unit prices include the cost of preparing existing construction to receive the Work indicated and costs of field quality control required for units of Work completed.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to concrete work, including, but not limited to, the following:
 - a. Verify concrete-maintenance specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Concrete restoration specialist.
 - c. Materials, material application, sequencing, tolerances, and required clearances.
 - d. Shoring and bracing.

- e. Quality-control program.
- f. Coordination with building occupants.

1.4 ACTION SUBMITTALS

A. Product Data:

- 1. For each type of product.
 - a. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, project application types consisting of horizontal, vertical or overhead locations and application instructions.

B. Shop Drawings:

- 1. Shoring and Bracing: Provide Drawings or documentation to ensure that structure and temporary supports withstand the anticipated loads during construction and the effect of demolition on the capacity of the structure. Submit design calculations, sealed by an engineer licensed in state of Project, for shoring and bracing where required by the extent of structural repairs or removal of deteriorated concrete and subsequent replacement.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For concrete-maintenance specialist and manufacturers.
- B. Material Certificates: For each type of portland cement supplied for mixing or adding to products at Project site.
- C. Product Test Reports: For each manufactured product provided.
- D. Field quality-control reports.
- E. Quality-Control Program: Submit before work begins.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Each manufacturer must employ factory-authorized service representatives who are available for consultation and Project-site inspection and on-site assistance.
- B. Concrete-Maintenance Specialist Qualifications: Engage an experienced concrete-maintenance firm that employs installers and supervisors who are trained and approved by manufacturer to apply products when performing the Work of this Section. Firm must have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance. Experience in only installing or patching new concrete is insufficient experience for concrete-maintenance work.

1. Field Supervision: Concrete-maintenance specialist firm must maintain experienced full-time supervisors on Project site during times that concrete-maintenance work is in progress.
- C. Quality-Control Program: Prepare a written plan for concrete maintenance to systematically demonstrate the ability of personnel to properly perform maintenance work, including each phase or process, protection of surrounding materials during operations, and control of debris and runoff during the Work. Describe in detail materials, methods, equipment, and sequence of operations to be used for each phase of the Work.
- D. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.
- B. Store cementitious materials off the ground, under cover, and in a dry location.
- C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and prevent contamination.

1.8 FIELD CONDITIONS

- A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.
 1. Use only Class A epoxies when substrate temperatures are below or are expected to go below 40 deg F within eight hours.
 2. Use only Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F within eight hours.
 3. Use only Class C epoxies when substrate temperatures are above and are expected to stay above 60 deg F for eight hours.
- B. Cold-Weather Requirements for Cementitious Materials:
 1. Do not apply unless concrete surface and air temperatures are above 40 deg F and will remain so for at least 48 hours after completion of Work.
 2. Comply with the following procedures:

- a. When air temperature is below 40 deg F, heat patching-material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
 - b. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant insulating blankets for 48 hours after repair or provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
 - c. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
- C. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F and above.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. For repair products, obtain each color, grade, finish, type, and variety of product from single source and from single manufacturer with resources to provide products of consistent quality in appearance and physical properties.

2.2 BONDING AGENTS

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Manufactured product that consists of water-insensitive epoxy adhesive, portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Sika Corporation: Basis of Design Product – Sika Armatec-110 EpoCem
 - b. Dayton Superior
 - c. MAPEI Corporation
- B. Mortar Scrub Coat: Mix consisting of 1 part portland cement and 1 part fine aggregate complying with ASTM C144, except 100 percent passing a No. 16 sieve.

2.3 PATCHING MORTAR

- A. Patching Mortar Requirements:

1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal, vertical, or overhead use orientation.
- B. Polymer-Modified, Cementitious Patching Mortar: Packaged, dry mix for repair of concrete and that contains a nonredispersible latex additive as either a dry powder or a separate liquid that is added during mixing.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Sika Corporation: Basis of Design Product – SikaTop 123 PLus
 - b. Dayton Superior
 - c. MAPEI Corporation
 2. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.4 STRUCTURAL CRACK REPAIR: EPOXY CRACK-INJECTION MATERIALS

- A. Epoxy Crack-Injection Adhesive: ASTM C881/C881M, bonding system Type IV, free of VOCs.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Sika Corporation: Basis of Design Product – Sikadur-35 Hi-Mod LV
 - b. Dayton Superior
 - c. MAPEI Corporation
 2. Capping Adhesive: Product manufactured for use with crack-injection adhesive by same manufacturer.
 3. Color: Provide epoxy crack-injection adhesive and capping adhesive as indicated by manufacturer's designations that blend with existing, adjacent concrete and do not stain concrete surface.

2.5 NON-STRUCTURAL CRACK REPAIR

- A. Two-component, polymer-Modified, Cementitious trowel-grade mortar: Packaged, dry mix for repair of concrete and that contains a nonredispersible latex additive as either a dry powder or a separate liquid that is added during mixing.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Sika Corporation: Basis of Design Product – SikaTop 122 PLus
 - b. Dayton Superior
 - c. MAPEI Corporation

2.6 CORROSION-INHIBITING MATERIALS

- A. Corrosion-Inhibiting Treatment: Waterborne solution of alkaline corrosion-inhibiting chemicals for concrete-surface application that penetrates concrete by diffusion and forms a protective film on steel reinforcement.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Sika Corporation: Basis of Design Product – Sika FerroGard-903
 - b. Dayton Superior
 - c. MAPEI Corporation

2.7 EPOXY COATING:

- A. High-build, protective, solvent free, colored epoxy coating:
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
 - a. Sika Corporation: Basis of Design Product – Sikagard-62
 - b. Dayton Superior
 - c. MAPEI Corporation
 2. Color and Texture: As indicated by manufacturer's designations Matching existing.

2.8 MISCELLANEOUS MATERIALS

- A. Curing Materials: For ready-mixed concrete or packaged repair materials.
- B. Formwork Materials: Form-facing materials must comply with ACI 301 requirements.
- C. Water: Potable.

- D. Cleaning Agent: Commercial muriatic acid solution.

2.9 MIXES

- A. General: Mix products, in clean containers, in accordance with manufacturer's written instructions.
 - 1. Do not add water, thinners, or additives unless recommended by manufacturer.
 - 2. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
 - 3. Do not mix more materials than can be used within time limits recommended by manufacturer. Discard materials that have begun to set.
- B. Dry-Pack Mortar: Mix required type(s) of patching-mortar dry ingredients with just enough liquid to form damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.

PART 3 - EXECUTION

3.1 CONCRETE MAINTENANCE

- A. Have concrete-maintenance work performed only by qualified concrete-maintenance specialist.
- B. Comply with manufacturers' written instructions for surface preparation and product application.

3.2 EXAMINATION

- A. Notify Engineer seven days in advance of dates when areas of deteriorated or delaminated concrete and deteriorated reinforcing bars will be located.
- B. Locate areas of deteriorated or delaminated concrete using hammer or chain-drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries. At piers, make boundaries level and plumb unless otherwise indicated.
- C. Pachometer Testing: Locate at least three reinforcing bars using a pachometer, and drill test holes to determine depth of cover. Calibrate pachometer using depth of cover measurements, and verify depth of cover in removal areas using pachometer.
- D. Perform surveys as the Work progresses to detect hazards resulting from concrete-maintenance work.

3.3 PREPARATION

- A. Ensure that supervisory personnel are on-site and on duty when concrete-maintenance work begins and during its progress.
- B. Protect persons, motor vehicles, surrounding surfaces of building being repaired, building site, plants, and surrounding buildings from harm resulting from concrete-maintenance work.
 - 1. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
 - 2. Use only proven protection methods appropriate to each area and surface being protected.
 - 3. Provide temporary barricades, barriers, and directional signage to exclude public from areas where concrete-maintenance work is being performed.
 - 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of concrete-maintenance work.
 - 5. Contain dust and debris generated by concrete-maintenance work and prevent it from reaching the public or adjacent surfaces.
 - 6. Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.
 - 7. Protect floors and other surfaces along haul routes from damage, wear, and staining.
 - 8. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.
 - 9. Protect adjacent surfaces and equipment by covering them with heavy polyethylene film and waterproof masking tape or a liquid-strippable masking agent. If practical, remove items, store, and reinstall after potentially damaging operations are complete.
 - 10. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
 - 11. Dispose of debris and runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- C. Existing Drains: Prior to the start of concrete-maintenance work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin concrete-maintenance work in an area until the drainage system is in working order.

1. Prevent solids, such as aggregate or mortar residue, from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from concrete-maintenance work.
 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
- D. Preparation for Concrete Removal: Examine construction to be repaired to determine best methods to safely and effectively perform concrete-maintenance work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed in the course of repair.
1. Verify that affected utilities have been disconnected and capped.
 2. Inventory and record the condition of items to be removed for reinstallation or salvage.
 3. Provide and maintain shoring, bracing, and temporary structural supports as required to preserve stability and prevent unexpected or uncontrolled movement, settlement, or collapse of construction being demolished and construction and finishes to remain. Strengthen or add new supports when required during progress of removal work.
- E. Reinforcing-Bar Preparation: Remove loose and flaking rust from exposed reinforcing bars by wire brushing until only tightly adhered light rust remains.
1. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in two or more adjacent bars, cut bars and remove and replace as indicated on Drawings.
 2. Remove additional concrete as necessary to provide at least 1-inch clearance at existing and replacement bars.
 3. Splice replacement bars to existing bars in accordance with ACI 318 by lapping, welding, or using mechanical couplings.
- F. Surface Preparation for Corrosion-Inhibiting Treatment: Clean concrete to remove dirt, oils, films, and other materials detrimental to treatment application.
1. Use low-pressure water cleaning or sand blasting.
 2. Allow surface to dry before applying corrosion-inhibiting treatment.

3.4 REMOVAL OF CONCRETE

- A. Do not overload structural elements with debris.
- B. Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcement.

- C. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
- D. Remove additional concrete if necessary to provide a depth of removal of at least 1/2 inch over entire removal area.
- E. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and to provide at least 3/4-inch clearance around bar.
- F. Test areas where concrete has been removed by tapping with hammer, and remove additional concrete until unsound and disbonded concrete is completely removed.
- G. Provide surfaces with a fractured profile of at least 1/8 inch that are approximately perpendicular or parallel to original concrete surfaces. At columns and walls, make top and bottom surfaces level unless otherwise directed.
- H. Thoroughly clean removal areas of loose concrete, dust, and debris.

3.5 APPLICATION OF BONDING AGENTS

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion System: Apply to reinforcing bars and concrete by stiff brush or hopper spray in accordance with manufacturer's written instructions. Apply to reinforcing bars in two coats, allowing first coat to dry two to three hours before applying second coat. Allow to dry before placing patching mortar or concrete.

3.6 INSTALLATION OF PATCHING MORTAR

- A. Place patching mortar as specified in this article unless otherwise recommended in writing by manufacturer.
 - 1. Provide forms where necessary to confine patch to required shape.
 - 2. Wet substrate and forms thoroughly and then remove standing water.
- B. Pretreatment: Apply specified bonding agent.
- C. General Placement: Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
- D. Vertical Patching: Place material in lifts of not more than 1 inch or less than 1/4 inch. Do not feather edge.
- E. Consolidation: After each lift is placed, consolidate material and screed surface.

- F. Multiple Lifts: Where multiple lifts are used, score surface of lifts to provide a rough surface for placing subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
- G. Finishing: Allow surfaces of lifts that are to remain exposed to become firm and then finish to a surface matching adjacent concrete.
- H. Curing: Wet-cure cementitious patching materials, including polymer-modified cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.

3.7 APPLICATION OF EPOXY CRACK-INJECTION MATERIALS

- A. Clean cracks with oil-free compressed air or low-pressure water to remove loose particles.
- B. Clean areas to receive capping adhesive of oil, dirt, and other substances that would interfere with bond.
- C. Place injection ports as recommended by epoxy manufacturer, spacing no farther apart than thickness of member being injected. Seal injection ports in place with capping adhesive.
- D. Seal cracks at exposed surfaces with a ribbon of capping adhesive at least 1/4 inch thick by 1 inch wider than crack.
- E. Inject cracks wider than 0.003 inch to a depth of 8 inches.
- F. Inject epoxy adhesive, beginning at widest part of crack and working toward narrower parts. Inject adhesive into ports to refusal, capping adjacent ports when they extrude epoxy. Cap injected ports and inject through adjacent ports until crack is filled.
- G. After epoxy adhesive has set, remove injection ports and grind surfaces smooth.

3.8 APPLICATION OF CORROSION-INHIBITING MATERIALS

- A. Apply corrosion-inhibiting treatment to surfaces indicated on Drawings.
- B. Apply by brush, roller, or airless spray in two coats at manufacturer's recommended application rate. Remove film of excess treatment by high-pressure washing before patching treated concrete.

3.9 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:

1. Packaged, Cementitious Patching-Mortar Application: randomly selected sets of samples for each type of mortar required, tested in accordance with ASTM C928/C928M.
 2. Epoxy Crack-Injection Materials: Core-drilled samples to verify proper installation.
 - a. Testing Frequency: one sample for each 100 ft. of crack injected.
 - b. Where samples are taken, refill holes with epoxy mortar.
 3. Product will be considered defective if it does not pass tests and inspections.
- C. Manufacturers Field Service: Engage manufacturers' factory-authorized service representatives for consultation and Project-site inspection and to provide on-site assistance when requested by Architect.
1. Have manufacturers' factory-authorized service representatives perform the following number of Project-site inspections to observe progress and quality of the Work, distributed over the period of product installation, regardless of on-site assistance requested by Architect:
 - a. Bonding-Agent and Packaged Patching-Mortar Installation: Three inspections.
 - b. Crack-Injection-Adhesive Preparation and Installation: Four inspections.
 - c. Corrosion-Inhibiting Treatment Installation: Two inspections.
- D. Prepare test and inspection reports.

END OF SECTION 030130

SECTION 078400 - THROUGH-PENETRATION FIRESTOP SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes filling of openings in floors, walls, and fire-rated partitions where pipe, conduit, ducts, and other installations (penetrations) are passing through fire-rated construction; and required fillers and accessories. Include both empty openings and openings containing penetrating items.

1.2 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
 - 1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
 - 2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
 - 3. Fire-resistance-rated floor and roof assemblies.
- B. F-Rated Systems: Provide through-penetration firestop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.
- C. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupied floor areas:
 - 1. Penetrations located outside wall cavities.
 - 2. Penetrations located outside fire-resistive shaft enclosures.
 - 3. Penetrations located in construction containing fire-protection-rated openings.
 - 4. Penetrating items larger than 4-inch diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture resistant through-penetration firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide through penetration firestop systems capable of supporting floor loads involved either by

- installing floor plates or by other means.
- 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.

- E. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.3 SUBMITTALS

- A. Product data for each type of through-penetration firestop system specified.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include through penetration firestop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
 - 1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 - 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.
- C. Product test reports from and based on tests performed by qualified independent testing laboratory evidencing compliance of through-penetration firestop systems with requirements including fire performance characteristics.
- D. Manufacturer's Certificates - signed by manufacturers of through-penetration firestop systems:
 - 1. Certification that products meet or exceed specified requirements. Evidence of UL Certification, Warnock Hersey, or Factory Mutual Systems Approval.
 - 2. Certification that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs) and are nontoxic to building occupants.
- E. Installer Qualification Data attesting that installer has completed through-penetration firestopping systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance. In addition, Installer has been approved by FMG according to FMG 4991, "Approval of Firestop Contractors" and successfully trained for product installation by through-penetration firestop system manufacturer
 - 1. Qualifications include having the necessary experience, staff, and training

to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

- F. Submit copies of field quality-control testing and inspection reports.
- G. Provide manufacturer's engineering judgment identification number and drawing details when there is no UL or Warnock Hersey system available for an application. Engineering judgment must include both project name and the contractor's name who will install through penetration firestop system as described in judgment drawing.
- H. Submit copy of Warranty specified herein.

1.4 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide through-penetration firestop system materials identical to those whose indicated fire performance characteristics have been determined per the ASTM test method indicated below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing and inspecting organization.
- B. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements to achieve a fire rating as noted on Drawings:
 - 1. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - 2. Through-penetration firestop systems correspond to those indicated by reference to through penetration firestop system designations listed by the following: UL in "Fire Resistance Directory."
- C. Single Source Responsibility: Provide through-penetration firestop systems, primers, and accessories from a single manufacturer.
- D. Installer Qualifications: Company specializing in installation of firestopping specified, licensed, trained and approved by manufacturer of firestop materials submitted, with experience on at least five projects of similar nature
 - 1. Installer must provide evidence of performance on at least three successful similar size and type projects.
 - 2. Installer must be FM approved per FM Standard 4991.
 - 3. Installer must be licensed by the state or local authority where applicable.
 - 4. Installer must be a member in good standing of the Firestop Contractor's International Association (FCIA).
- E. All through-penetration firestop systems will be installed by one company that will coordinate with all trades requiring through-penetration firestop systems to complete their respective installations.

- F. Inspection Requirements: ASTM E 2174-01 - Standard Practice for On-Site Inspection of Installed Fire Stop.
- G. Provide firestopping products containing no detectable asbestos as determined by the method specified in 40 CFR Part 763, Subpart F, Appendix A, Section 1, "Polarized Light Microscopy".
- H. Pre-installation Conference: Conduct conference at Project site to comply with requirements of the Contract.
- I. Information within construction documents referring to specific design designations of through penetration firestop systems is intended to establish requirements for performance based on conditions that are expected to exist during installation. Any changes in conditions and designated systems require the Architect's prior approval. Submit documentation showing that the performance of proposed substitutions equals or exceeds that of the systems they would replace and are acceptable to authorities having jurisdiction.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop systems to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Notify Owner's inspecting agency at least seven days in advance of

through-penetration firestop system installations; confirm dates and times on days preceding each series of installations.

- D. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until Owner's inspecting agency and building inspector, if required by authorities having jurisdiction, have examined each installation.

1.8 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Submit written agreement on through-penetration firestop system manufacturer's standard form, signed by manufacturer, installer, and contractor, agreeing to repair or replace defective materials that do not comply with these specifications or fail to provide the fire-stopping requirements of the referenced standards for a period of three (3) years after the date of Substantial Completion and Owner Final Acceptance.
- C. When available submit written agreement on through-penetration firestop system manufacturer's standard form, signed by manufacturer, agreeing to repair or replace defective materials that fail to provide an air and watertight condition after materials have cured for a period of five (5) years after the date of Substantial Completion and Owner Final Acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers are approved for use upon condition of submittal of shop drawings with UL assembly designations equivalent to the types indicated on the drawings. Final Record Documents will reflect the appropriate UL assembly designations for the selected manufacturer:
 - 1. Hilti, Inc., (800) 562-2728 www.us.hilti.com.
 - 2. 3M Brand Fire Protection Products, (800) 328-1687 www.solutions.3m.com.
 - 3. Tremco, Inc., (866) 209-2404 www.tremcosealants.com.

2.2 FIRESTOPPING - GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.

1. For penetrations involving CPVC piping, provide through-penetration firestop systems which include materials that have been tested to be compatible with CPVC piping.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Ceramic Fiber.
 - c. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - d. Fire-rated form board.
 - e. Fillers for sealants.
 2. Temporary forming materials.
 3. Substrate primers.
 4. Collars.
 5. Steel sleeves.
- C. Under normal environmental conditions, all material used shall be non-corrosive to metal and compatible with synthetic cable jackets.
- D. Provide all miscellaneous items required to attach materials as specified and shown on Drawings.

2.3 FILLER MATERIALS

- A. Pliable, hand applied, putty-like or foamed material, with enough consistency to retain its shape during and after installation, and which provides an immediate fire seal, is incombustible, emits no hazardous or toxic fumes when exposed to fire or high temperatures, and complies with requirements of the- following standards:
 1. Underwriters Laboratories classification standards for 3-hour fire rating and 3-hour cold side temperature rating or fire-ratings as required for the project.
 2. National Electric Code.
 3. NFPA 101 Life Safety Code.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not

re-emulsify during exposure to moisture.

- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
 - 1. Use intumescent putties utilizing graphite-based expansion agents in lieu of sodium silicate to prevent degradation by rain or high humidity.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric strips.
- H. Putty Pads: Wall opening protective materials for use with UL listed metallic and specified nonmetallic outlet boxes.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of plastic or glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated through penetration firestop system limits use to non-sag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Non-sag formulation for openings in vertical and other surfaces
- L. Firestop Mortar based on fire-resistive microsilica compounds.

2.4 MISCELLANEOUS MATERIALS

- A. Backup fillers, support frames, backup board for single access openings, primers, etc., as recommended and approved by the filler manufacturer.
- B. Primer: Type recommended by through-penetration firestop system manufacturer for specific substrate surfaces.
- C. Installation Accessories: Clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

2.5 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Clean opening to be sealed and remove loose material. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
 - 1. Remove laitance and form release agents from concrete.
- D. Anchor, position, and secure in place materials passing through the opening.
- E. Make sure there is enough clearance between materials passing through and none are resting against the side of the opening, so that filler material can surround each item.
- F. Protect adjacent finished surfaces.

3.2 INSTALLATION

- A. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces. Apply primer and materials in accordance with manufacturer's instructions. All products used must be from same manufacturer for all applications.
- B. Make sure there is enough clearance between materials passing through and none are resting against the side of the opening, so that filler material can surround each item.
- C. Install material at walls or partition openings which contain penetrating sleeves, piping, duct work, conduit and other items, requiring through-penetration firestop system.

- D. Apply through-penetration firestop system material in sufficient thickness to achieve rating to uniform density and texture.
 - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.
- E. Identify through-penetration firestop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Include the following information on labels:
 - 1. The words "Warning - Through-Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Through-penetration firestop system designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Through-penetration firestop system manufacturer's name.
 - 6. Installer's name.
- F. Examine installation including sealant materials and any damming or support materials to verify integrity of installation. Where system design permits, remove damming or support materials only after it has been determined that sealant materials have fully cured or dried.

3.3 FIELD QUALITY CONTROL

- A. Inspecting Agency: Owner may engage a qualified independent inspecting agency to inspect through-penetration firestop systems and to prepare test reports.
 - 1. Inspecting agency will state in each report whether inspected through-penetration firestop systems comply with or deviate from requirements.
- B. Proceed with enclosing through-penetration firestop systems with other construction only after inspection reports are issued.
- C. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements of tested and listed system design.
- D. After installation is complete, qualified independent inspecting agency shall submit inspection findings in writing with certification that Systems and Designs

were installed in compliance with requirements of tested and listed firestop system.

3.4 REPAIRS AND MODIFICATIONS

- A. Identify damaged, improperly installed or reentered seals for repair or modification.
- B. Modifications to penetrants shall be accomplished as per the through penetration firestop manufacturer's recommendations.
- C. Only materials used in the original seal and designated by the manufacturer as suitable for said repair, shall be used for this purpose.

3.5 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion and Owner Final Acceptance. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 078400

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes sealing the perimeter of exterior openings where joints occur, joints on exterior of building, and other locations shown on the drawings.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide elastomeric joint sealants for exterior applications that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.
- B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 QUALITY ASSURANCE

- A. All manufacturer items shall be factory labeled, on the material or its container.
- B. Manufacturer shall have a minimum of 10-years experience specializing in specified item.
- C. Applicator shall be Sealant Manufacturer approved with 5-years successful experience.
 - 1. Applicator shall employ only skilled trade workers for the Work.
- D. Obtain elastomeric materials only from manufacturers that if requested, will send a qualified technical representative to the project site for advising the Installer of proper procedures and precautions for the use of the materials.
- E. Contractor shall hold a pre-caulking meeting at the project site with the Architect and all involved parties to review conditions, materials, colors, and other requirements.

1.4 REFERENCES

- A. ACI 504 R – Guide to Joint Sealants for Concrete Structures
- B. ASTM C834 – Standard Specification for Latex Sealants
- C. ASTM C919 – Standard Practice for Use of Sealants in Acoustical Applications

- D. ASTM C920 – Standard Specification for Elastomeric Joint Sealants
- E. ASTM C 1193 – Standard Guide for Use of Joint Sealants
- F. ASTM D1056 – Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
- G. SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.5 SUBMITTALS

- A. Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of bond breakers, backer rods, and accessories.
- B. Submit full color samples for Architect selection.
- C. Certificates from the manufacturers of joint sealants attesting that their products comply with the specification and are suitable for the use indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturer's requirements to prevent their deterioration or damage due to moisture, temperature, contaminants, or other causes.

1.7 WARRANTY

- A. The Contractor shall furnish written guarantee that work executed under this section is free from defects of material and workmanship for a period of 5-years from date of substantial completion of the entire project.
- B. Include coverage that Contractor will, immediately and at its own expense, repair and replace all such defects as may develop during the term of this guarantee.
- C. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Multicomponent Non-sag Urethane Sealant:
 - 1. Available Products:
 - a. Pecora Corporation; Dynatrol II.
 - b. Tremco; Dymeric 511.
 - c. Tremco; Vulkem 922.
 - 2. Type and Grade: M (multicomponent) and NS (nonsag).
 - 3. Class: 50.
 - 4. Use Related to Exposure: NT (nontraffic).
 - 5. Uses Related to Joint Substrates: as applicable to joint substrates indicated.
- C. Single-component, non-sag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.
 - 1. Available Products:
 - a. Dow Corning; 790.
 - b. Sika Corporation; Sikasil WS-295.
- D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
 - 1. Available Products:

- a. Pecora Corporation; AC-20+.
- b. Tremco; Tremflex 834.
- c. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.

2.3 JOINT-SEALANT BACKING

- A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, and capable of remaining resilient at temperatures as low as minus 26 degrees F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to contribute otherwise to optimum sealant performance.

2.4 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Non-porous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non-staining, non-absorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.
 - a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

2. Remove laitance and form-release agents from concrete.
 - a. Clean non-porous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

- B. Joint Priming: Prime joint substrate based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.2 INSTALLATION

- A. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- B. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 1. Do not leave gaps between ends of sealant backings.
 2. Do not stretch, twist, puncture, or tear sealant backings.
 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION 079200

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SECTION 081113 – HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Insulated, steel fire-rated, hollow metal doors.
 - 2. Steel, fire-rated, hollow metal door frames.
- B. Related Sections include the following:
 - 1. Division 08 Section "Door Hardware" for door hardware and weatherstripping.
 - 2. Division 09 Section "Painting" for field painting factory-primed doors and frames.

1.2 SUBMITTALS

- A. Product Data: For each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, sound and fire-resistance ratings, and finishes.
- B. Shop Drawings: Show the following:
 - 1. Elevations of each door design.
 - 2. Frame details for each frame type including dimensioned profiles.

1.3 QUALITY ASSURANCE

- A. Steel Door and Frame Standard: Comply with ANSI A 250.8, unless more stringent requirements are indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.
- B. Inspect doors and frames on delivery for damage and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect. Remove and replace damaged items that cannot be repaired as directed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design: L Series 16 gauge, HD Fire Rated Door, as manufactured by Steelcraft.
 - 1. Alternate Manufacturers:
 - a. Amweld Building Products, Inc.
 - b. Ceco Door Products; a United Dominion Company.
 - c. Curries Company.
 - d. Mesker Door, Inc.
 - e. Republic Builders Products.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 - 1. Temperature-Rise Limit: Provide doors that have a maximum transmitted temperature end point of not more than 450 degrees F above ambient after 30 minutes of standard fire-test exposure.
 - 2. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.30 degrees Btu/F x h x sq. ft. when tested according to ASTM C 236.

2.3 MATERIALS

- A. Hot-Rolled Steel Sheets: ASTM A 569, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- B. Cold-Rolled Steel Sheets: ASTM A 366, Commercial Steel (CS), or ASTM A 620, Drawing Steel (DS), Type B; stretcher-leveled standard of flatness.
- C. Body Filler: 2-Part polyester resin putty type automotive filler. Basis of Design: Bondo® Body Filler.

2.4 DOORS

- A. General: Provide doors of sizes, thicknesses, and designs indicated.
- B. Doors: Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:
 - 1. Level 2 and Physical Performance Level B (Heavy Duty), Model 1 Full Flush.

2. Door Size; Varies from 3'-0" to 4'-0" wide by nominal 7 feet tall, 1-3/4 inches thick.
3. Core: Polystyrene.

2.5 FRAMES

- A. General: Provide steel frames for doors that comply with ANSI A250.8 and with details indicated for type and profile. Frame depths vary.
- B. Frames of 0.053-inch- thick steel sheet for Level 2 steel doors.
 1. Frame Type; 2 inch wide, flush and gasketed with equal rabbet, full depth of wall.
- C. Supports and Anchors: Fabricated from not less than 0.042-inch-thick, electrolytic zinc-coated or metallic-coated steel sheet.
- D. Inserts, Bolts, and Fasteners: Manufacturer's standard zinc-coated units complying with ASTM A 153, Class C or D.

2.6 FABRICATION

- A. General: Fabricate steel door and frame units to comply with ANSI A250.8 and to be rigid, neat in appearance, and free from defects including warp and buckle.
- B. Door Construction: Fabricate doors, panels, and frames from metallic-coated steel sheet. Close top and bottom edges of doors flush as an integral part of door construction or by addition of 0.053-inch- thick, metallic-coated steel channels with channel webs placed even with top and bottom edges.
- C. Single-Acting, Door-Edge Profile: Beveled edge
- D. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
- E. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.
- F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- G. Thermal-Rated (Insulating) Assemblies: Provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 on fully operable door assemblies.
 1. Provide thermal-rated assemblies with R-value of 3.5 or better.
- H. Hardware Preparation: Prepare doors and frames to receive concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements in ANSI A250.6 and ANSI A115 Series specifications for door and frame preparation for hardware.

- I. Frame Construction: Knocked down. Fabricate frames to shape shown.
- J. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
- K. Locate hardware as indicated on Shop Drawings or according to ANSI A250.8.

2.7 FINISHES

- A. Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
- B. Placing Frames: Comply with provisions in SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set.
 - 1. Provide at least three wall anchors per jamb. Attach wall anchors to existing wall construction with countersunk flathead screws. Fill with body filler and finish smooth, all screw head locations, spot prime repairs.
- C. Door Installation: Comply with ANSI A250.8. Fit hollow-metal doors accurately in frames, within clearances specified in ANSI A250.8. Shim as necessary to comply with SDI 122 and ANSI/DHI A115.1G.

3.2 ADJUSTING AND CLEANING

- A. Prime-Coat Touchup: Immediately after installation, sand smooth any rusted or damaged areas of prime coat and apply touch up of compatible air-drying primer.

END OF SECTION 081113

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes access doors and frames for walls.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details material descriptions, dimensions of individual components and profiles, and finishes.

PART 2 - PRODUCTS

2.1 ACCESS DOORS AND FRAMES

- A. Flush Access Door with Concealed Flanges:
 - 1. Basis of Design: Model DW-5040 as manufactured by Acudor Products, Inc.
 - 2. Alternate Manufacturers:
 - a. Karp Associates, Inc.
 - b. Metropolitan Door Industries Corporation.
 - c. Williams Brothers Corporation of America.
 - d. Substitutions per Division 01 Section "Substitution Procedures".
 - 3. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
 - 4. Location: Wall.
 - 5. Door Size: 24" w. by 30" h.
 - 6. Uncoated Steel Sheet for Door: Nominal 0.060 inch, 16 gage, factory primed.
 - 7. Frame Material: Same material and thickness as door.
 - 8. Latch and Lock: SFIC Key-operated Cabinet lock. Key into existing system.

2.2 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879, with cold-rolled steel sheet substrate complying with ASTM A 1008, Commercial Steel (CS), exposed.
- C. Frame Anchors: Same material as door face.

- D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A 153 or ASTM F 2329.

2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
- C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
 - 1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.
- D. Latch and Lock Hardware:
 - 1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2.4 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.
- C. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
 - 1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 ADJUSTING

- A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION 083113

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SECTION 084213 - ALUMINUM-FRAMED ENTRANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior manual-swing entrance doors and door-frame units.
 - 2. Interior manual-swing entrance doors and door-frame units.
 - 3. Sidelights.
 - 4. Transoms.

1.3 ALLOWANCES

- A. Field quality-control testing is part of testing and inspecting allowance.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For aluminum-framed entrances. Include plans, elevations, sections, full-size details, and attachments to other work.
 - 1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
 - 2. Include full-size isometric details of each vertical-to-horizontal intersection of aluminum-framed entrances, showing the following:
 - a. Joinery, including concealed welds.
 - b. Anchorage.
 - c. Expansion provisions.

- d. Glazing.
 - e. Flashing and drainage.
- 3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.
- E. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch (300-mm) lengths of full-size components and showing details of the following:
 - 1. Joinery, including concealed welds.
 - 2. Anchorage.
 - 3. Expansion provisions.
 - 4. Glazing.
 - 5. Flashing and drainage.
- F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer and field testing agency.
- B. Energy Performance Certificates: For aluminum-framed entrances, accessories, and components, from manufacturer.
 - 1. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed entrance.
- C. Product Test Reports: For aluminum-framed entrances.
- D. Field quality-control reports.
- E. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For aluminum-framed entrances to include in maintenance manuals.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified according to ASTM E 699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025.

1.9 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Structural Loads:
 - 1. All Loads: As indicated on Drawings.
- C. Structural: Test according to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- D. Air Infiltration: Test according to ASTM E 283 for infiltration as follows:
1. Entrance Doors:
 - a. Pair of Doors: Maximum air leakage of 1.0 cfm/sq. ft. (5.08 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
 - b. Single Doors: Maximum air leakage of 0.5 cfm/sq. ft. (2.54 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa).
- E. Water Penetration under Static Pressure: Test according to ASTM E 331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested according to a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. (300 Pa).
- F. Energy Performance: Certify and label energy performance according to NFRC as follows:
1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. x h x deg F (2.55 W/sq. m x K) as determined according to NFRC 100.
 2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.35 as determined according to NFRC 200.
 3. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 15 as determined according to NFRC 500.
- G. Noise Reduction: Test according to ASTM E 90, with ratings determined by ASTM E 1332, as follows.
1. Outdoor-Indoor Transmission Class: Minimum 26.
- H. Blast Resistance:
1. Hazard Rating: No Break per ASTM F 1642.
 2. Performance Condition: 1 per GSA-TS01.
- I. Windborne-Debris Impact Resistance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Wind Zone 1.

1. Large-Missile Test: For glazed openings located within 30 feet (9.1 m) of grade.
- J. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes:
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 MANUFACTURERS

- A. Kawneer
- B. Tubelite, USA
- C. Or approved equal

2.3 ENTRANCE DOOR SYSTEMS

- A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing operation.
 1. Door Construction: 1-3/4-inch (44.5-mm) overall thickness, with minimum 0.125-inch- (3.2-mm-) thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
 - a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior
 2. Door Design: As indicated.
- B. Framing Members: Manufacturer's standard extruded aluminum, minimum 0.125 inch (3.2 mm) thick and reinforced as required to support imposed loads.
 1. Nominal Size: As indicated on Drawings.
- C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.
- D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Materials:
 1. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

- a. Sheet and Plate: ASTM B 209 (ASTM B 209M).
 - b. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
 - c. Extruded Structural Pipe and Tubes: ASTM B 429/B 429M.
 - d. Structural Profiles: ASTM B 308/B 308M.
2. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
- a. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
 - b. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
 - c. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

2.4 ENTRANCE DOOR HARDWARE

- A. Entrance Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."
- B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door to comply with requirements in this Section.
1. Entrance Door Hardware Sets: Provide quantity, item, size, finish or color indicated.
 2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.
 3. Opening-Force Requirements:
 - a. Egress Doors: Not more than 15 lbf (67 N) to release the latch and not more than 30 lbf (133 N) to set the door in motion and not more than 15 lbf (67 N) to open the door to its minimum required width].
 - b. Accessible Interior Doors: Not more than 5 lbf (22.2 N) to fully open door.
- C. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of entrance door hardware are indicated in "Entrance Door Hardware Sets" Article. Products are identified by using entrance door hardware designations as follows:
1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Manufacturers' names are abbreviated in "Entrance Door Hardware Sets" Article.
 2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.
- D. Pivot Hinges: BHMA A156.4, Grade 1.

1. Offset-Pivot Hinges: Provide top, bottom, and intermediate offset pivots at each door leaf.
- E. Butt Hinges: BHMA A156.1, Grade 1, radius corner.
 1. Nonremovable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while entrance door is closed.
 2. Exterior Hinges: Stainless steel, with stainless-steel pin.
 3. Quantities:
 - a. Provide full length piano hinge.
- F. Continuous-Gear Hinges: Manufacturer's standard with stainless-steel bearings between knuckles, fabricated to full height of door and frame.
- G. Mortise Auxiliary Locks: BHMA A156.5, Grade 1.
- H. Manual Flush Bolts: BHMA A156.16, Grade 1.
- I. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.
- J. Panic Exit Devices: BHMA A156.3, Grade 1, listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.
- K. Cylinders: As specified in Section 087100 "Door Hardware."
 1. Keying: Coordinated with owner.
- L. Strikes: Provide strike with black-plastic dust box for each latch or lock bolt; fabricated for aluminum framing.
- M. Operating Trim: BHMA A156.6.
- N. Removable Mullions: BHMA A156.3, extruded aluminum.
 1. When used with panic exit devices, provide removable mullions listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305. Use only mullions that have been tested with exit devices to be used.
- O. Closers: BHMA A156.4, Grade 1, with accessories required for a complete installation, sized as required by door size, exposure to weather, and anticipated frequency of use; adjustable to comply with field conditions and requirements for opening force.
- P. Concealed Overhead Holders: BHMA A156.8, Grade 1.
- Q. Surface-Mounted Holders: BHMA A156.16, Grade 1.
- R. Door Stops: BHMA A156.16, Grade 1, floor or wall mounted, as appropriate for door location indicated, with integral rubber bumper.

- S. Weather Stripping: Manufacturer's standard replaceable components.
 - 1. Compression Type: Made of ASTM D 2000, molded neoprene, or ASTM D 2287, molded PVC.
 - 2. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.
- T. Weather Sweeps: Manufacturer's standard exterior-door bottom sweep with concealed fasteners on mounting strip.
- U. Silencers: BHMA A156.16, Grade 1.
- V. Thresholds: BHMA A156.21, raised thresholds beveled with a slope of not more than 1:2, with maximum height of 1/2 inch (12.7 mm).
- W. Finger Guards: Manufacturer's standard collapsible neoprene or PVC gasket anchored to frame hinge-jamb at center-pivoted doors.

2.5 ACCESSORIES

- A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
 - 1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
 - 2. Reinforce members as required to receive fastener threads.
 - 3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
 - 1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.
- C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.
- D. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil (0.762-mm) thickness per coat.

2.6 FABRICATION

- A. Form or extrude aluminum shapes before finishing.

- B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- C. Fabricate components that, when assembled, have the following characteristics:
 - 1. Profiles that are sharp, straight, and free of defects or deformations.
 - 2. Accurately fitted joints with ends coped or mitered.
 - 3. Physical and thermal isolation of glazing from framing members.
 - 4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
 - 5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
- D. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
 - 1. At exterior doors, provide compression weather stripping at fixed stops.
 - 2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.
- E. Entrance Doors: Reinforce doors as required for installing entrance door hardware.
 - 1. At pairs of exterior doors, provide sliding-type weather stripping retained in adjustable strip and mortised into door edge.
 - 2. At exterior doors, provide weather sweeps applied to door bottoms.
- F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
- G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.7 ALUMINUM FINISHES

- A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.
- B. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
 - 1. Color: As selected by architect.
- C. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm). Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare surfaces that are in contact with structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

3.3 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's written instructions.
 - 2. Do not install damaged components.
 - 3. Fit joints to produce hairline joints free of burrs and distortion.
 - 4. Rigidly secure nonmovement joints.
 - 5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
 - 6. Seal perimeter and other joints watertight unless otherwise indicated.
- B. Metal Protection:
 - 1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or installing nonconductive spacers.
 - 2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Set continuous sill members and flashing in full sealant bed as specified in Section 079200 "Joint Sealants" to produce weathertight installation.
- D. Install components plumb and true in alignment with established lines and grades.
- E. Install glazing as specified in Section 088000 "Glazing."
- F. Entrance Doors: Install doors to produce smooth operation and tight fit at contact points.
 - 1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.

2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware according to entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Field Quality-Control Testing: Perform the following test on aluminum-framed entrances.
 1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested according to AAMA 501.2 and shall not evidence water penetration.
- C. Aluminum-framed entrances will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

3.5 MAINTENANCE SERVICE

- A. Entrance Door Hardware:
 1. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

3.6 ENTRANCE DOOR HARDWARE SETS

END OF SECTION 084213

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SECTION 087100 – DOOR HARDWARE

PART 1- GENERAL

1.1 WORK COVERED BY THIS SECTION

- A. Consists of securing and furnishing to the job site all Finish Hardware in accordance with this section and applicable drawings. It is intended that the following list of hardware cover all items required to complete the project and supplement the electronic security doors. Omissions and/or discrepancies shall be brought to the Design Professional's attention during the bidding period and, as needed, be corrected by addendum.
- B. Items covered include, but are not necessarily limited to:
 - 1. Surface Mounted Door Closers.
 - 2. Electric Strikes.
 - 3. Fire Rated Mortise type Exit Devices with Lever Trim.
 - 4. Continuous Hinges.
 - 5. Lock Cylinders, SFIC Cylinder Cores, and Keying.
 - 6. Lock Cylinders and SFIC Cylinder Cores for Access Doors.
 - 7. Kickplates.
 - 8. Floor Mounted Magnetic Door Holders.
 - 9. Weatherstripping.
 - 10. Door Position Switches.
 - 11. Thresholds.

1.2 RELATED SECTIONS

- A. Section 08110 - Metal doors and frames.
- B. Division 26 - Electrical.
- C. Section 281300 - Access Control
- D. Architectural Drawings.
- E. Electrical Drawings.
- F. SSI Drawings.

1.3 REFERENCES:

- A. State and Local Codes including Authority having jurisdiction.
- B. ANSI 156.18 - Materials and Finishes.

- C. ANSI 117.1 - Specifications for Making Buildings and Facilities Usable by Physically Handicapped People.
- D. ADA - Americans with Disabilities Act of 1990.
- E. BHMA - Builders Hardware Manufacturers Assoc.
- F. NFPA - National Fire Protection Assoc.
 - 1. NFPA 80 - Fire Doors and Windows.
 - 2. NFPA 101 - Life Safety Code.
- G. SDI - Steel Door Institute.

1.5 SUBMITTALS:

- A. Submit 6 copies of vertically formatted Hardware Schedule.
 - 1. Format Hardware Schedule into Hardware Groups to clearly identify each door and frame with the following.
 - a. Unique number; Descriptive location; Size; Hand; Degree of swing.
 - 2. List within Hardware Group all items required for each door, including the following.
 - a. Quantity; Item description; Manufacturer's name and catalog number; Size: BHMA finish.
- B. Furnish six (6) copies of catalog cuts for each item of hardware.
 - 1. Furnish index and explanation of abbreviations, symbols and/or codes contained in Hardware Schedule.
- C. Furnish chart of mounting heights and locations.
- D. Provide templates to door and frame manufacturer indicating location and reinforcing required for hardware items.
- E. Approval of the Hardware Schedule will not relieve the suppliers' responsibility of furnishing all hardware to complete the project.
- F. Submittal Sequence: Submit initial draft of final schedule along with essential Product Data to facilitate the fabrication of other work that is critical in the Project construction schedule. Submit the final Door Hardware Schedule after Samples, Product Data, coordination with Shop Drawings of other work, delivery schedules, and similar information has been completed and accepted.

- G. Keying Schedule: Prepared by or under the supervision of supplier, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.
- H. Product Certificates: Signed by manufacturers of electrified door hardware certifying that products furnished comply with requirements.
 - 1. Certify that door hardware approved for use on types and sizes of labeled fire doors complies with listed fire door assemblies.
- I. Maintenance Data: Provide maintenance manuals for each type of door hardware.
- J. Warranties: Special warranties specified in this Section.
- K. Electrically related items and instructions:
 - 1. Items and Instructions to be furnished within this section shall be italicized in the Finish Hardware Schedule.
 - 2. All openings using electrically operated hardware, furnished completely from this section, except wiring, will require (6) six copies of a detailed color-coded wiring diagram showing all components used in the opening. The supplier shall provide these diagrams with the hardware submittal. Factory installation instructions from the various elements will not be acceptable as meeting this requirement.

1.6 COORDINATION:

- A. Furnish templates and approved Hardware Schedule in a timely manner to respective material suppliers and trades to ensure accurate reinforcing and fitting of finish hardware.

1.7 QUALITY ASSURANCE:

- A. Supplier to be a directly franchised distributor of the products to be furnished, with warehousing facilities within 50 miles of the project. An AHC, Architectural Hardware Consultant, or person of equivalent experience shall be in the Supplier's employ and available for consultation to the Design Professional, Owner and Contractor at reasonable times during the course of work.
- B. Single Source Responsibility: Obtain each category of hardware; lockset, hinges, closers, etc. from a single manufacturer.
- C. Manufacturers shall supply both pre-installation instruction and post-installation walk thru to insure proper function and installation of all items. Recommendations, as needed, will be made for adjustment or replacement of any hardware items deemed unacceptable.
- D. Regulatory Requirements: Comply with provisions of the following:

1. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1, as follows:
 - a. Levers, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
 - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
 2. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
 3. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
- E. Pre-installation Conference: Conduct conference at Project site to review methods and procedures related to electrified door hardware including, but not limited to, the following:
1. Inspect and discuss electrical roughing-in and other preparatory work performed by other trades.
 2. Review sequence of operation for each type of electrified door hardware. Review the re-use of salvaged security hardware integrated with new security hardware.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review required testing, inspecting, and certifying procedures.

1.8 DELIVERY, STORAGE AND IDENTIFICATION:

- A. Package hardware items individually in manufacturer's original cartons, clearly marked to indicate contents and cross referenced to Hardware Schedule.
- B. Deliver, store and protect all items under provisions of the General Conditions.
- C. Provide locked storage area protected from moisture, sunlight, paint, chemicals, etc.
- D. All Best Lock Co. permanent pin tumbler cores and keys shall be delivered directly from the factory to PHL DOA.

1.9 MAINTENANCE:

- A. Furnish six (6) copies of any specialized tools and maintenance instruction manuals to Owner's Representative. Manuals are to be bound in three ring hard backed binders, incorporate a master index at the front and separation of manufacturer's products by plastic tabs.
- B. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- C. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies as used in the manufacture and installation of original products.

1.10 WARRANTY:

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of door hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
- C. Warranty Period: Three (3) years from date of Substantial Completion, unless otherwise indicated.
- D. Warranty Period for Manual Closers: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. To assure consistency and compatibility with other systems currently in place within the Airport the following manufacturer's products are specified in each product category. Acceptable alternates, where applicable, are noted.

2.2 FINISHES:

- A. Satin Chromium: US26D, BHMA 626: Exit devices and Trim; Cylinders; Electric Strikes.
- B. Satin Stainless Steel: US32D, BHMA 630: Hinges; Kickplates.
- C. Aluminum Powder Coat: BHMA 689: Closers; Magnetic Door Hold Opens.
- D. Mill Finish Aluminum: Continuous Hinges; Door Switches, Threshold.
- E. Black: Weatherstripping.

2.3 HINGES:

- A. Basis of Design Product: Continuous geared aluminum hinge, as manufactured by Stanley ST.
- B. Provide a single continuous hinge on all doors.
- C. Sizes: Door height less one inch.
- D. Provide instructions for proper door adjustment.
- E. Stanley and McKinney are acceptable alternates in this product category.
- F. Warranty all items against defects in material and workmanship for a period of three (3) years.

2.4 MORTISE CYLINDERS:

- A. Basis of Design Product: Model 1E 74 mortise type cylinder as manufactured by the Best Lock Company. Provide with 7 pin, Best Lock (SFIC), drill and pick resistant (UL 437), interchangeable core cylinders.
- B. Coordinate lock keyway with DOA.
- C. Provide a three (3) year warranty against defects in material and workmanship.
- D. No substitutions.

2.5 KEYING, KEYS:

- A. Contractor shall be responsible for furnishing both temporary and permanent pin tumbler cylinders and cores. All Best Lock Co. permanent pin tumbler cores and keys shall be delivered directly from the factory to PHL DOA for installation by DOA personnel.

2.7 EXIT DEVICES:

- A. 98 Series Mortise Lock Devices, as manufactured by Von Duprin.
- B. Functions as noted in Hardware Groups.
- C. Provide a three (3) year warranty against defects in material and/or workmanship on all mechanical products.
- D. No substitutions.

2.8 CLOSERS:

- A. As manufactured by Stanley ST.
- C. Provide ten (10) year warranty against defects in material and workmanship on all mechanical products.
- D. No substitutions.

2.9 KICKPLATES:

- A. As manufactured by Trimco.
 - 1. Kickplates:
 - a. Provide on all hollow metal doors.
 - b. Single doors – 16" X 2" LDW

2.10 MAGNETIC DOOR HOLDER:

- A. Door Holder: AHB
 - 1. Floor mounted type.

2.11 DOOR SWITCHES

- A. Door switches shall be triple biased type, with tamper switches, concealed mounted in the head of the door frame and top of the door, with cables to DIP.
- B. Provide mounting cutout to door hardware trade for factory fabrication of cutouts.
- C. Door switches shall be Sentrol/GE 2757A.

2.12 THRESHOLDS

- A. Thresholds: National Guard, fabricated to full width of opening indicated.

2.13 DOOR PULLS

- A. Trimco.

2.14 PROTECTION PLATES

- A. Trimco.

2.15 WALL/FLOOR STOPS

- A. Trimco.

2.16 SLIENCERS

- A. Trimco.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION:

- A. Utilize instructions and templates provided with each item of hardware. Where cutting and fitting is required to install hardware onto or into surfaces that are to be painted later or finished in another way, coordinate removal, storage and reinstallation of hardware items with finishing work specified in Division 09. Do not install surface mounted items until finishes have been completed on the substrates involved.
- B. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with other governing regulations.
 - 1. Recommended Locations for Builders Hardware for Standard Steel Doors and Frames X DHI.
 - 2. ADAG – Americans with Disabilities Act Guidelines.
- C. Power supply for electric door hardware shall be located in the Door Interface Panel.

- D. Door Closers and Fire Rated Exit Devices shall be mounted with machine screws threaded into steel reinforcement plates in hollow metal doors.
- E. Set units level and plumb. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchoring or fasteners. Space fasteners and anchors in accordance with industry standards.

3.3 ADJUST AND CLEAN:

- A. Check and adjust the operation of each door and item of hardware to ensure proper function and operation. Replace units that cannot be adjusted to operate smoothly.
- B. Final adjustments are to be made after all ventilating systems are in operation.
- C. Clean all hardware items and adjacent surfaces after installation.
- D. Where door hardware is installed more than one month prior to acceptance of the space all items shall be revisited to assure operation and cleanliness.

3.4 HARDWARE GROUPS:

Hardware Group No. 01:

Provide each single door (Door widths vary from 3'-0" to 3'-8"") with the following:

Quantity	Description	Catalog Number	Finish	Mfr.
1 EA	CONTINUOUS HINGE	780-112HD – Custom Length (1" LDH)	AL	ST
1 EA	FIRE EXIT MORTISE DEVICE	9875-F-992L-NL-03 (Door widths vary)	626	VON
1 EA	MORTISE CYLINDER	1E74 (to retract latch bolt)	626	BES
1 EA	SFIC CYLINDER CORE	6CS-SFIC	626	BES
1 EA	SURFACE CLOSER	4040 XP-EDA-AL-Template for 180°	689	ST
1 EA	KICK PLATE	8400 16" X 2" LDW (Door widths vary)	630	TR
1 EA	FLOOR MAGNETIC DOOR HOLDER	SEM 7820	689	ABH
1 SET	SEALS	S88D 18'	DKB	TR
1 EA	DOOR SWITCH	2757 A	AL	HES
1 EA	ELECTRIC STRIKE	6111	626	HES
1 EA	THRESHOLD	413S	AL	NA
EA	ELECTRIC STRIKE	6111	626	VON

Card reader by security supplier. Card access system by security supplier.
Door Interface Panel by Security supplier will power electric hardware.

Operational Description:

Free Egress (from Boarding Bridge) at all times. Pressing Push Bar retracts latchbolt. Lever always locked, entrance by lever when key retracts latchbolt from pull side. Card Reader electrically retracts the latchbolt either for momentary unlatching or for extended periods of time. Provide quiet operation. One internal SPDT switch monitors the latchbolt position and second momentary SPDT switch monitors the key cylinder. Door is Self-Closing.

Hardware Group No. 02:

Provide temporary construction access door with the following:

Description	Catalog Number	Finish	Mfr.		
1 CONTINUOUS HINGE	780-112HD – Custom Length (1" LDH)	AL	ST		
1 FIRE EXIT MORTISE DEVICE	9875-F-992L-NL-03 (Door widths vary)	626	VON		
1 MORTISE CYLINDER	1E74 (to retract latch bolt)	626	BES		
1 SFIC CYLINDER CORE	6CS-SFIC	626	BES		
1 SURFACE CLOSER	4040 XP-EDA-AL-Template for 180°	689	ST		
1 KICK PLATE	8400 16" X 2" LDW (Door widths vary)	630	TR		
1 SEALS	S88D 18'	DKB	TR		
1 THRESHOLD	413S	AL	NA		
EA ELECTRIC STRIKE	6111			626	VON

END OF SECTION 087100

SECTION 092216 – NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Non-load-bearing steel framing systems for interior partitions.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 FRAMING SYSTEMS

- A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
 - 1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
 - 2. Protective Coating: ASTM A 653, G60, hot-dip galvanized unless otherwise indicated.
- B. Studs and Tracks: ASTM C 645
 - 1. Steel Studs and Tracks:
 - a. Minimum Base-Metal Thickness: 0.0269 inch.
 - b. Depth: 3-5/8 inches
- C. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-metal thickness, with minimum 1/2-inch- wide flanges.
 - 1. Depth: 1-1/2 inches.
 - 2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

2.2 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 - 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Installation Standard: ASTM C 754.
 - 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, or similar construction.

3.3 INSTALLING FRAMED ASSEMBLIES

- A. Install framing system components according to spacing indicated, but not greater than spacing required by referenced installation standards for assembly types.
 - 1. Single-Layer Application: 16 inches o.c.
- B. Install studs so flanges within framing system point in same direction.
- C. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates
 - 1. Other Framed Openings: Frame openings other than door openings with single framing members
- D. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Interior gypsum board.

- B. Related Requirements:

- 1. Section 07844 "Firestopping" for firestopping requirements in gypsum board walls.
 - 2. Section 092216 "Non-Structural Metal Framing" for non-structural steel framing and suspension systems that support gypsum board panels.
 - 3. Section 099100 "Painting" for prime and finish coatings for gypsum board construction.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.

- B. Samples: For the following products:

- 1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

- C. Samples for Initial Selection: For each type of trim accessory indicated.

- D. Samples for Verification: For the following products:

- 1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

1.4 QUALITY ASSURANCE

- A. Mockup: Build mockup of one gate area to demonstrate aesthetic effects and to set quality standards for materials and execution for balance of the project.

- 1. Build mockup to establish the following:

- a. Level of gypsum board finish indicated for use in exposed locations.
 - b. Alignment with adjacent existing gypsum construction.
2. Apply or install final painting on exposed surfaces prior to review of mockups.
 3. Subject to compliance with requirements, approved mockups may become part of the completed Work, if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.
- B. Do not install panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 GYPSUM BOARD, GENERAL

- A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.2 INTERIOR GYPSUM BOARD

- A. Gypsum Board, Type X: ASTM C 1396.
 1. Thickness: 5/8 inch.
 2. Long Edges: Tapered.
- B. Impact-Resistant Gypsum Board: ASTM C 1396 gypsum board, tested according to ASTM C 1629.
 1. Core: 5/8 inch, Type X.
 2. Surface Abrasion: ASTM C 1629, meets or exceeds Level 2 requirements.
 3. Indentation: ASTM C 1629, meets or exceeds Level 2 requirements.
 4. Soft-Body Impact: ASTM C 1629, meets or exceeds Level 2 requirements.

5. Hard-Body Impact: ASTM C 1629, meets or exceeds Level 2 requirements according to test in Annex A1.
6. Long Edges: Tapered.

2.3 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
 1. Material: Galvanized or aluminum-coated steel sheet, or rolled zinc.
 2. Shapes:
 - a. Cornerbead.
 - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
 - c. U-Bead: J-shaped; exposed short flange does not receive joint compound.

2.4 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475.
- B. Joint Tape:
 1. Interior Gypsum Board: Paper.
- C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
 3. Fill Coat: For second coat, use setting-type, sandable topping compound.
 4. Finish Coat: For third coat, use setting-type, sandable topping compound.
 5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

2.5 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
 1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

- A. Comply with ASTM C 840.
- B. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- C. Locate edge and end joints over supports. Do not place tapered edges against cut edges or ends. Do not make joints other than control joints at corners of framed openings.
- D. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
 - 1. Type X: Vertical surfaces unless otherwise indicated.
 - 2. Impact-Resistant Type: All vertical locations within 48 inches of floor surface.
- B. Single-Layer Application:
 - 1. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing).
 - 2. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

3.4 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Interior Trim: Install in the following locations:
 - 1. Cornerbead: Use at outside corners.

2. LC-Bead: Use at exposed panel edges.
3. U-Bead: Use at exposed panel edges.

3.5 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints, beveled edges, and damaged surface areas.
- C. Apply joint tape over gypsum board joints.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
 1. Level 5: At all locations.
 - a. Primer and its application to surfaces are specified in Section 099100 "Painting."

3.6 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

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SECTION 096513 - RESILIENT BASE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Thermoset-rubber base.

1.3 ACTION SUBMITTALS

- A. Product Data: For type of product.
- B. Sample for Initial Selection: For product and color specified, not less than 12 inches long.
- C. Sample for Verification: For product and color required in manufacturer's standard-size Samples, but not less than 12 inches long.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than 10 linear feet of type and color of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees F or more than 90 degrees F.

1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees F or more than 95 degrees F, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOSET-RUBBER BASE

- A. Manufacturers:
 - 1. Flexco.
 - 2. Johnsonite.
 - 3. Roppe Corporation, USA.
- B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 1. Style:
 - a. Style A, Straight Base.
 - b. Style B, Cove Base.
 - 2. Location: Match style of base at existing adjacent installations.
- C. Thickness: 0.125 inch.
- D. Height: 4 inches.
- E. Lengths: Cut lengths 48 inches long.
- F. Outside Corners: Job formed or preformed.
- G. Inside Corners: Job formed.
- H. Colors: Match existing adjacent resilient base color.

2.2 INSTALLATION MATERIALS

- A. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

1. Manufacturer's standard water based adhesive with 50 g/L VOC or less.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Do not install resilient products until materials are the same temperature as space where they are to be installed.
 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls where base is required.
- C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. Preformed Corners: Install preformed corners before installing straight pieces.

G. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 12 inches in length.
 - a. Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 12 inches in length.
 - a. Cope corners to minimize open joints.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
- B. Perform the following operations immediately after completing resilient-product installation:
 1. Remove adhesive and other blemishes from surfaces.
 2. Sweep and vacuum horizontal surfaces thoroughly.
 3. Damp-mop horizontal surfaces to remove marks and soil.
- C. Protect resilient products from marks, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION 096513

SECTION 099100 - PAINTING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes surface preparation and field application of paints to unpainted surfaces, previously painted surfaces, and prime painted surfaces.

1.2 REFERENCES

- A. ASTM International:
 - 1. ASTM D16 - Standard Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
- B. SSPC: The Society for Protective Coatings:
 - 1. SSPC - Steel Structures Painting Manual.

1.3 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years of experience.
- B. Applicator: Company specializing in performing work of this section with minimum five years experience.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.6 ENVIRONMENTAL REQUIREMENTS

- A. Do not apply exterior coatings during rain or snow when relative humidity is outside recommended humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.
- B. Minimum Application Temperature for Alkyd (oil based) Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.
- C. Provide temporary lighting that provides a minimum lighting level of 80 foot candles on all surfaces to be painted.
- D. DO NOT use custodian sinks or other owner receptacles for cleaning mixing or other operations, without the understanding the requirement that any used shall be thoroughly cleaned and plumbed by this contractor, for optimum use by the owner, whether previously soiled, damaged, or not.

1.7 WARRANTY

- A. Furnish five-year manufacturer warranty for paints and coatings.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

- A. Preferred Paint Manufacturer:
 - 1. Porter Paints.
- B. Acceptable Alternate Paint Manufacturers:
 - 1. Benjamin Moore.
 - 2. ICI Delux or Glidden Paint.
 - 3. PPG.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723 Class B & C; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 450 or less.

2.3 COMPONENTS

- A. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
 - 1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
 - 2. For good flow and brushing properties.

3. Capable of drying or curing free of streaks or sags.
- B. Use coatings of the same manufacturer within any paint or finish system to the extent possible.

2.4 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block primers and finish-coat materials that are made by a single manufacturer to the extent possible, compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated.
- C. Chemical Components of Interior Paints and Coatings: Provide products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24) and the following chemical restrictions:
 1. Primers: VOC content of not more than 100 g/L.
 2. Paints and Coatings: VOC content of not more than 150 g/L.
 3. Anticorrosive Coatings: VOC content of not more than 250 g/L.

2.5 INTERIOR PRIMERS

- A. Interior Ferrous-Metal Primer: Factory-formulated, quick-drying, rust-inhibitive alkyd-based metal primer.
 1. Porter Paints; Porter Guard Alkyd Metal Primer No. 272/276: Applied at a dry film thickness of not less than 2.0 mils.
- B. Interior Gypsum board Primer: Factory-formulated, quick drying, latex primer.
 1. PPG Architectural Paints; SpeedHide Zero Interior, Zero VOC, Latex Sealer No. 6-4900: applied at a dry film thickness of not less than 1.4 mils.

2.6 INTERIOR FINISH COATS

- A. Interior Semi-gloss Acrylic Enamel: Factory-formulated semi-gloss acrylic-latex enamel for interior application.
 1. Porter Paints; Pro-Master 2000 Semi-Gloss Interior Latex Wall & Trim Paint No. 6139: Applied at a dry film thickness of not less than 1.5 mils.
- B. Interior Eggshell Acrylic Enamel: Factory-formulated Eggshell acrylic enamel for interior application.

1. Glidden Professional; Diamond 450 No VOCs, Interior Latex Wall & Trim Paint No. 7200: Applied at a dry film thickness of not less than 1.5 mils.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify surfaces are ready to receive Work as instructed by product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.

3.2 PREPARATION

- A. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects. Cleaning shall include removing any foreign substances.
- B. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent.
- C. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and all rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. On any steel surfaces subject to moisture, this cleaning shall be done the same day as the painting. Do not clean anymore surfaces that cannot be painted the same day.

3.3 APPLICATION

- A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- B. When painting gypsum board wall and soffit surfaces, extend new paint top coats to the nearest interior or exterior corner such that plane of new work and adjacent surface in the same plane are all painted to provide a uniform appearance.
- C. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.
- D. Sand/ steel wool surfaces lightly between coats to achieve required finish.
- E. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Finishing Mechanical And Electrical Equipment:
 1. Remove electrical cover plates, hardware, light fixture trim, escutcheons, and fittings prior to finishing.

2. Previously painted mechanical and electrical items will be required to be painted under this section, unless specifically noted otherwise on the drawings.
 3. Prime and paint insulated and exposed pipes, conduit, boxes, hangers, brackets, collars and supports, except where items are shop finished.
 4. Paint exposed conduit and electrical equipment occurring in finished areas.
 5. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- G. Mask off areas specifically noted not to be painted, and provide any other masking necessary for a professional result.
- H. Do not paint over fire rating labels on fire rated hollow metal doors and frames.

3.4 CLEANING

- A. Collect waste material which may constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.5 SCHEDULE - INTERIOR SURFACES

- A. Steel - Unprimed:
1. One coat of ferrous metal primer.
 2. Two coats of latex enamel, semi-gloss.
- B. Steel - Primed:
1. Touch-up with ferrous metal primer.
 2. Two coats of latex enamel, semi-gloss.
- C. Gypsum Board - Unprimed:
1. One coat of interior gypsum board primer.
 2. Two coats of latex enamel, eggshell.

END OF SECTION 099100

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SECTION 101423 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This section includes signs that are directly attached to the doors, door frames and DIP panels.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: For signs.
 - 1. Include fabrication and installation details and attachments to other work.
 - 2. Show sign mounting heights and locations.
 - 3. Show message list, typestyles, graphic elements, and layout for each sign at a scale of 3 inches equals one foot.
- C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
 - 1. Include representative Samples of available typestyles and graphic symbols.
- D. Samples for Verification: For each type of sign assembly showing all components and with the required finishes as follows:
 - 1. Door Signs: Full-size Sample.
 - 2. Restricted Access Signs: Full-size Sample.
 - 3. Full-size Samples, if approved, will be returned to Contractor for use in Project.
- E. Product Schedule: For door signs. Use same designations indicated on Drawings or specified.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For signs to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Deterioration of finishes beyond normal weathering.
 - b. Separation or delamination of sheet materials and components.
 - 2. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 DOOR NUMBER SIGNS

- A. Door Number Signs: Signs with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:
- B. Large Door Number Signs:
 - 1. Aluminum-Sheet Sign: 0.040" thick aluminum sheet face sheet with matte black painted surface and painted white reflective lettering. Sign: 2'-8" w x 10" h.
 - 2. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
 - 3. Mounting: two-face tape.
 - 4. Text Font: Frutiger 55, 8 inch.
 - 5. Verify Door Numbers with DOA.
- C. Small Door Number Signs:
 - 1. Engraved Plastic Sign: Black plastic face sheet with routed graphics revealing the white plastic core. Sign: 3" w x 1" h.

- a. Composite-Laminate Sheet Thickness: 0.0625 inch.
 - b. Subsurface Graphics: Routed.
 - c. Surface Color: Matte Black.
 - d. Lettering Color: Matte White.
2. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Beveled.
 - b. Corner Condition in Elevation: Square.
 3. Mounting: two-face tape.
 4. Text Font: Frutiger 55, 0.625 inch.
 5. Verify Door Numbers with DOA.

2.2 RESTRICTED AREA SIGNS

- A. Aluminum-Sheet Sign: 0.040" thick aluminum sheet face sheet with red painted surface, painted gray accent band and painted white reflective lettering. Sign: 2'-0" w x 12" h.
 1. Surface Color: Matte Black.
 2. Lettering Color: Matte White.
 3. Accent Band Color: Semi-Gloss, Battleship Gray
 4. Sign-Panel Perimeter: Finish edges smooth.
 - a. Edge Condition: Square cut.
 - b. Corner Condition in Elevation: Square.
 5. Mounting: two-face tape.
 6. Text Font: Frutiger 55, 1 inch and 0.50 inch size as indicated on the Drawings.

2.3 SIGN MATERIALS

- A. Aluminum Sheet and Plate: ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated.
- B. Laminated Plastic Sheet: Standard with manufacturer for each sign.
- C. Paints and Coatings for Sheet Materials: Paints that are recommended by manufacturer for optimum adherence to surface and are UV and water resistant for colors and exposure indicated.

2.4 ACCESSORIES

- A. Fasteners and Anchors: Manufacturer's standard as required for secure anchorage of signs, noncorrosive and compatible with each material joined, and complying with the following:

- B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

2.5 FABRICATION

- A. General: Provide manufacturer's standard sign assemblies according to requirements indicated.
 - 1. Pre-assemble signs and assemblies in the shop to greatest extent possible. Disassemble signs and assemblies only as necessary for shipping and handling limitations. Clearly mark units for reassembly and installation; apply markings in locations concealed from view after final assembly.
 - 2. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.
 - 3. Conceal connections.

2.6 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.
 - 1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
 - 2. Install signs so they do not protrude or obstruct according to the accessibility standard.
 - 3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.
- B. Install signs in locations on doors as indicated on Drawings.
- C. Mounting Method:
 - 1. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips at sign perimeter, to back of sign and of suitable additional quantity to support weight of sign without slippage. Keep strips

away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.2 ADJUSTING AND CLEANING

- A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.
- B. Remove temporary protective coverings and strippable films as signs are installed.
- C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

END OF SECTION 101423

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SECTION 102600 - WALL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal corner guards.
 - 2. Abuse-resistant wall coverings.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for metal protective trim units, according to BHMA A156.6, used for kick plates.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
 - 2. Include fire ratings of wall protection materials.
- B. Shop Drawings: For each type of wall and door protection showing locations and extent.
- C. Samples for Initial Selection: For each type of impact-resistant wall-protection unit indicated, in each color and texture specified.
 - 1. Include Samples of accessories to verify color selection.
- D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
 - 1. Metal Corner Guards: 12 inches long.
 - 2. Abuse-Resistant Wall Covering: 6 by 6 inches square.
 - 3. Wall Covering Trim: 12 inches long.

1.4 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For each type of exposed plastic material.
- B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of wall protection product to include in maintenance manuals.
 - 1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Corner-Guards: One, 48-inch-long unit. Package mounting screws with extra corner guard.
 - 2. Wall Protection Units: One 48inch by 96 inch sheet, plus 96 inch long edge trim.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store wall protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
 - 1. Maintain room temperature within storage area at not less than 70 degrees F during the period plastic materials are stored.
 - 2. Keep plastic materials out of direct sunlight.
 - 3. Store plastic wall-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 degrees F.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:

- a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
 - b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723 Class B & C; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: 25 or less.
 2. Smoke-Developed Index: 450 or less.
- B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.
- C. Adhesive shall have 50 g/L VOC or less.

2.3 CORNER GUARDS

- A. Surface-Mounted, Metal Corner Guards: Fabricated as one piece from formed metal with formed edges; with 90-degree turn to match wall condition.
 1. Basis of Design Product: Model CO/CSO Series, as manufactured by Construction Specialties.
 2. Alternate Manufacturers:
 - a. Pawling Corporation.
 - b. Tepromark Architectural Products.
 - c. Wallguard.com.
 3. Material: Stainless-steel sheet, Type 304.
 - a. Length: 48 inches.
 - b. Thickness: Minimum 16 gauge.
 - c. Finish: Directional satin, No. 4.

4. Wing Size: Nominal 2 inch by 2 inch or 3 inch by 3 inch to match existing corner guards.
5. Corner Radius: 1/8 inch.
6. Mounting: Flat-head or oval-head, countersunk screws through factory-drilled mounting holes.

2.4 ABUSE-RESISTANT WALL COVERINGS

- A. Abuse-Resistant Sheet Wall Covering: Fabricated from semi-rigid, plastic sheet wall-covering material.
 1. Basis of Design Product: Acrovyn® 4000 Sheet, as manufactured by Construction Specialties.
 2. Alternate Manufacturers:
 - a. Pawling Corporation.
 - b. Tepromark Architectural Products.
 - c. Wallguard.com.
 3. Size: 48 by 96 inches.
 4. Sheet Thickness: 0.040 inch.
 5. Color and Texture: Match existing abuse-resistant wall covering.
 6. Height: Wainscot to match existing (Top of wainscot 44" AFF.).
 7. Trim Moldings: Extruded rigid plastic that matches wall-covering color.
 8. Mounting: Manufacturer's standard heavy-duty water based mastic type adhesive.

2.5 MATERIALS

- A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.
- B. Fasteners: Stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened.
- C. Adhesive: As recommended by protection product manufacturer.

2.6 FABRICATION

- A. Fabricate wall protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
- B. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.7 FINISHES

- A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances, fire rating, and other conditions affecting performance of the Work.
- B. Examine walls to which wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
 - 1. For wall protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Complete finishing operations, including painting, before installing wall and door protection.
- B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

- A. Installation Quality: Install wall protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.
- B. Mounting Heights: Install wall protection in locations and at mounting heights indicated on Drawings. If not indicated on Drawings, install at heights indicated below:
 - 1. Corner Guards: 48 inches above finished floor.
 - 2. Wall Protection Wainscot: 44 inches above finished floor.
- C. Accessories: Provide mounting hardware, anchors, trim moldings, and other accessories required for a complete installation.

1. Provide anchoring devices and suitable locations to withstand imposed loads.
 2. Adjust top caps as required to ensure tight seams.
- D. Abuse-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.4 CLEANING

- A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
- B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION 102600

SECTION 263543 – 400Hz GROUND POWER UNIT AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. The City of Philadelphia, Department of Commerce, and Division of Aviation (DOA) propose to replace one (1) 400Hz Ground Power Unit (GPU) at the Philadelphia International Airport (PHL). The intent of this project is to enhance the passenger convenience, security and safety during enplanement/deplanement. The project's scope of work will under one, General Contract.
 - 1. **General Contract** – PHL Bid No. GC-6648 includes all Architectural, Civil, Equipment, Mechanical, Structural, and Electrical requirements. The scope of work and requirements of this Specification 263543 shall be part of PHL Bid No. GC-6648.
- B. All work as shown on the Contract Drawings.
- C. The GPU shall be designed and manufactured as indicated in the Project Specifications, including all structural, support, mechanical, electrical, and finish requirements to serve the aircraft mix indicated in the Project Specifications.
- D. The Manufacturer supplying the new GPU shall also be required to fully coordinate with other Contractor performing the other parts of this Project.
- E. As specified in this SECTION, provide the necessary management, supervision, labor, materials, supplies and equipment to provide GPU's and accessories.
 - 1. Supply new 90Kva 400Hz GPU units on the new Passenger Boarding Bridges also being supplied for this Project as indicated in the plans and these specifications.
 - 2. Supply new GPU accessories (e.g. cable hoists, output cables, pendant controls, mounting brackets and hardware, etc.) for all identified Gates.
- H. Related Work Specified Elsewhere.
 - 1. OWNER CONTRACT DOCUMENTS – SECTION C AND 7
 - 2. DIVISION 26 – ELECTRICAL
 - 3. SECTION 347713 - PASSENGER BOARDING BRIDGES

1.2 REFERENCES

- A. The latest edition of the publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

1. International Electrotechnical Commission (IEC):
 - a. IEC 158-1 - Rating and Testing for Contactors.
2. Institute of Electrical and Electronics Engineers (IEEE):
 - a. IEEE C2 - National Electrical Safety Code (ANSI).
 - b. IEEE Std 519 - Harmonic Control in Electrical Power Systems.
 - c. IEEE Std 1100 - Powering and Grounding Electronic Equipment (IEEE Emerald Book).
 - d. IEEE Std 1159 - Monitoring Electric Power Quality.
 - e. IEEE C62.41 - Surge Voltages in Low-Voltage AC Power Circuits (ANSI).
3. U.S. Department of Defense (DOD):
 - a. MIL-STD-461 - Control of Electromagnetic Interference Characteristics of Subsystems and Equipment.
 - b. MIL-STD-704 - Aircraft Electric Power Characteristics.
 - c. MIL-PRF-24021K - Electric Power Monitors, External Aircraft.
4. National Electrical Manufacturers Association (NEMA):
 - a. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. NEMA ST 20 - Dry-Type Transformers for General Applications.
5. National Fire Protection Association (NFPA):
 - a. NFPA 70 - National Electrical Code.
6. Underwriters Laboratories (UL):
 - a. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures Ninth Edition.
 - b. UL 506 - Specialty Transformers Twelfth Edition.
 - c. UL 1012 - Safety Power Units Other Than Class 2 Sixth Edition.
 - d. UL 1449 - Transient Voltage Surge Suppressors Second Edition.

1.3 DEFINITIONS

- A. The City of Philadelphia, Division of Aviation (DOA) is the Owner and contracting entity for this project.
- B. The Owner shall appoint a Project Manager (Owner PM) as the Owner representative for this Project. All project correspondence, submittals, RFI's, questions, etc. shall be directed to the Owner PM. The Owner shall notify the Contractor of the Owner PM's contact information when the contract is awarded.
- C. The term "Day" or "Days" shall refer to work days not calendar days.
- D. The terms "400Hz Ground Power Unit", or "GPU" and specified components of these, whether referred to in singular or plural form, apply to each unit provided for this Project.
- E. PBB Tunnels "A," "B," and "C", if referred to, are referred to in the order from closest to the terminal to closest to the aircraft.

- F. The terms "right" and "left" refer to directions looking down the PBB tunnels toward the aircraft.
- G. The term "Contractor" shall refer jointly to the General Contractor who is awarded the contract and the GPU manufacturer who designs, manufactures and installs the new GPU.
- H. The term "Manufacturer" shall mean the GPU and / or GPU accessory manufacturer(s).

1.4 SUBMITTALS

- A. Shop Drawings, Samples and Required Documentation (Submittals) shall be supplied in accordance with the requirements of this Specification and of Owner Contract Documents – SECTIONS C AND 7.
 - 1. All Shop Drawings, Samples and Required Documentation submitted in English language and in Inch-Pound units, including dimensions, volumes, weights, and forces.
 - 2. The Owner's review, comment, approval or rejection of the Contractor's Submittals shall not be considered a prerequisite for the Contractor to undertake the design, procurement of materials and manufacturing of the GPU and accessories.
 - a. If the Contractor is required to undertake the design, procurement of materials and manufacturing of the GPU and accessories prior to the Owner's review and approval of the Contractor's submittals, the Contractor shall undertake these activities at its own risk and shall modify the design, material procurement and manufacturing based on the Owner's review, comment, approval or rejection of the Contractor's Submittals.
 - b. Any such modification shall be at the cost of the Contractor and shall not impact the Project schedule.
- B. **Shop Drawings** - All drawings, diagrams, illustrations, schedules, test reports, certifications, cut sheets, calculations and other data or information which are specifically prepared and submitted by the Contractor to demonstrate that the Contractor will provide a GPU and accessories which meets the requirements of the Project Specifications and Drawings.
 - 1. Shop Drawing submittals shall show sufficient detail to indicate conformance to the requirements of the Project Specifications and Drawings.
 - 2. Shop Drawing submittals shall be organized in a manor so that compliance to Project Specifications and Drawings can be easily determined by the Owner.
 - 3. Before submitting each Shop Drawing package, the Contractor shall have determined and verified that the Shop Drawing submittal does in fact demonstrate compliance to the Project Specifications and Drawings.
 - a. Shop Drawing packages that contain information that is not in compliance with the Project Specifications and Drawings will be rejected and will require re-submittal.

4. Manufacturer's assembly or fabrication drawings that do not provide information needed to determine compliance with requirements of the Project Specifications and Drawings are not acceptable and shall not be submitted.
- C. **Samples** - Physical examples of materials, equipment, or workmanship that are representative of some portion or all of the GPU or its components and accessories and which establish the standards by which certain portions of the GPU, its components, accessories or installation will be judged.
- D. Contractor shall submit Shop Drawings, Samples and Required Other Documentation for Owner's review and approval in accordance with the schedule required in approved Progress Schedule and **APPENDIX I – SUBMITTAL SCHEDULE**.
1. All submittals will be identified as required and furnished in the number of copies specified in the Contract Documents.
 2. The data shown on the Shop Drawings and Required Documentation will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Owner the services, materials, and equipment Contractor proposes to provide.
- E. Shop Drawings and Samples shall include but not be limited to the following:
1. An index prepared in sequential order listing all drawings, sketches, details, and material submitted.
 2. Product Data: Manufacturer's technical product data, including specifications. Include data substantiating that materials comply with requirements.
 3. GPU Unit Data: Manufacturer's technical product data, including but not limited to the following:
 - a. General arrangement of GPU and its components
 - b. Electrical and electronic components
 - c. Circuit board details and mounting details
 - d. Details of controls on exterior and interior of unit.
 - e. Error messages and method of display
 - f. Transformers performance curves with system operating conditions indicated.
 - g. Access doors and panels.
 - h. Materials, gauges, and finishes.
 - i. Filters
 - j. Pendant Control
 - k. Electrical / Controls schematics.
 - l. Wiring diagrams detailing wiring for power, signal, and control systems and differentiate between portions of wiring that are factory-installed and portions to be field-installed.
 - m. Interface details / information to PBB HMI display
 - n. Methods of field assembly, components, and locations and size of each field

connection. Detail mounting and securing to passenger boarding bridges, including brackets.

4. Accessory Product Data: Submit manufacturer's technical data for:
 - a Output cable and cable head
 - b Cable Hoist
 - (1) General arrangement of cable hoist and components
 - (2) Electrical / Controls schematics
 - (3) Wiring diagrams detailing wiring for power, signal, and control systems and differentiate between portions of wiring that are factory-installed and portions to be field-installed.
 - (4) Bird screen protection
 - (5) Anti-rewind feature
 - (6) Cable and banana clips
 - (7) Hinged access cover
 - (8) Mounting details to PBB, including mounting location.
 5. Provide drawings and procedures that will be provided to installation subcontractor the required details and information for the removal, scrap or storage of GPU and ancillary equipment and the installation of the new or existing GPU and new ancillary equipment.
 - a. Drawings and procedures shall provide sufficient detail so that the installation subcontractor can successfully complete the removal, scrap or storage of the existing GPU and ancillary equipment and install the new or existing GPU and new ancillary equipment.
- F. The Contractor shall not be relieved of responsibility for compliance to the requirements of the Project Drawings and Specifications by the Owner's approval of Shop or working drawings, product data, samples or similar submittals. Deviations from the requirements of the Project Drawings and Specifications shall not be approved unless:
1. the Contractor has specifically submitted a formal deviation or substitution request to the Owner in writing, per the requirements of the Contract Documents. This **DOES NOT** include information in the submittal document or making notes on submittal documents that such deviation is included within the Contractor's submittal, and;
 2. the Owner has given written approval of each such deviation by specific written response to the Contractor.
- G. If deviations from the Project Drawings and Specification requirements are included in approved Shop Drawings or other submittals documents and they are NOT identified and approved per paragraph F above, these deviations shall NOT be considered approved
- H. Certifications
1. The GPU shall be certified by an NRTL for compliance to Power Units Other than Class 2 –UL1012, latest edition and General Use Power Supplies – CAN/CSA C22.2

- No. 107.1.95, latest edition. Evidence of such certification from the NRTL (e.g. the Authorization to Mark) must be supplied with the Contractor's Proposal OR prior to Contract award.
2. Independent 3rd Party Labeling from an NRTL, such as UL or ETL, shall be affixed to the name plate of the GPU prior to shipment, either by permission or by inspection of the Independent 3rd Party NRTL. This labeling shall indicate compliance to the requirements of Power Units Other than Class 2 –UL1012, latest edition and General Use Power Supplies – CAN/CSA C22.2 No. 107.1.95, latest edition.
- I. Contractor shall supply documentation of coordination with the PBB manufacturer indicating coordination efforts, including mounting requirements, loads, power, communication, control, interlock, precool control, and condensate coordination.
 - J. Spare Parts: No spare parts required for new units.
 - K. Operation and Maintenance Manuals:
 - a. Proposed format and content of the O&M manuals shall be submitted to the Owner for review and approval thirty (30) days prior to shipment of the first GPU.
 - b. Supply, upon delivery of the first GPU unit, five (5) copies of the GPU Operations and Maintenance (O&M) Manuals for the GPU units.
 - c. O&M Manuals shall not be generic in nature and shall reflect the exact construction of the GPU units furnished.
 - d. Non-applicable items and drawings shall not be included in the manuals.
 - e. Manuals may have descriptive type photographs.
 - f. Pages shall have reinforced edges.
 - g. Manuals shall be compact in size and bound.
 - h. Manufacturer shall also provide three (3) USB copies of the O&M Manual. Each section of this electronic O&M manual shall be directly accessible via an index provided with the electronic O&M manual.
 8. O&M manuals shall contain the following information:
 - a. Description and operation of all systems and components.
 - b. Electrical drawings specific for each unit furnished. Provide two sets of bound, laminated electrical drawings for each unit, to be placed inside an access door to the unit controls.
 - c. Maintenance instructions including troubleshooting/diagnostics guidelines.
 - d. GPU PLC Control Documentation
 - e. Instructions for software access, programming upload and download and system diagnostics.
 - f. Overhaul instructions.

- g. List of parts and part numbers.
 - h. Illustrated parts list of all components.
 - i. Complete and detailed Preventive Maintenance Program for each type of GPU furnished under this Contract.
- L. Quality Assurance, Inspections, Testing and Commissioning – See **APPENDIX I – SUBMITTAL SCHEDULE.**
- M. Training: See **APPENDIX I – SUBMITTAL SCHEDULE.**
- N. Other Documentation: See **APPENDIX I – SUBMITTAL SCHEDULE.**
- O. As Built Drawings: The Contractor shall supply the Owner with an As Built set of Shop Drawings within thirty (30) days of Final Acceptance by the Owner of the work at the first gate.
 - 1. Quantity and submittal of the As Built drawings shall be per the requirements of the Contract Documents.
- P. Project Schedule: Contractor shall develop and submit a Project Schedule, per the Contract Requirements, within thirty (30) days of the NTP.
 - 1. Project Schedule shall include, but is not limited to the following:
 - a. Complete list and schedule for of all required submittal documentation
 - b. Contract Review activities
 - c. Design and Engineering activities
 - d. Material Procurement activities
 - e. Manufacturing activities
 - f. Shipment activities
 - g. Installation activities
 - h. Quality Assurance activities, included all inspection and hold points, factory inspections and testing, onsite inspections and testing, substantial completion and final acceptance.
 - i. Training activities
 - 2. Schedule should be on a gate-by-gate basis
 - 3. Schedule should include activities for GPU design, manufacturing, factory testing, installation and field testing and commission.
 - 4. Schedule should include a one (1) week for tenant Airline “familiarization period” Airline employees to become familiar with the equipment at each gate. This familiarization process will utilize aircraft to “test” all equipment.
 - 5. Schedule shall be coordinated with PBB manufacturer and the overall Project schedule.
- Q. Software and Laptop: Contractor will supply at Substantial Completion of the first gate,

copies of any and all software and the required interface cables so that the Authorities maintenance personnel can reload the GPU's control software and make any necessary adjustments, as allowed by the manufacturer, to the GPU control software.

1. If any software licenses are required to use this software, the Contractor shall supply any and all required licenses.
2. GPU manufacturer shall coordinate with the PBB Contractor, who is to supply one (1) laptop computer for the Project with the latest Windows Operating System and all of the necessary software that would be required to access and use the GPU software.

1.5 QUALITY ASSURANCE

- A. GPU units shall be products of a single manufacturer.
- B. GPU Unit Manufacturer's Qualifications: The GPU manufacturer shall be in the specific business to design and manufacture the specially constructed GPU required by this Specification.
 1. The GPU manufacturer must have a minimum of ten (10) years' experience in producing the GPU design proposed.
 2. The GPU design being proposed MUST have been in continuous use for a minimum of five (5) years.
 3. Specific design features included in this five (5) year requirement shall be the:
 - a. Method of power conversion - PWM
 - b. Modular / Card Rack - Control Board Design
 - c. Unit Operator Controls and Displays
- C. NFPA Compliance: Comply with applicable portions of NFPA 70 and 79, for components and installation of GPU units.
- D. Factory and On-Site functional testing shall be conducted as Specified in Section 4 of this Specification and in SECTION 347713 – PASSENGER BOARDING BRIDGES.
- E. Certifications
 1. The GPU shall be certified by a nationally recognized testing laboratory (NRTL) for compliance to Power Units Other than Class 2 –UL1012, latest edition and General Use Power Supplies – CAN/CSA C22.2 No. 107.1.95, latest edition.
 2. The GPU shall also have an NRTL certification name plate affixed to the GPU.
 3. Components shall be certified by an NRTL for compliance with UL 1012 and CSA C22.2.107.1-M91.

- F. Prior to the Owner and their designated representatives scheduling the first Factory Inspection visit, the GPU manufacture shall submit a Certificate of Compliance that the equipment supplied under this contract fully comply with the Contract Specifications and Drawings.
 - 1. This Certificate of Compliance shall be signed by the GPU manufacturer's Engineering Manager, Quality Assurance Manager and General Manager.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Factory and Field Storage.
 - 1. Store GPU units at the factory and on site during installation process, and protect equipment and material against rust, debris, water and other damage, including the covering of all openings.
 - 2. The Contractor shall have the flexibility to produce the GPU units to facilitate their production schedule if the production schedule does not match the requirements for the GPU units to be in PHL for installation.
 - 3. The on-site installation schedule will be in coordination with the PBB delivery schedule.
 - 4. The Contractor shall coordinate all deliveries with the Owner PM so that the GPU units and accessories are delivered to PHL to correspond to their scheduled installation.
 - a. It is the objective of the delivery and installation process to NOT have any GPU units stored on-site at PHL.
- B. Lift and support GPU's with the manufacturer's designated lifting brackets or supporting points on the unit's frame.
- C. Deliver GPU's as a factory-assembled unit to the extent allowable by shipping limitations, with protective crating and covering.
- D. Deliver and store the GPU accessories (e.g. cable hoist, output cable, mounting brackets, PBB interface cables) to the jobsite in original unopened containers with labels informing about manufacturer, product name, and other pertinent information.
- E. The shipment, unloading and checking of equipment shall be coordinated with the Owner PM. Under no circumstances will the equipment be released for shipment or delivered to jobsite without prior approval.
- F. Examine all equipment and material delivered to the jobsite for concealed damage. The Contractor shall be responsible for loss or damage until equipment is off loaded at PHL. Report any damage to the Owner PM.

- G. Protect all equipment and material so that it may be stored at job site prior to installation and start-up. Include the coverings of all openings, protection against rust and other damage.

1.7 SEQUENCING AND SCHEDULING

- A. Working Area: Coordinate location of GPU staging area, storage area and erection area with the Owner PM.
- B. Coordinate with the contractor performing the installation of the PBB, GPU units, PCAir units and bag slides.
- C. Electrical power: Coordinate with the contractor performing the terminal building electrical power upgrades and with the PBB manufacturer for power supplied on the PBB to the GPU mounted under the PBB cab.

1.8 WARRANTY

- A. Special Project Warranty: Provide special project warranty, signed by Contractor, PBB Installation subcontractor and the GPU Manufacturer, agreeing to replace, repair, or restore defective materials and workmanship of any product, materials or work provide pursuant to this Specification during a warranty period of 2 years from final acceptance of the Owner.
- B. GPU Manufacturer shall also provide directly to the Owner, a 5-year warranty form the date of final acceptance by the Owner, to replace defective:
 - 1. GPU bus capacitors
 - 2. Transformers
- A. This warranty shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.
- D. "Defective" is defined to include, but not by way of limitation, operation or control system failures, performances below required minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration and similar unusual, unexpected and unsatisfactory conditions.
- E. Warranty Claim Response Time: The manufacturer shall ship repair parts and send a qualified service technician (if requested), to the Owner within 24 hours of being notified of an equipment failure while under warranty and parts shall be deliver at the applicable Owner facility within 48 hours from the time the order was placed by the Owner. If the manufacturer is unable to obtain the parts to restore the equipment to service, the Owner reserves the right to obtain the replacement parts or service elsewhere and charge the total cost to the manufacturer, including labor and administrative fees. The

manufacturer shall pay all Customs fees, taxes and freight for warranty parts during the warranty period.

- F. In the event of a significant, complex, or catastrophic failure of an integrated component of the GPU and at the Owner's request, the manufacturer will provide freight and logistics to ship a failed ground power unit back to the manufacturer for factory testing and repairs while the unit is still under warranty and to return the repaired and tested component back to the Owner for installation. Alternately, the GPU manufacture can opt to provide a qualified technician at PHL to trouble shoot and repair such significant, complex or catastrophic failure

1.9 MAINTENANCE

- A. Additions to Operation and Maintenance Manuals: Include the following in the actual GPU provided.
 - 1. A "one-line diagram" from service entrance to 400 Hz utilization panel or point.
 - 2. A weatherproof, tear resistant plastic data sheet with operating instructions for each unit including startup and shutdown procedures.

SPECIFICATION CONINUED ON NEXT PAGE

PART 2 - PRODUCTS

2.1 GENERAL

- A. In this Specification, the term “or Owner approved equal” may be used to indicate that the Contractor shall have the option of proposing an alternative to what has been specified. The Contractor’s alternative must be equal to or exceed the performance, functionality and safety requirements of the Specification.

2.2 MANUFACTURERS

- A. Subject to compliance with requirements of this Specification, the Contractor shall supply equipment, parts and material from one of the manufacturers identified below. Equipment, parts and materials from these suppliers will support the Owner’s objective of maximizing the expertise and experience of the Owner’s maintenance contractor and help minimize the spare parts requirements for the Owner’s Maintenance group. In addition, the Owner has established a minimum standard of quality and reliability for certain equipment, parts and components that are routinely purchased to maintain the Owner’s equipment. The list below of approved manufacturers reflects this standard and is in support of the Owner’s objectives

1. Ground Power Units:
 - a. Oshkosh/JBT Aerotech.
 - b. ITW GSE
 - c. TwistAero
2. GPU Output Cables
 - a. ITW GSE
3. Cable Hoist
 - a. Oshkosh/JBT Aerotech.
 - b. ITW GSE

2.3 MATERIALS

- A. Where components are not otherwise indicated
1. Provide standard components published by manufacturer as included in standard pre-engineered Ground Power Unit and as required for a complete system.
 2. All equipment and parts furnished shall be the manufacturer’s latest listed and published stock models, except as permitted or required by the Owner PM.
 3. The equipment and parts shall meet all the applicable requirements of the specifications.
- B. Material Specifications:

Component	Applicable Standard
Structural Plate/Steel/Shapes	ASTM-A36 or ASTM A572 Grade 50
Structural Tube	ASTM-A500 Grade B
Steel Pipe	ASTM-A53 Grade b
Steel Sheet	ASTM-A570, ASTM A569 or ASTM A653
Steel Plate	ASTM-A514, ASTM 517
Bolts-Standard	ASTM A307
Bolts-High Strength	ASTM A325, SAE-J429 Grade 5 or 8, or ASTM A490
Electrical and Electronic Components	NFPA 70, NFPA 79, UL listed

2.4 400Hz GROUND POWER UNIT (GPU)

A. Input Power

1. Input Voltage: The GPU shall operate with input voltages not varying more than plus 10% or minus 15% of nominal voltage rating.
2. Input Frequency: The GPU shall operate on 50/60 Hz input power frequencies.
3. Input Current Requirements at Rated Load: The nominal input current at rated load shall be 480 Vac and a maximum of 125 amps.
4. Input Inrush Current: On start up the GPU shall withstand inrush current of up to 100% of that input current required when the GPU is operating at rated load output.
5. Input Power Factor: The GPU shall operate with an input power factor to .95 or greater at loads of 25% to 100% of the nominal rated load for the unit.
6. Input Phase Rotation: The GPU shall be input phase rotation independent, allowing the GPU to be connected to the incoming power without regard for phase rotation.
7. Input Harmonic Distortion: shall be a maximum of 10% at full rated load and a maximum of 13% at 50% load.
8. Efficiency: The overall efficiency of the GPU shall not be less than 91% at 50% or greater load.
9. Input Power Break: The GPU shall be capable of supplying uninterrupted power to the aircraft during a micro break on the input power.
10. Input Circuit Breaker: The GPU will contain an internally mounted circuit breaker on the input power line(s) to allow the input power to be removed in the case of a fault or for maintenance.
11. Input Power Disconnect: A separate GPU circuit breaker shall be incorporated into

the PBB disconnect cabinet or shall be in a separate GPU disconnect mounted at the PBB rotunda. Power shall be supplied from this disconnect to the GPU via separate cabling integrated with the PBB cable conveyance system.

12. Unit Disconnect Breaker:

- a. The GPU shall be equipped with either (1) a fixed mounted shunt trip breaker, or (2) a switch; that:
 - (1) shuts off power to the output cables
 - (2) shuts down the SCR'
 - (3) discharges lethal power from the DC Bus
 - i) going from 650 vdc to 50 vdc in ≤ 4 seconds and
 - ii) totally discharged in 15 to 20 seconds.
 - (4) This breaker or switch shall also serve as a door or panel interlock which will activate when the main panel door is opened.
- b. A bypass door interlock switch shall be provided to allow testing and repair of the unit with the doors opened.

B. Output Power – 400Hz AC

1. The GPU shall have a self-balancing feature for the output power.
2. Output Voltage: Shall be adjustable by plus or minus 10% of 115 Volts.
3. Output Voltage Drift: The output voltage shall not change by more than 1% of its originally set value with the unit operating at a constant load, a change in ambient temperature up to 55 degrees C in an eight-hour period or as the unit stabilized from a cold condition at any load.
4. Output Voltage Regulation: Voltage regulation shall not exceed $\pm 1\%$ from no load to full load and from rated load to no load with $\pm 10\%$ input voltage.
 - a. Output voltage shall recover to the steady state condition less than 50 MS after any load change up to 100%.
 - b. The voltage shall not exceed the limits of MIL-STD-704E during transient recovery.
5. Output Voltage Distortion (Total Harmonic Distortion): Total harmonic distortion on the output voltage waveform shall not exceed 3% (line to line/line to neutral) with any rated load up to 100% load.
 - a. Any single harmonic will not exceed 2%.
6. Output Voltage DC Content: The DC voltage at the output terminals will not exceed 0.1 volts under any rated load conditions.
7. Output Voltage Modulation: The modulation of the voltage waveform shall not exceed 0.5% RMS, rated load conditions.
8. Output Voltage Balance: The maximum output voltage deviation of any of the three output phases will not exceed 2% from the average of the three output phase voltages under balanced load conditions.

- a. Voltage unbalance shall not exceed 3 volts, with 10% unbalanced load on 1 phase and shall meet MIL-STD-704E, figure 1 and ARP1940, 3.1.5.10.
9. Output Frequency Regulation: Shall be 400 Hz plus or minus 0.1% at any rated load condition.
10. Output Frequency Modulation: Shall be less than $\pm 0.25\%$ of the period of output voltage wave.
11. Output Phase Displacement: The phase angle between each of the three output phases will be 120 degrees plus or minus 1.5 degrees under all rated, balanced load conditions.
 - a. The phase angle displacement with an unbalanced load of 15% the unit's rated current shall be 120 degrees plus or minus 4 degrees.
12. Output Current: 90Kva (260 amps) at .8 power factor load continuous and simultaneous on both output cables.
13. Bus Capacitors: Bus capacitors shall be either polypropylene or electrolytic.
14. No Break Power Transfer: The GPU must be capable of continuous operation during a switch from the Aircraft APU to the GPU.
15. Line Drop Compensation: The GPU shall have a built-in automatic line drop compensation, which shall be adjustable from 1% to 8% of rated voltage at rated load.
16. Power Factor: The GPU will be capable of operating with an output power factor of 0.0 to 1.0.

C. Overload

1. Overload Capacity: The GPU shall be capable of supplying overloads of up to 125% for 10 minutes, 150% for 3 seconds and 200% for 1 second.
2. Short Circuit Capability: The GPU shall withstand an output short and the short shall be cleared by internal solid-state circuitry.

D. Fault Systems

1. The GPU will be capable of monitoring the following items and shutting down in the event they are out of tolerance. The faults listed below will be displayed or indicated.
 - a. Input power phase rotation
 - b. Input voltage 10% higher than nominal rating
 - c. Input voltage 15% less than nominal rating
 - d. Output voltage less than 100 Vac per MIL-STD-704E
 - e. Output voltage greater than 125 Vac per MIL-STD-704E
 - f. Output overload
 - g. No 28vdc returned on EF wires

- h. DC bus faults
 - i. Over temperature of heat sink
 - j. Output frequency fault
- 2. The GPU shall be capable of performing a “self-check” of the output power quality before allowing power to be supplied to the aircraft.

E. Indicators

- 1. The GPU shall display operating information of the GPU using:
 - a. an LCD or
 - b. LED or
 - c. via downloading to the Owner’s laptop PC via an RS232 port.
 - (1) If the use of an RS232 port interface is required, the Contractor shall supply the necessary cables and software to connect to the laptop of the Owner’s maintenance contractor to the GPU, retrieve and display the required data.
 - d. Information displayed shall include, but not limited to:
 - (1) Input voltage – each phase and average
 - (2) Input current – 3 phase average
 - (3) Output voltage – each phase and average
 - (4) Output current – each phase and average
 - (5) Output Kva (total) or Vdc (total)
 - (6) Output frequency
 - (7) Event History.
 - (8) Unit Settings
- 2. Front panel lights will indicate the following:
 - a. Fault occurred
 - b. Input voltage applied to unit
 - c. 28Vdc bypass switch in bypass position
 - d. Output voltage present, unit is connected to aircraft and operating
 - e. 28Vdc EF voltage missing

F. Switches And Controls

- 1. The GPU and Cable Hoist shall be controlled by a single Pendant Control mounted near the wheel bogie of the PBB.
 - a. The Pendant Control shall NOT be mounted on any part of the PBB that elevates or in a location that which would pose a safety hazard to ramp personnel using the pendant control.
 - b. Pendant control for the GPU / Cable Hoist shall be mounted on a plate attached to the wheel bogie cross tube and the plate shall be painted per the same process and exterior color as the PBB.
- 2. See Specification 347713 and contract drawings for GPU/Pendant Control requirements for each gate.
- 3. All voltages in the Pendant Control shall be low voltage – 28 volts maximum.

4. The Pendant Control electrical construction and wiring shall comply with the requirements paragraph 2.4.1.8 of this Specification.
5. Pendant control enclosures shall;
 - a. be SST
 - b. be NEMA 3R or 4 rated
 - c. have a SST cover with piano style SST hinge and be retained by SST latch(s) or SST self-retaining screws.
 - d. shall have a drain device for condensate
6. The Pendant Control shall have push buttons and indicators for the 400Hz GPU and Cable Hoist functions.
 - a. The push buttons and indicators shall be oriented from top to bottom in the pendant control in the order listed below.
 - (1) Up push button – for retracting the Cable Hoist
 - (2) Down push button - for extending the Cable Hoist
 - (3) Green LED indicating light, with clear lens, which indicates the unit is connected to aircraft and operating.
 - (4) Start push button – for starting the unit
 - (5) Stop push button – for stopping / resetting the unit.
 - b. Each button on the Pendant control or indicator shall be labeled with an engraved, weather resistant placard identifying the button or indicator function.
7. The Pendant Control shall also have an engraved placard identifying it as the 400Hz GPU and Cable Hoist pendant control.
8. The following controls and indicators shall be located on the outside of the GPU unit:
 - a. Start / Stop / Reset push buttons for 400Hz output.
 - b. 400Hz operate light – green LED lamp with clear lens
 - c. 28Vdc Bypass switch and flashing indicator light.
 - d. Red Fault Light
 - e. Error message displays
 - f. LCD contrast, if LCD screen is supplied
9. The following controls and indicators shall be located on the inside of the GPU unit:
 - a. Line drop compensation adjustment
 - b. Voltage adjustment ($\pm 10\%$)
 - c. Hour meter (99,999 hours)

G. External Interface

1. Connections between the GPU and the Pendant Control and GPU interlock shall be heavy duty Quick Disconnect type.
2. Quick Disconnect fittings shall be UL or ETL approved.
 - a. Quick Disconnect receptacles and plugs shall be labeled with a permanent type label to indicate which receptacle goes with which plug.
3. Internally mounted terminal blocks shall be used for connecting the GPU output

- cable and any control functions from the GPU output cable, pendant control or PBB interlock.
- a. All connection points shall be clearly labeled as to the function that will connect to them from the GPU output cable, pendant control and PBB interlock.
 - b. The terminal blocks for the GPU output cables shall be “stud” type.
4. Any “knockout” penetrations that are required in the case of the GPU for the input power cable, output cable(s) or control cables shall be done in the factory, by the GPU manufacturer.
 5. The GPU shall be mounted under the PBB Cab Bubble within 4” – 6” of the PBB Cab Bubble floor.
 6. The GPU shall have yellow and black safety tape applied to the bottom circumference of the GPU.
 7. The GPU shall provide information to the PBB HMI so that the PBB HMI can display status and error messages that will include, but not limited to:
 - a. A graphic representation of the GPU and its major components
 - b. Status of inverters / IGBT's
 - c. Status of transformers
 - d. Status of cooling fans
 - e. Input voltage
 - f. Output voltage / amps
 - g. Output frequency
 - h. E&F bypass setting
 - i. Any faults or error messages.

H. Physical Characteristics

1. Weight: The GPU shall weigh no more than 2,750 pounds
2. Cabinet Dimensions: The GPU shall be mountable either under the Cab of the PBB or on the side of the PBB
3. Cabinet Material: The cabinet will be constructed from painted anodized aluminum.
4. Weather Rating: The GPU's cabinet / enclosure shall be rated as NEMA 3R or IEC IP54.
5. Acoustical Noise: The GPU shall not emit more than 70 dBA at 1.5-meter height and 1.0 meter distant.
6. Temperature Rating: The GPU shall be capable of operating temperature of -40 to +50°C.

I. Other Design Requirements

1. The GPU shall be sectional in design.

- a. Transformer section shall be isolated and separate from the front and back sections of the unit.
 - b. There shall be a drain device for condensate in the front and back sections of the unit.
2. Vertical cooling towers or heat sink shall be utilized to cool sensitive internal electronic components.
3. Cooling Fans shall cool the cooling tower or heat sinks.
 - a. Any fans that circulate air into the interior of the GPU must utilize input air that is filtered.
 - b. The filters shall be easily accessible and removable for cleaning. The filters shall be a washable mesh type.
4. Interior of the unit shall be sealed so that contaminants brought into the unit by cooling fans will not enter the control sections of the unit.
5. The GPU shall be designed so that the all maintenance, including removal and installation of all components can be accomplished without removing the GPU from the Passenger Boarding Bridge.
6. GPU shall be interlocked with the PBB to prevent horizontal movement of the PBB if the GPU unit is powered on.
7. Control Boards.
 - a. All control boards must be mounted in a card rack OR a board specific location.
 - b. All connection to the boards shall be accomplished by plug in connectors
 - c. Each connector set must be labeled, along with all of its wire connections, to eliminate misconnections.
8. Wiring and Terminal Blocks
 - a. Wires shall not be pulled tight in the GPU unit or subjected to chafing or damage by vibration of the GPU or by the operation of the PBB.
 - b. Wires shall not droop or sag in their routing.
 - c. All wiring shall be brought to mounted terminal blocks.
 - (1) Wire splices or wire nuts of any type shall NOT be used.
 - (2) Terminal blocks shall not be allowed to hang free in air.
 - (3) In junction boxes where space does not allow for the use of terminal blocks, mounted Wago type connectors are acceptable.
 - d. Wiring in all enclosures and junction boxes shall comply with the NEC requirement in Table 314.16 for the wiring fill capacity for the enclosure or junction box.
 - e. Wiring shall be formed and restrained to give a neat appearance.
 - f. All wires, including spares, within junction boxes, control cabinets, disconnects, other electrical enclosures shall be neatly secured and routed.
 - (1) Wire routing trays shall be used when space permits.
 - g. Grommets and suitable anti-chafe material shall be used where wires are required to pass through structure or similar relief or opening which exposes the wire to possible chafing.

- h. All wiring shall be identified using stamped labels or other Owner approved wire labels.
 - (1) Labels shall be visible and located within 1 in. of their termination point.
 - (2) Wires are to be numbered in a logical sequence
 - (3) All wire numbers are to be indicated on wiring diagrams.
 - i. Spare wires shall be numbered and also labeled as “SPARE”.
 - j. Spare wires shall be indicated on the wiring diagrams.
 - k. Wires must meet the bend radius requirements of NEC.
 - (1) Ninety-degree bends shall not be allowed.
 - l. Ferrules or insulated ring terminals shall be used on any fine stranded wire, depending on the terminal block connection.
 - (1) Fork or Spade terminals shall ONLY be allowed to make connections to purchased components that have ring terminals and are assembled into the GPU. No other use of fork or spade terminals shall be allowed.
 - (2) Direct connection of fine stranded wire to a terminal block shall NOT be allowed.
 - m. Terminal blocks shall be either:
 - (1) Finger proof or tamper proof design
 - (2) Stud or open style design with a protective cover supplied by the terminal block manufacturer.
 - (3) Other terminal block designs shall not be accepted.
 - n. Terminal blocks must meet the applicable requirements of SAE J561, J858 and J928.
 - o. Wire ties SHALL NOT be used to secure and support any wiring.
 - p. NEC / UL approved clamps and methods must be used to secure and support wiring.
 - (1) Clamps used shall be specifically designed for the wiring being clamped (e.g. clamps for flat pack cable are not the same as clamps for SO cable).
 - q. Wire ties shall only be used to keep wires together for appearance and routing to various components.
9. The front and rear door of GPU shall be hinged to allow for maintenance and equipped with a door interlock switch that trips the unit’s main shunt trip breaker when opened.
- a. The door interlock must be able to be by-passed for maintenance access to the unit.
10. The front and rear door of GPU shall be lockable to prevent unauthorized access into the unit. There shall be two lockable latches on each door, on either side of the door.
11. The GPU shall be able to provide the required signal to the PBB and provide a suitable connection for the interlock wiring.
12. Attached to the interior of the GPU’s front door shall be a:
- a. laminated drawing which provides an elevation view of the front internal compartment of the GPU and identifies each component’s location, as well as the component description and manufacture’s part number.
 - b. wiring schematic showing the all wires by wire number and termination point for

connections visible from the front of the unit.

13. Attached to the interior of the GPU's rear door shall be a:
 - a. laminated drawing which provides an elevation view of the rear internal compartment of the GPU and identifies each component's location, as well as the component description and manufacture's part number.
 - b. wiring schematic showing the all wires by wire number and termination point for connections visible from the rear of the unit.
14. Drawings and schematics for #12 and #13 above shall be laminated or be printed on weather proof material.
15. If the GPU's front and / or rear doors are equipped with electrical controls or components, the doors shall be equipped with grounding straps.
 - a. Grounding straps used on the GPU shall be braided.
 - b. Wire type straps shall not be allowed.
16. An unused holes or penetrations in the exterior of the GPU shall be plugged. If the holes are threaded, SST bolts shall be used to plug the hole.
17. The GPU shall have an exterior paint system that provides superior corrosion protection.
 - a. Exterior casing surfaces, doors, and panels shall be primed and have a baked polyurethane enamel or powder finish coat.
 - b. Color shall match the color selected by the Owner for the PBB and PCAir.
18. Mounting brackets used to attach the GPU to the PBB shall be painted per the exterior paint process specified in SECTION 347713 – PASSENGER BOARDING BRIDGES. The color shall match the PBB color.

2.5 Output Cables

- A. Contractor shall provide one (1) 400Hz output cable, with connectors, of sufficient length to service the required Aircraft mix.
 1. The Contractor shall be responsible to determine mounting location of the GPU on the PBB and the length of the GPU Output Cables in order to service the required aircraft mix.
 2. GPU output cable shall be supported at the entrance to the GPU by wire type strain reliefs
 3. 90KVa 400Hz output cable shall be solid.
 4. The 400Hz cable head nose end shall be "detachable" for ease of maintenance and replacement and shall be equipped with thermal overload protection.

(a) The cable head shall be the THERMGARD REPLACEMENT CONTACT SECTION – GREEN – JB7178 manufactured by ITW GSE.

5. The 400Hz cable head shall have replaceable buttons for 400Hz function of the GPU On / Off and Cable Hoist Up / Down.
6. The 400Hz output cable wires shall be labeled on the unit connection end with the phase and function of the wire.

2.6 CABLE HOISTS

A. Mechanical Design

1. Contractor shall supply one (1) PBB C Tunnel mounted cable hoist for the 400 Hz output cable as indicated in the Contract Drawings and these specifications.
2. The contractor shall supply new cable hoists at each gate indicated on the Contract Drawings.
3. The contractor shall ensure that each new cable hoist supplied is compatible with existing pendant controller.
4. Cable hoist shall be interlocked with the PBB to prevent horizontal movement of the PBB if the Cables Hoist is lowered.
5. GPU cable hoist mounting.
 - a. GPU cable hoist(s) shall be mounted on the PBB C tunnel (forward of lift columns) or rotating cab, whichever is more efficient for operations at the specific gate.
6. Three (3) “banana” clips shall be supplied with each cable hoist to stow the GPU output cable.
7. Cable hoist and mounting brackets shall be painted with the same exterior paint process and color as the PBB.
8. Cable hoist shall have an aluminum perforated bottom cover that prevents birds from gaining access to the interior of the hoist box.
 - a. Perforated metal shall be 10 ga. with holes less than 0.50 in.
 - b. Long sides of cover shall be bent up 90° so cover can be retained inside the hoist box by perimeter screws.
9. Cable hoist shall be equipped with anti-rewind switch.
10. Cable hoist access cover on top of the unit shall meet the following requirements.
 - a. The access cover shall be permanently attached with by stainless steel hinges
 - b. Stainless steel self-retaining fasteners or stainless steel latches shall be used to secure the cover.
 - c. Any rev-nut or nut-cert used shall be stainless steel.
 - d. Cover shall be painted per the approved PBB exterior paint process and be

painted the same color as the PBB exterior.

B. Electrical Design and Construction

1. All control voltages in the cable hoist shall be low voltage - 28 volts maximum.
2. The Cable Hoist electrical construction and wiring shall comply with the requirements paragraph 2.4.1.8 of this Specification.
3. Quick Disconnect fittings shall be UL or ETL approved.
 - a. Quick Disconnect receptacles and plugs shall be labeled with a permanent type label to indicate which receptacle goes with which plug.
4. The Cable Hoist shall be UL listed or otherwise certified by the 3rd party Nationally Recognized Testing Laboratory (NRTL), such as ETL, for compliance to the applicable UL codes.
 - a. A name plate with the UL listing or other listing shall be affixed to the unit.

SPECIFICATION CONTINUED ON NEXT PAGE

PART 3 - EXECUTION

3.1 SITE EXAMINATION

- A. The Contractor shall coordinate with and provide assistance as needed to the PBB Manufacturer in the performance of the Site Examination requirements specified in PART 3 – EXECUTION of Specification 347713 – PASSENGER BOARDING BRIDGES.

3.2 INSTALLATION

- A. GPU shall be mounted underneath the PBB cab, as far forward and as close as possible to the floor of the PBB cab.
 - 1. Connections from the GPU to the GPU pendant control and PBB interlock circuits shall be run through rigid conduit to the entry points of the PBB console or PBB cable scissor at the wheel bogie.
- B. The GPU manufacturer shall supply the necessary drawings, instructions, manuals and all materials, accessories, components, etc., required to fully assemble, commission and test the GPU and accessories.
- C. All such materials shall be packaged as an Installation “Kit” with clearly labeled and indexed containers and materials within containers. These Installation Kits shall be packaged and protected so that they may be stored in an exterior uncovered environment for several months.
- D. The GPU manufacturer shall provide qualified manufacturer's technical representative / service personnel during the GPU installation, testing and commissioning process at each gate to assure a proper installation, and to provide adequate and reliable field service support to correct any and all equipment failures that may occur during the commissioning and testing and during the initial operating period. This representation shall be available at GPU for the first 15 days after the first GPU is installed and accepted by the Owner. The manufacturer's field service representative shall monitor and ensure that the approved PBB Installation Subcontractor follows:
 - 1. The manufacturer's field installation manual.
 - 2. Compliance with all safety requirements.
 - 3. Accurate and complete reports and records maintenance
 - 4. Applicable requirements of the Project Specifications and Drawings
- E. Refer to SECTION 347713 – PASSENGER BOARDING BRIDGES for additional installation information, requirements and specifications.

3.3 TRAINING

- A. Contractor shall provide Operations and Maintenance classes for the GPU's supplied on this Project.
1. The training shall be specific to the GPU's supplied to PHL. A "standard" training class is not acceptable.
 2. Training shall utilize prepared texts, power point presentations and other instructional aids as appropriate. Contractor shall supply whatever equipment is required to present training materials.
 3. The Contractor shall conduct multiple Operations Training Classes to facilitate the scheduling of Owner and Tenant Airline personnel.
 - a. Operations training classes shall be a minimum of 2 hours and shall consist of both class room and hands on training.
 - b. Operator training shall include, at a minimum, the proper demonstration as well as actual use of correct GPU operations to avoid damaging the equipment or aircraft or personal injury, by improper use of the GPU and its controls.
 - c. The Contractor shall provide (1) class for the tenant airline.
 - i. These Operator training classes shall be conducted at substantial completion of the first gate.
 - d. The anticipated Operator training class size shall be 10.
 4. The Contractor shall conduct a Maintenance Training Class to facilitate the scheduling of Owner and Owner maintenance contractor personnel.
 - a. Maintenance training classes shall be a minimum of 4 hours and shall consist of both class room and hands on training.
 - b. Maintenance training shall include, at a minimum:
 - (1) proper demonstration of cut-away models of critical parts, full instruction of proper maintenance and troubleshooting, and instructions on proper use of manuals.
 - (2) Instruction in proper use, operation, and daily maintenance of the GPU.
 - (3) Emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies.
 - (4) Normal procedures to be followed in checking for sources of operational failures or malfunctions.
 - (5) Use of the hardware / software tools required to upload and download control programs, trouble shoot the GPU control software, perform equipment diagnostics and review data flow.
 - (6) Requirements for a complete GPU PM maintenance program, including monthly, quarterly, semiannual and annual checks.
 - (7) Warranty, technical support and parts ordering procedures.
 - c. The Contractor shall provide two (2) Maintenance training classes, one on first shift and one on second shift, at substantial completion of the first gate.
 - d. The anticipated class size shall be 5.
 5. The Contractor shall video tape one complete Operations training session and one complete Maintenance training session and provide these recordings to the Owner.

6. Training dates and times shall be coordinated with the Owner PM.
7. The Owner, Owner's Maintenance Contractor and tenant Airline shall assign their respective employees to be trained.
8. Contractor shall submit a Training Syllabus for all training classes to be conducted at PHL within sixty (60) days of the Notice to Proceed. Format and content of Contractor's proposed Training classes shall be subject to approval of the Owner.
9. The Contractor's GPU operator and maintenance training classes shall be conducted concurrent with the PBB and PCAir training classes.
10. The Contractor's GPU training program must meet the requirements of this Specification and be done within the allowance for the GPU, PCAir and PBB operator and maintenance training classes, as stated in the Project Bid Documents.

SPECIFICATION CONTINUED ON NEXT PAGE

PART 4 - CONTRACTOR QUALITY CONTROL REQUIREMENTS

4.1 QUALITY ASSURANCE

- A. The Contractor shall comply with, and perform all of the quality control, inspections, factory testing and on-site testing requirements as specified in PART 4 – CONTRACTOR QUALITY CONTROL REQUIREMENTS in Specification 347713 – PASSENGER BOARDING BRIDGES.

4.2 FACTORY ACCEPTANCE

- A. The following shall replace the requirements of Specification 347713 – 4.6 FACTORY ACCEPTANCE TESTING
- B. Factory testing shall meet the following requirements.
1. The Contractor shall develop a comprehensive Factory Test Plan, identifying the specifics of the tests to be carried out, and the acceptance criteria of such test, to ensure the GPU's comply with the requirements of the Specification and Contract Documents.
 2. The Factory Test Plan shall be submitted to the Owner PM 60 days prior to the factory tests being conducted.
 3. Routine Factory Tests: Test every GPU to assure compliance with the specifications as follows:
 - a. Load Bank Test: Test for one hour at 50% kW and one hour at approximately 100% kW capacity. Monitor voltage, frequency, and current at 15-minute intervals during testing.
 - b. Efficiency Test: Test efficiency for 25, 50, 75, 90 and 100% loading.
 - c. Burn-in test: Before delivery, operate each GPU for a minimum of 16 hours.
 4. Special Factory Test: Test one 90kVA GPU to assure compliance with the specifications as follows:
 - a. Harmonic Distortion: Provide test results of input harmonic currents and voltages. The test data shall include total harmonic distortion and amplitudes of individual harmonics in graphic representation for no load, 25, 50, 75, and 100% load factors.
 - b. No Load Losses: Operate at no load and nominal input voltage. Measure and record input voltage, output voltage, and output frequency.
 - c. Voltage balance (output) and (input).
 - d. Transient voltage dip and response at 0.8 pf (output).
 - e. Frequency regulation (output).
 - f. Overload.
 - g. Line drop compensation circuit.
 - h. Input current harmonics.
 5. The results of the Factory Testing shall be supplied to the Owner PM prior to shipment. The Owner will NOT approve shipment of the GPU's without the Owner

PM's review and approval of the Factory Test Results.

SPECIFICATION CONTINUED ON NEXT PAGE

APPENDIX I – SUBMITTAL SCHEDULE

SHOP DRAWINGS AND SAMPLES

Description	Due Date
Index of Shop Drawings, Samples and Required Documentation that will be submitted by Contractor	Per Contractor's Submittal Schedule
Product Data / Cut Sheets	Per Contractor's Submittal Schedule
GPU Unit Design Drawings and Data	Per Contractor's Submittal Schedule
Accessory Product Data	Per Contractor's Submittal Schedule
Installation Drawings and Information	Per Contractor's Submittal Schedule
As Built Drawings	30 Days from Final Acceptance of first Gate
Software, as required by Specifications	Substantial Completion of First Gate

REQUIRED DOCUMENTATION

Description	Due Date
Certification by Third Party agency or NRTL to UL1012, latest edition and CAN/CSA C22.2 No. 107.1.95, latest edition. Evidence of such certification from the NRTL (e.g. the Authorization to Mark).	With Contractor Proposal or prior to Contract Award.
Documentation of GPU components certified to UL-1012 and CSA C22.2.107.1-M91.	Per Contractor's Submittal Schedule
Certificate of Compliance – Signed by QA, Engineering and General Managers	Prior to First Factory Inspection
Documentation of coordination with PBB manufacturer	Per Contractor's Submittal Schedule
Project Progress Schedule	30 Days from NTP
Written notification of Start of Fabrication for 1 st unit	30 Days prior to start of Fabrication
Written Notification of completion of assembly and readiness for factory inspection and testing – each unit.	15 Days prior to completion of assembly.
Training plan and class syllabus for all training	60 Days from NTP
Proposed content and format of O&M Manuals	60 Days from NTP
Final O&M Manuals	With shipment of Equipment for 1 st Gate
Special GPU Warranty Document	Final Acceptance of 1 st Gate

QUALITY ASSURANCE / TESTING

Description	Due Date
Quality Plan, specific to the Project and including at a minimum, the following • Review, Inspection, Hold and Witness points, with acceptance criteria, that will be performed during the contract review, design, manufacturing, factory testing, installation and field testing / commission. • Scope of inspections and tests to be performed, with acceptance criteria • Test plans, procedures, methods, techniques for Factory Acceptance Testing. • Test plans, procedures, methods, techniques for Onsite Functional Testing and Commissioning	60 Days from NTP
Contractor's Factory Test results and records – Each piece of equipment	Prior to Shipment of each piece of equipment
Contractor's On-Site Functional Test Results and Records – Gate by Gate	With Final Acceptance of a Gate

INSTALLATION

See Specification 347713 – PASSENGER BOARDING BRIDGES for submittal requirements for the installation of the GPU's.

END OF SECTION 263543

SECTION 347713 - PASSENGER BOARDING BRIDGES

PART 1 - GENERAL

1.1 SUMMARY

- A. The City of Philadelphia, Department of Commerce, and Division of Aviation (Owner) propose to replace seven (7) Passenger Boarding Bridges (PBB's), associated equipment (where applicable), and restripe Concourse D at the Philadelphia International Airport (PHL). One additional PBB will be removed, and the associated gate permanently closed. The intent of this project is to enhance the passenger convenience, security and safety during enplanement/deplanement and upgrade gate capabilities for new generation of aircraft. The project's scope of work will be under one, General Contract.
 - 1. **General Contract** – PHL Bid No. 6648 includes all Architectural, Civil, Equipment, Mechanical, Structural, and Electrical requirements. The scope of work and requirements of this Specification 347713 shall be part of PHL Bid No. 6648.
- B. Identified PBB replacement gates on the D and E Concourses included in this project's scope of work are:
 - 1. D2, D4, D6, D8, D10, D11, D12 (removal only), and E2.
- C. The Contractor shall supply and install seven (7) new PBB's and two (2) new fixed walkways at the identified project gates, as indicated on the Drawings and in these Specifications, including all structural, support, mechanical, electrical, and finish requirements to serve the aircraft mix indicated on the Drawings. Install existing PCAir and GPU units (where applicable) and their ancillary equipment on the new PBB's.
- D. Related Work Specified Elsewhere:
 - 1. OWNER CONTRACT DOCUMENTS – SECTION C AND 7
 - 2. DIVISION 26 – ELECTRICAL
 - 3. SECTION 263543 - 400Hz GROUND POWER UNIT AND ACCESSORIES
 - 4. SECTION 347722 – POTABLE WATER CABINETS

1.2 REFERENCES

- A. The PBB shall be designed and manufactured to meet U.S. Codes and Regulations that have been adopted by the Passenger Boarding Bridge industry. Portions or all certain recognized industry or association standards referred to herein as being a requirement of these Specifications shall be considered as binding as though the reproduced in full herein unless supplemented and/or modified by more stringent requirements in this Specification. Unless otherwise stated, the reference standard shall be the standard which is current as of the date of issuance of these Specifications
- B. Applicable Industry and Association Standards

1. Design: Society of Automotive Engineers (SAE) Aerospace Recommended Practice (ARP) 1247, FAA Advisory Circular AC-150/5210-5, Americans with Disabilities Act (ADA), Occupational Safety and Health Administration (OSHA), Virginia Uniform Statewide Building Code (VUSBC) 2006 Edition adopting IBC 2006.
2. Structural: American Institute of Steel Construction (AISC), Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings. American Welding Society (AWS) Standards.
3. Material: Structural Plate/Steel/Shapes: ASTM-A36; Structural Tube: ASTM-A500; Steel Pipe: ASTM-A53; Steel Sheet: ASTM-A570; Steel Plate: ASTM-A514; Hinge Pins: ASTM-A311 Grades 1018 & 1144; Bolts: High Strength SAE-J429 Grades 5 & 8 or ASTM-A325 & A440.
4. Mechanical: Mechanical components and designs shall conform to the relevant recommendations and standards established by the Society of Automotive Engineers (SAE) and the American Society of Mechanical Engineers (ASME).
5. Electrical: The PBB shall be listed by a Nationally Recognized Testing Laboratory (NRTL), such as ETL, for conformance to applicable ANSI/UL codes. The PBB and the Fixed Walkway and their components, materials and methods of construction and installation shall conform to the applicable requirements and recommendations of the National Electrical Manufacturers Association (NEMA), the National Electrical Code (NEC), NFPA-70 and NFPA 79, latest issue and State, county and local construction and electrical codes including any modifications to the NEC by the local authority having jurisdiction.
6. Paint: Surface preparation and painting shall conform to the guidelines and standards of the Structural Steel Painting Council (SSPC).
7. Fire Protection: The PBB design shall comply with NFPA 415, 2022. Select materials and components shall be tested per NFPA 415, 2022. Select materials shall comply with the material specifications of NFPA 415, 2022.
8. FAA AC 150/5220-21C: This advisory circular (AC) contains the Federal Aviation Administration's (FAA's) performance standards, specifications, and recommendations for the design, manufacture, testing and maintenance of equipment used in the boarding of airline passengers.

1.3 DEFINITIONS

- A. The City of Philadelphia, Division of Aviation (DOA) is the Owner and contracting entity for this project.

- B. The Owner shall appoint a Project Manager (Owner PM) as the Owner representative for this Project. All project correspondence, submittals, RFI's, questions, etc. shall be directed to the Owner PM. The Owner shall notify the Contractor of the Owner PM's contact information when the contract is awarded.
- C. The terms "Day" or "Days" shall refer to work days, not calendar days.
- D. The terms "Passenger Boarding Bridge" or "PBB" and specified components of these, whether referred to in singular or plural form, apply to each unit provided in this Contract.
- E. PBB Tunnels "A," "B," and "C" are referred to in the order from closest to the terminal to closest to the aircraft.
- F. The terms "right" and "left" refer to directions looking down the PBB tunnels toward the aircraft.
- G. The term "Contractor" shall refer jointly to the General Contractor who is awarded the contract and the PBB and new Fixed Walkway manufacturer who designs, manufactures and installs the new PBB's and new Fixed Walkways.

1.4 SUBMITTALS

- A. Shop Drawings, Samples and Required Documentation (Submittals) shall be supplied in accordance with the requirements of this Specification and of Owner DOCUMENTS – SECTIONS C AND 7.
 - 1. All Shop Drawings, Samples and Required Documentation submitted in English language and in Inch-Pound units, including dimensions, volumes, weights, and forces.
 - 2. The Owner's review, comment, approval or rejection of the Contractor's Submittals shall not be considered a prerequisite for the Contractor to undertake the design, procurement of materials and manufacturing of the PBB and accessories.
 - a. If the Contractor is required to undertake the design, procurement of materials and manufacturing of the PBB and accessories prior to the Owner's review and approval of the Contractor's submittals, the Contractor shall undertake these activities at its own risk and shall modify the design, material procurement and manufacturing based on the Owner's review, comment, approval or rejection of the Contractor's Submittals.
 - b. Any such modification shall be at the cost of the Contractor and shall not impact the Project schedule.
- B. **Shop Drawings** - All drawings, diagrams, illustrations, schedules, test reports, certifications, cut sheets, calculations and other data or information which are specifically prepared and submitted by the Contractor to demonstrate that the Contractor will provide a PBB and accessories which meets the requirements of the Project Specifications and Drawings.
 - 1. Shop Drawing submittals shall show sufficient detail to indicate conformance to the requirements of the Project Specifications and Drawings.

2. Shop Drawing submittals shall be organized in a manor so that compliance to Project Specifications and Drawings can be easily determined by the Owner.
 3. Before submitting each Shop Drawing package, the Contractor shall have determined and verified that the Shop Drawing submittal does in fact demonstrate compliance to the Project Specifications and Drawings.
 - a. Shop Drawing packages that contain information that is not in compliance with the Project Specifications and Drawings will be rejected and will require re-submittal.
 4. Manufacturer's assembly or fabrication drawings that do not provide information needed to determine compliance with requirements of the Project Specifications and Drawings are not acceptable and shall not be submitted.
 5. Refer to Engineer-of-Record Qualifications in this Section for sealing of certain As Built Shop Drawings.
- C. **Samples** - Physical examples of materials, equipment, or workmanship that are representative of some portion or all of the PBB or its components and which establish the standards by which certain portions of the PBB, its components and installation will be judged.
- D. Contractor shall submit Shop Drawings, Samples and Required Other Documentation for Owner's review and approval in accordance with the schedule required in approved Progress Schedule and **APPENDIX I**.
1. All submittals will be identified as required and furnished in the number of copies specified in the Contract Documents.
 2. The data shown on the Shop Drawings and Required Documentation will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Owner the services, materials, and equipment Contractor proposes to provide.
- E. Shop Drawings and Samples shall include but not be limited to the following:
1. An index prepared in sequential order listing all drawings, sketches, details, and material submitted.
 2. Product Data: Manufacturer's technical product data, including specifications. Include data substantiating that materials comply with requirements.
 3. Interior Finishes:
 - a. Interior finish schedule including interior wall and ceiling finishes. Include physical characteristics, such as durability, resistance to fading, flame resistance, and manufacturer's recommendations for maximum permissible moisture content of substrates.
 - b. Wall material impact resistance test report.
 - c. Transition ramp details.
 - d. Marine Grade Plywood compliance to BS 1088.
 - e. Wall board construction and thickness
 - f. Wall finish attachment methods.

- g. Light fixture details, layout, and maintained illumination calculations at floor using the actual interior finishes (use 10% reflectance for the floor surface).
 - h. PBB and fixed walkway section dimensions and general arrangement drawings.
 - i. Tunnel, cab and rotunda flooring system
 - j. Tunnel floor finish.
 - k. Cab and cab bubble floor finish.
 - l. Rotunda Floor finish.
 - m. Floor covering edging details, including lines of demarcation between covered and hard surfaced floor at wall areas, and treatment at doors and thresholds.
 - n. Rotunda and Cab radiused diamond plate
 - o. Floor covering quantity.
 - p. Cab and Rotunda Curtain details, including mounting and operation.
 - q. Insulation.
 - r. Handrail details.
 - s. Bridge precooling/preheating grille.
 - t. Security camera locations.
4. Exterior:
- a. General PBB layout, including mounting of all ancillary equipment and accessories, including roof handrails, service landing and stairs, etc.
 - b. Exterior elevations.
 - c. Graphics/signage details.
 - d. Exterior Paint System – Details for all three (3) coats.
 - e. Second coat and top coat colors.
 - f. Flashing (building to PBB or fixed walkway).
 - g. Flashing (fixed walkway section to PBB).
 - h. Cab door seal.
 - i. Ramp service stairway.
 - j. Service/maintenance ladder, cage and cab roof handrails, roof fall protection cables and connection points.
 - k. Baggage chute.
 - l. Gate sign.
 - m. Preconditioned Air Unit mounting location and mounting details
 - n. Preconditioned Air Unit hose reel or basket and PBB interface.
 - o. Ground Power Unit mounting location and mounting details.
 - p. Cable hoist mounting location and details.
5. Cab:
- a. Operator's cone of visibility, including mirrors for viewing drive wheels and apron.
 - b. Control panel location and functional layout of Operator console faceplate and all switches and controls.
 - c. HMI Screen layout for all Operator controls.
 - d. View panels.
 - e. Safety devices, including proximity sensor product data.
 - f. Canopy closure fuselage seal interface detail for largest specified aircraft to be serviced.
 - g. Aircraft Spacer
 - h. Modifications necessary for proper connection with required aircraft types including auto-leveling devices and RJ aircraft features.
 - i. Operating instructions placard.
 - j. Sun block / glare reduction material for Operator's window.

- k. Cab Mirrors and mounting locations
- 6. Interior and Exterior Safety and Signage:
 - a. Rain Gutter markings
 - b. All Interior Signage and Plaques.
 - c. All Exterior Signage and Plaques.
- 7. Electrical, Mechanical, Structural:
 - a. Certifications of Compliance with all listed Design and Construction Standards.
 - b. Horizontal drive system and components
 - c. Vertical drive system and components, including hydraulic schematics if hydraulic vertical drive system is supplied. Also include outrigger system to be supplied, as well as the proposed safety hoop system.
 - d. All electrical and mechanical components installed or attached to the exterior of the PBB.
 - e. Details of equipment disconnect panel or individual equipment disconnects, including mounting details.
 - f. Details of PBB cable carrier system and conduit / SO cable routing for PBB, new fixed walkway.
 - g. All electrical components used on the interior of the PBB, including components in the power panel and operator console.
 - h. Operator cameras and display
 - i. Gate Sign
 - j. Electrical power and control schematic diagrams.
 - k. Electrical components, wire information, wire routings, use of conduit, terminations, terminal blocks.
 - l. Details of roof handrails and safety cable system, including details of attachment methods and materials.
 - m. Details of service door, landing and stairs.
 - n. Bag slide.
 - o. Interface requirements for foundations and building supplied utilities. Provide exact location of electrical power and communications J-boxes.
 - p. Structural drawings including all pertinent calculations which shall be signed and sealed by a professional engineer legally authorized to practice in the jurisdiction where the Project is located.
 - q. The PBB manufacturer shall provide the Owner PM with actual foundation loading data sheets for each type of bridge and walkway provided based on load requirements specified in the "Structural Design and Support Elements" Article in Part 2 of this Section. Foundation loads shall include design forces and moments (in three directions) at the column base due to dead, live, wind and seismic loads. In addition, furnish bolting layout with dimensions.
- 8. Provide drawings and procedures that will be provided to installation subcontractor the required details and information for the removal and scrap of PBB's and ancillary equipment and the installation of the new PBB's, Fixed Walkways and ancillary equipment.
 - a. Drawings and procedures shall provide sufficient detail so that the installation subcontractor can successfully complete the removal and storage of the existing PBB's and ancillary equipment and install the new PBB's and ancillary equipment.

F. The Contractor shall not be relieved of responsibility for compliance to the requirements

of the Project Drawings and Specifications by the Owner's approval of Shop or working drawings, product data, samples or similar submittals. Deviations from the requirements of the Project Drawings and Specifications shall not be approved unless:

1. the Contractor has specifically submitted a formal deviation or substitution request to the Owner in writing, per the requirements of the Contract Documents. This **DOES NOT** include information in the submittal document or making notes on submittal documents that such deviation is included within the Contractor's submittal, and;
2. the Owner has given written approval of each such deviation or substitution request by specific written response to the Contractor.

G. If deviations from the Project Drawings and Specification requirements are included in approved Shop Drawings or other submittals documents and they are NOT identified and approved per paragraph F above, these deviations shall NOT be considered approved

H. Certifications

1. Provide evidence of compliance with 2022 Chapter 6 design requirement. The PBB shall be certified by an NRTL for compliance to the applicable UL codes and NFPA 415 2022. Evidence of such certification from the NRTL (e.g. the Authorization to Mark) must be supplied with the Contractor's Proposal OR prior to Contract award.
 2. Independent 3rd Party Labeling from an NRTL, such as UL or ETL, shall be affixed to the name plate of the PBB prior to shipment, either by permission or by inspection of the Independent 3rd Party NRTL. This labeling shall indicate compliance to the requirements of NFPA 415 2022 and the applicable UL codes.
- I. Spare Parts: In addition to the recommended spare parts list and sources, the Contractor shall submit the list of the PBB Manufacturer's recommended stocking levels of critical spare parts, including the manufacturer's item description, part number, assemblies per unit, the recommended on-hand stocking level and a firm list price for a period of two (2) years from the date of Final Acceptance of the PBB by the Owner.
1. The total value of this Recommended Spare Parts List shall be equal to the value of the PBB Spare Parts Allowance identified in the Project Bid Documents.

J. Operations and Maintenance manuals:

1. Proposed format and content of O&M manuals shall be submitted to the Owner for review and approval thirty (30) days prior to shipment of the first PBB.
2. Supply, upon delivery of the first PBB, five (5) copies of the PBB Operations and Maintenance (O&M) Manuals for the PBB's
3. O&M Manuals shall not be generic in nature and shall reflect the exact construction of the PBB's furnished.
4. Non-applicable items and drawings shall not be included in the manuals.

5. Manuals may have descriptive type photographs.
6. Pages shall have reinforced edges.
7. Manuals shall be compact in size and bound.
8. Manufacturer shall also provide three (3) USB Drive copies of the O&M Manual. Each section of this electronic O&M manual shall be directly accessible via an index provided with the electronic O&M manual.
9. The O&M manuals shall contain the following information:
 - a. Description and operation of all systems and components.
 - b. Electrical drawings specific for each bridge furnished. Provide one set of bound, laminated electrical drawings for each bridge, to be placed in the control console. Provide one set in each technical manual.
 - c. Maintenance instructions including troubleshooting/diagnostics guidelines.
 - d. PBB Control Software Documentation
 - e. Instructions for software access, programming upload and download and system diagnostics
 - f. Overhaul instructions.
 - g. List of parts and part numbers.
 - h. Illustrated parts list of all components.
 - i. Recommended spare parts list and sources.
 - j. Complete and detailed Preventive Maintenance Program for each type of boarding bridge furnished under this Contract.
- K. Installation: See **APPENDIX I – SUBMITTAL SCHEDULE**.
- L. Permits and Certificates: Provide Owner PM with copies of all inspection/acceptance certificates and operating permits as required by the Owner and the City of Philadelphia – Department of Licenses and Inspections (L&I) or Tinicum Township necessary to allow normal, unrestricted use of the PBB's, GPU's and PCAir's after completion of initial acceptance inspections.
- M. Quality Assurance, Inspections, Testing and Commissioning: See **APPENDIX I – SUBMITTAL SCHEDULE**.
- N. Training: See **APPENDIX I – SUBMITTAL SCHEDULE**.
- O. Other Documentation: See **APPENDIX I – SUBMITTAL SCHEDULE**.
- P. As Built Drawings: The Contractor shall supply the Owner with an As Built set of Shop Drawings within thirty (30) days of Final Acceptance by the Owner of the work at the first gate.
 1. Quantity and submittal of the As Built drawings shall be per the requirements of the Contract Documents.
 2. Certain As Built drawings shall be Signed and Sealed per 1.5.F.
- Q. Project Schedule: Contractor shall develop and submit a Project Schedule, per the Contract Requirements, within thirty (30) days of the NTP.

1. Project Schedule shall include, but is not limited to the following:
 - a. Complete list and schedule for of all required submittal documentation
 - b. Contract Review activities
 - c. Design and Engineering activities
 - d. Material Procurement activities
 - e. Manufacturing activities
 - f. Shipment activities
 - g. Installation activities
 - h. Quality Assurance activities included all inspection and hold points, factory inspections and testing, onsite inspections and testing, substantial completion and final acceptance.
 - i. Training activities
 2. Schedule should be on a gate-by-gate basis
 3. Schedule should include activities for PBB, PCAir, GPU and PWCs.
 4. Schedule should include a one (1) week for tenant Airline “familiarization period” Airline employees to become familiar with the equipment at each gate. This familiarization process will utilize aircraft to “test” all equipment.
- R. Software and Laptop: Contractor will supply at Substantial Completion of the first gate, copies of all software and the required interface cables so that the Authorities maintenance personnel can reload the PBB’s control software and make any necessary adjustments, as allowed by the manufacturer, to the PBB control software.
1. If any software licenses are required to use this software, the Contractor shall supply all required licenses.
 2. Contractor shall also supply one (1) laptop computer for the Project with the latest Windows Operating System and all the necessary software that would be required to access and use the PBB, PCAir and GPU software.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: The PBBs and Fixed Walkways shall be manufactured and assembled in the United States. The PBB manufacturer shall be in the specific business to design and manufacture the specially constructed PBB required by this Specification. The Contractor must have a minimum of ten (10) years’ experience in producing the PBB design proposed. The PBB design being proposed MUST have been in continuous use for a minimum of ten (10) years in the US market. Specific design features included in this ten (10) year requirement shall be the PBB’s:
1. Tunnel side wall structural panels
 2. Tunnel roller system
 3. Vertical drive system

4. Horizontal drive system
 5. Electronic controls system.
 6. Cable Conveyance System
- B. Product Qualifications: The Owner has established certain key PBB product design features that shall be supplied for the new PBB's to be of consistent design, functionality, reliability and maintainability with the Owner's fleet of Apron Drive PBB's. Further definition of these required design features can be found in the details of the Specification.
- C. Installation Subcontractor Qualifications: The Installation subcontractor used by the Contractor to install the PBB's and the ancillary equipment and remove and scrap the existing PBB's and ancillary equipment shall have a minimum of ten (10) years of experience installing PBB's, PCAir and GPU's. The installation subcontractor shall be trained and certified by the PBB manufacturer as having the necessary experience, staff, and training to install the manufacturer's products per the specified requirements.
- D. Regulatory Requirements: The bridges shall be designed to conform to all applicable Federal, State and Municipal Codes and regulations as applicable to the project site which are in effect at the time of manufacture.
1. The PBB must fully comply with the requirements of Chapter 6 of NFPA 415 2022 and applicable UL codes.
 - a. The major components of the PBB, identified below, MUST have passed the fire tested per Chapter 6, Section 6.4 of NFPA 415 2022.
 - (1) 6.4.6 – Walls and Floors
 - (2) 6.4.7 – Flexible Closures
 - (3) 6.4.8 – Cab and Rotunda Curtain Slats
 - (4) 6.4.9 – Aircraft Bumper
 - (5) 6.4.10 – Miscellaneous Seals and Weather-stripping
 - b. PBB design shall comply with the design requirements of NFPA 415 2022, Chapter 6, Sections 6.1 and 6.2.
 - c. The specific materials identified Chapter 6, Section 6.3 of NFPA 415 2022 shall comply with the requirements of NFPA 415 2022, Chapter 6, Sections 6.3.
 - d. The PBB to be supplied shall have Independent 3rd Party Certification from an NRTL of compliance with the requirements of NFPA 415 2022 (items 1.a 1.b and 1.c above) and the applicable UL codes.
 - e. In addition, independent 3rd Party Labeling from an NRTL, such as UL or ETL, shall be affixed to the name plate of the PBB prior to shipment, either by permission or by inspection of the Independent 3rd Party NRTL. This labeling shall indicate compliance to the requirements of NFPA 415 2022 and the applicable UL codes.
 - f. All equipment control cabinets shall comply with UL 508A and shall be labeled as being in compliance with UL 508A.
 2. Structural Design and Construction Standards:
 - a. American Welding Society Standards.
 - (1) All welds shall be qualified weld procedures performed by qualified welders in accordance with AWS D.1.1.
 - (2) Submit welder qualifications and weld procedure qualifications.

- (3) All welds shall exhibit adequate penetration and shall be clean and free of slag.
 - (4) Welds shall not be ground to improve appearance except as required for flush surfaces or where nonstructural parts are involved.
 - b. All sheared or sharp metal edges shall be deburred or broken.
 - (1) All exposed metal corners shall have minimum radii in accordance with the appropriate material specification.
- 3. Mechanical and Hydraulic Specifications and Standards:
 - a. All mechanical components and designs shall conform to the recommendations and standards established by the Society of Automotive Engineers, Joint Industrial Conference and the American Society of Mechanical Engineers.
 - b. All threaded fasteners shall incorporate suitable locking devices.
- 4. Electrical Specifications and Standards:
 - a. The PBB and the new Fixed Walkway and their components, materials and methods of construction and installation shall conform to the applicable requirements and recommendations of the National Electrical Manufacturers Association (NEMA), the National Electrical Code (NEC), NFPA-70 and NFPA 79, latest issue and State, county and local construction and electrical codes including any modifications to the NEC by the local authority having jurisdiction.
 - b. All electrical components utilized shall be recognized by Underwriters Laboratories/ETL in all cases where UL/ETL maintains a listing category for the devices installed.
- F. Engineer-of-Record Qualifications – Signed and Sealed Drawings
 - 1. Provide all “As Built” PBB structural design and connection shop drawings and all structural calculations required by these Specifications signed and sealed by a professional engineer licensed to practice in the jurisdiction where the Project is located and experienced in providing engineering services of the kind indicated which has resulted in the successful design and installation of PBB’s similar in material, design, and extent to that provided for this Project.
 - 2. Provide all other “As Built” structural, mechanical and electrical systems shop drawings signed and sealed or otherwise certified by a professional engineer licensed to practice in the state or country, if foreign, of manufacture.
- G. Certificate of Compliance - Prior to the Owner and their designated representatives scheduling the first Factory Inspection visit, the PBB, manufacture shall submit a Certificate of Compliance that the equipment supplied under this contract fully complies with the Contract Specifications and Drawings.
 - 1. This Certificate of Compliance shall be signed by the PBB manufacturer’s Engineering Manager, Quality Assurance Manager and General Manager.
- H. Contractor shall be fully responsible to ensure that the new PBB’s, rotunda corridors, rotunda spool pieces, and new Fixed Walkways supplied for this Project are designed and manufactured to conform to the existing PBB foundation conditions, existing walkway conditions and existing building face conditions.

1. The Contractor **SHALL NOT** rely on the Project Drawings for their design as the information on these drawings is for reference only.
2. The Contractor **SHALL** base their designs on the results of their own site survey information

1.6 DELIVERY, STORAGE, AND HANDLING

- A. The equipment shall NOT be shipped until approval from the Owner has been received. If the Contractor ships the equipment without the Owner's approval, the Contractor shall bear ALL costs associated with any storage, delays, or required remedies performed at site to correct non-compliances to the Specifications and Drawings.
- B. Delivery: Deliver PBB's and Walkways with protective covering to prevent exposure of interior to weather, dirt and water.
- C. Factory and Field Storage:
 1. Store PBB's and new Fixed Walkways at the factory and on-site during installation process, and protect interior from weather, dirt, water and construction debris.
 2. The Contractor shall have the flexibility to produce the PBB's and new Fixed Walkways to facilitate their production schedule if the production schedule does not match the requirements for the PBB's and Walkways to be in PHL for installation.
 3. The on-site installation schedule will be spread out over approximately twelve (12) months due to restrictions on the number of gates that can be taken out of service at one time.
 - a. Therefore, the Contractor shall make the necessary provisions to store the PBB's or new Fixed Walkways at the manufacturing location and deliver the PBB's or new Fixed Walkways to meet the on-site installation schedule.
 4. The Contractor shall coordinate all deliveries with the Owner PM so that the PBB's, Walkways and any ancillary equipment are delivered to PHL to correspond to their scheduled installation.
 - a. NO PBB's will be stored on-site at PHL.
- D. Handling: Handle PBB's and new Fixed Walkways according to manufacturer's written rigging and installation instructions for unloading, transporting and setting in final location.
 1. The Contractor shall submit a crane plan for each gate describing in detail the location of equipment and sequence of operations specific to the gate area. The crane plan shall be submitted to DOA at least four (4) weeks prior to scheduled crane day.

1.7 SEQUENCING AND SCHEDULING

- A. Working Area: Coordinate location of delivered equipment staging area, storage area and erection area with the Owner PM.

- B. Coordinate the removal and scrap of the existing PBB and GPU (where applicable) with the Owner PM and the gate closure schedule.
- C. Coordinate the recovery of certain spare parts prior to removal of the equipment with the Owner PM.
- D. PBB and Walkway Foundation: Coordinate any refurbishment or repair of existing PBB and Walkway foundations with the removals and scrap of existing equipment and installation of new equipment.
- E. Bridge-Installed Equipment: Coordinate the installation of the 400 Hz GPU, PCAir units and bag slides with the PBB installation.
- F. Electrical power and communication: Coordinate installation and connections with contractor performing this work.
- G. Architecture and Security: Coordinate installation and connections with contractor performing this work.
- H. Coordinate the PBB and new Fixed Walkway installation and commissioning at the two (2) gates where the existing Walkways will be replaced.
- I. The Contractor's schedule shall include a one (1) week familiarization period for each tenant airline to use the PBB, PCAir and GPU to "fit" test the equipment and identify any additional operational issues or other deficiencies that shall be corrected by the contractor before the tenant airline begins operation at the gate.

1.8 WARRANTY

- A. Special Project Warranty: Provide special project warranty, signed by Contractor, PBB Installation subcontractor and the PBB Manufacturer, agreeing to replace, repair, or restore defective materials and workmanship of any product, materials or work provide pursuant to this Specification during a warranty period of 2 years from final acceptance of the Owner.
- B. PBB Manufacturer shall also provide, directly to the Owner, a 5-year warranty from the date of final acceptance by the Owner, to replace defective:
 - 1. motors and inverters
 - 2. motors and gearboxes
 - 3. horizontal drive motors
 - 4. control systems
 - 5. wheel bogie assembly
 - 6. lift column assemblies
 - 7. Tunnel and Rotunda guide frame roller assemblies
 - 8. Tunnel frame work and sheet metal in its entirety
 - 9. Cab assembly, including rotating components, bearings and sheet metal enclosures
 - 10. Rotunda assembly and sheet metal enclosures

11. cab and rotunda curtain assemblies to include motors, shafts, bearings, bushings, guides
 12. canopy assembly and control system
 13. articulating cab floor assembly and control system
 14. auto level components and control system
 15. all electrical harnesses, connector blocks, and components related to the electrical operating systems
 16. PLC/computer systems and components
- C. PBB Manufacturer shall also provide a 5-year warranty directly to the Owner against any exterior paint system failure.
- D. These warranties shall be in addition to, and not a limitation of, other rights the Owner may have against the Contractor under the Contract Documents.
- E. "Defective" is defined to include, but not by way of limitation, operation or control system failures, performances below required minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unusual, unexpected, and unsatisfactory conditions.
- F. Warranty Claim Response time: The manufacturer shall ship repair parts and send a qualified service technician (if required), to the Owner within 24 hours of being notified of an equipment failure while under warranty and parts shall be delivered at the applicable Owner facility within 48 hours from the time the order was placed by the Owner. If the manufacturer is unable to obtain the parts to restore the equipment to service, the Owner reserves the right to obtain the replacement parts or service elsewhere and charge the total cost to the manufacturer, including labor and administrative fees. The manufacturer shall pay all Customs fees, taxes, and freight for warranty parts during the warranty period.

1.9 MAINTENANCE MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Provide the following materials for each PBB at installation:
 - a. Paint touch-up kit, full and unopened.
 - b. Aircraft closure (canopy) repair kit.

1.10 SUPPLY OF RECOMMENDED SPARE PARTS

- A. The Owner shall determine which parts and the quantities of each part, the Contractor shall supply from the Recommended Spare Parts List submitted per paragraph 1.4.I.
1. The Owner shall advise the Contractor of the selected PBB Spare parts and quantities, equal to the PBB Spare Parts Allowance, within sixty (60) days of the Owner's approval of the PBB Manufacturer's Recommended Spare Parts list.
 2. The Contractor shall deliver these spare parts to the Owner no later than the Sub-

stantial Completion date of the Scope of Work at the first gate.

SPECIFICATION CONTINUED ON NEXT PAGE

PART 2 - PRODUCTS

2.1 GENERAL

- A. In this Specification, the term “or Owner approved equal” may be used to indicate that the Contractor shall have the option of proposing an alternative to what has been specified. The Contractor’s alternative must be equal to or exceed the performance, functionality and safety requirements of the Specification.

2.2 MANUFACTURERS

- A. Subject to compliance with requirements of this Specification, the Contractor shall supply equipment, parts and material from one of the manufacturers identified below. Equipment, parts and materials from these suppliers will support the Owner’s objective of maximizing the expertise and experience of the Owner’s maintenance contractor and help minimize the spare parts requirements for the Owner’s Maintenance group. In addition, the Owner has established a minimum standard of quality and reliability for certain equipment, parts and components that are routinely purchased to maintain the Owner’s equipment. The list below of approved manufacturers reflects this standard and is in support of the Owner’s objectives:

1. PBB’s and new Fixed Walkways:
 - a. Oshkosh/JBT AeroTech.
 - b. TK Airport Solutions, Inc.
2. Baggage Slide
 - a. Nova.
 - b. PAIGE Industries.
 - c. P&W.

2.3 MATERIALS

- A. Where components are not otherwise indicated
1. Provide standard components published by manufacturer as included in standard pre-engineered PBB and new Fixed Walkway systems and as required for a complete system.
 2. All equipment and parts furnished shall be the manufacturer’s latest listed and published stock models, except as permitted or required by the Owner PM.
 3. The equipment and parts shall meet all the applicable requirements of the specifications.
- B. Material Specifications:

Component	Applicable Standard
Structural Plate/Steel/Shapes	ASTM-A36 or ASTM A572 Grade 50
Structural Tube	ASTM-A500 Grade B

Steel Pipe	ASTM-A53 Grade b
Steel Sheet	ASTM-A570, ASTM A569 or ASTM A653
Steel Plate	ASTM-A514, ASTM 517
Hinge Pins	ASTM-A311 Grades 1018 & 1144, or ASTM A576 Grade 1045
Bolts-Standard	ASTM A307
Bolts-High Strength	ASTM A325, SAE-J429 Grade 5 or 8, or ASTM A490
Electrical and Electronic Components	NFPA 70, NFPA 79, UL listed

2.4 GENERAL REQUIREMENTS - PASSENGER BOARDING BRIDGE

A. Design: The PBB and new Fixed Walkway shall meet the following general requirements.

1. The PBB shall be apron drive, telescoping two or three-tunnel design and shall be the PBB model numbers as defined in these Specifications.
2. The PBB, including telescoping tunnels, cab and canopy shall serve the aircraft mix as defined in these Specifications.
3. The PBB and new Fixed Walkway foundation locations with respect to the terminal wall and terminal door shall be "As Constructed" and shall be verified by the Contractor to ensure the new PBB's and new Fixed Walkways interface correctly with the foundation and terminal building or existing Fixed Walkway.
4. The Aircraft Mix for each gate is specified in the Contract Drawings.
5. New Fixed Walkways shall be of the same construction and interior finish as the PBB tunnels.

B. Operation Limits:

1. The PBB shall be capable of moving to any point on the terminal apron within the design operation range to accommodate the indicated aircraft.
2. The PBB shall have simultaneous directional movements including extension-retraction, lateral motion, vertical elevation, and cab rotation.
3. Each PBB shall have a minimum continuous operation range as indicated on the Drawings or Specifications, measured from the center point of the rotunda to the center point of cab rotation.
4. The PBB shall meet the full continuous range of horizontal and vertical movement specified throughout the full continuous range of cab rotation without requiring field modification to meet the full range of movement.

C. Operating Environment:

1. The PBB shall operate satisfactorily in the Philadelphia International Airport operational and climatological environment, under ambient temperatures from -25°F to 125°F on wet, ice-covered or snow-laden apron surfaces.
2. The entire PBB shall be weatherproof when extended while parked to the aircraft and in the stowed position with the cab door closed.
3. See Structural Contract Drawings for design load requirements.

D. Operating Instructions:

1. A weatherproof and water-resistant placard outlining the PBB operating instructions shall be displayed in a prominent location in the cab of each PBB in plain sight of the Operator.
2. A qualified graphics expert shall prepare the placard and the displayed instructions.
3. Operating instructions shall be specific to the PBB model, features and functions of the particular PBB.

E. Safety Requirements:

1. The purpose of these specifications and standards is to describe the requirements, quantities, performance and maintenance properties of the PBB design and installation.
2. Safety to passengers, employees, other personnel, aircraft and equipment is of prime importance.
3. Nothing in these specifications shall relieve the manufacturer or Contractor of the responsibility for providing and installing a safe product.
4. All equipment shall be designed to be fail-safe and all controls that regulate PBB motions (i.e., horizontal travel, vertical travel, and cab rotation) shall be of the dead-man type.
 - a. Dead-man type shall mean controls that require the operator to apply constant pressure to be engaged.
 - b. Once the pressure is released the control is disengaged.
5. All operating mechanisms (i.e., horizontal and vertical drive, cab rotation) shall be designed so the drive mechanism is locked when power fails or is shut off.
6. Positive mechanical stops shall be provided to prevent over-travel where any component might become disengaged from its guiding or restraining component.
 - a. The positive stop shall be in addition to all limit switches provided to restrict over-travel during normal operating conditions, including tunnel extension / retraction, drive wheel steering motions and cab rotation.
 - b. Mechanical stops shall be identified and detailed on the shop drawings.
7. The operator's position in the control cab shall be designed to provide the operator

- adequate visibility to position the boarding bridge with the cab weather door closed
8. Suitable enclosures, guard rails, and other restraint devices shall be provided to protect the operator from being pitched out the open end of the cab in case of sudden stops or inadvertent movements of the bridge when operated with the door open.
 9. Fall protection shall be provided for technicians (2 of up to 300 lbs. ea.) working on the PBB and new Fixed Walkway roof consisting of:
 - a. Two (2) stainless steel tie-off cables on the roof of the new Fixed Walkway and the PBB A and B tunnel and the part of the C tunnel not covered by handrails
 - b. OSHA compliant Roof handrails on the C tunnel.
 - c. Labeled tie off points on the PBB Rotunda and Cab roof
 - d. An OSHA compliant safety-caged roof access ladder from the service platform outside the PBB service door.
 10. Fall protection tie off points shall be supplied on both sides of the Cab, outside the Cab weather doors so that personnel working on the exterior of the Cab can attached safety harnesses.
 11. Safety Placards and Signage:
 - a. Safety signage shall be in all areas and locations where there is exposure to hazards for maintenance/operational personnel and the public. Refer to OSHA, ANSI, NEC, National Safety Council, local, federal and state codes for recommended location, size, shape, design and verbiage required for safety signage, the verbiage of the sign shall be appropriate for the particular location/warning.
 - b. The safety signs shall be clearly visible, firmly affixed and large enough for the content to be visually distinguishable from a minimum of 6 feet away.
 - c. The following are, at a minimum, the safety placards, labels and signage that shall be provided. The Contractor shall also provide whatever safety placards, label and signage they have deemed necessary for the safety of the passengers, PBB operators, ramp personnel, maintenance personnel or any other persons using the PBB or near the PBB while it is operating.
 - (1) Operator Instructions – Mounted by operator control console. Instructions shall be specific to the operational functions and features of the PBB.
 - (2) **“NO EXIT - Authorized Personnel Only”** – Mounted on interior of service door
 - (3) **“WARNING – CRUSH HAZARD, KEEP FEET CLEAR”** (with graphic) mounted each side of wheel bogie cross tube.
 - (4) **“FORWARD”** – Mounted on forward/aircraft side of the wheel bogie cross tube.
 - (5) **“REVERSE”** – Mounted on rear/terminal side of the wheel bogie cross tube.
 - (6) High Voltage and Electrical Warning Signs and graphics for all electrical cabinets, panels and junction boxes, and as required by NEC and/or local codes
 - (7) Engraved labels on all equipment disconnects or disconnect cabinets and exterior junction boxes.
 - (8) **“DO NOT LOCK DOOR WHILE DOCKED TO AIRCRAFT”** – On interior of weather door.
 - (9) **“CAUTION - UNEVEN SURFACES”** (with graphic) above transition ramp(s).
 - (10) **“CAUTION - UNEVEN SURFACES”** – Cab exterior – right side- above ACF Floor.
 - (11) **“DO NOT TOUCH”** on Auto-level wheel assemblies.

(12) Label all fall protection tie offs with appropriate warning placards.

- d. Electrical equipment as OCPD/transformer shall bear the arc flash labels with appropriate PPE warnings.

F. Maintenance Provisions:

- 1 Maintenance requirements shall present no special problems to personnel knowledgeable in their respective fields of hydraulics, electrical power and controls, or general mechanical assembly.
- 2 Install PBB components with adequate access and appropriate fastener types to permit change-out by one person.
 - a. If a component's weight requires mechanical assistance to lift, the component or assembly shall be provided with lift eyes, forklift guides, or other means of providing a mechanical advantage.
 - b. Components shall be simple, rugged and easily accessible for routine maintenance, lubrication, exchange and adjustment.
 - c. Electrical cabinets, hydraulic cabinets and pumps shall be located so they are always accessible to maintenance personnel.
 - d. All interior electrical cabinets shall have a door-operated light for illuminating all interior components.
- 3 Provide access panels to exterior areas where any inspections, adjustments, maintenance or replacement of components is required.
 - a. The access panel and opening shall be sized to allow necessary tools and equipment to be inserted to complete the work.
 - b. The panel shall be permanently attached with by stainless steel hinges
 - c. Panel shall use stainless steel self-retaining fasteners or stainless-steel latches to secure the panel.
 - d. Any rev-nut or nut-cert used shall be stainless steel.
 - e. Panels shall be painted per the approved PBB exterior paint process and be painted the same color as the PBB exterior.
 - f. **NOTE** – the requirements of this paragraph shall also apply to the access cover of the GPU Cable Hoist. See Specification Section 263543.
- 4 Provide all product specific tools required for routine maintenance.
- 5 Utilize standardized modular components that are readily available in the continental United States to provide rapid corrective measures of malfunctioning critical components. Critical bridge components shall be located to allow for ease of access and installation.
- 6 The manufacturer shall maintain an adequate inventory of all proprietary or vendor fabricated and modified parts for routine maintenance of the unit.
 - a. All stock shall be maintained, whether the unit is in current production, for a minimum of ten (10) years from date of final acceptance of the last unit installed.
- 7 All mechanical and electrical systems shall be protected from potential damage resulting from climatic conditions, falling objects or collision with aircraft service equipment and other moving vehicles.
- 8 All cable ties, fasteners, straps and other items subject to direct or indirect sunlight

shall be ultraviolet light rated.

G. Power and Communication Characteristics:

1. Incoming power for PBB, Fixed Walkway, PCAir, and GPU and the communication circuit will be provided to the face of the terminal building in junction boxes provided by the Owner.
2. Provide PBB, PCAir and GPU disconnect cabinet or individual equipment disconnects on the PBB rotunda column per the requirements of paragraph 2.7.A.1.
3. The Contractor shall be required to supply the necessary junction boxes, conduit, fittings, properly sized power feeders (not SO Cable), cabling and other required materials to connect all power circuits and all communication or other function circuits terminated at the building face to the disconnects or disconnect cabinet and the communication or other function junction boxes on the PBB rotunda.
4. If a new Fixed Walkway is supplied, it shall be shipped with the necessary junction boxes, conduit and fittings, properly sized power feeders (not SO Cable) cabling and other required materials to connect all power circuits and all communication or other function circuits terminated at the building face to the disconnects or disconnect cabinet and the communication or other function junction boxes on the PBB rotunda.
 - a. Equipment power feeders shall be one continuous run from the junction boxes at the terminal face to the SST disconnect cabinet or individual equipment disconnects at the PBB rotunda.
 - b. No intermediate junction boxes under the Fixed Walkway shall be allowed.
5. There will be three (3) power circuits provided at the terminal face. One circuit each for the PBB, PCAir and GPU.
6. A section of flex conduit shall be utilized for each conduit connection from the PBB rotunda or Fixed Walkway to the terminal building or PBB Rotunda to Fixed Walkway.
 - a. Flexible conduits **SHALL NOT** exceed three (3) feet in length.
7. Equipment power feeders from the terminal building to the SST Disconnect Cabinet or individual equipment disconnects at the PBB Rotunda, including those under the new Fixed Walkway AND from the SST Disconnect cabinet or individual equipment disconnects to the PBB power panel, PCAir and GPU **SHALL NOT** be parallel feeders.
8. There shall be three (3) equipment power feeders from the junction boxes at the terminal building face to the SST Disconnect Cabinet or individual disconnects at the PBB rotunda. This includes power feeders under the new Fixed Walkways.
 - a. One (1) ea. power feeder for the PBB, PCAir and GPU.
9. The PBB shall operate on a 480-volt, 3-phase, 60-Hz, 60-Amp circuit, with ground.
10. The PBB shall have a telephone communication circuit with CAT6 cable from a location in the PBB cab to a junction box mounted at the terminal face.

11. Provide PBB cable conveyance system for the required
 - a. PBB, PCAir and 400Hz GPU power
 - b. Control wiring
 - c. Four (4) CAT6 communication cables
12. Cable conveyance system shall have been in use for a minimum of ten (10) years.
13. Rotunda Column Grounding: Provide a grounding stud on the rotunda base plate and make required connection to grounding stud so that PBB and all ancillary equipment are properly grounded.

H. Mechanical Characteristics:

1. Mechanical Design and Components:
 - a. Only standard components readily available in the continental United States, manufactured in Inch-Pound standard units and conforming to recommendations and standards listed in the Quality Assurance Article shall be used.
 - b. All operating mechanical components shall be assembled and tested before the PBB leaves the manufacturer's plant.
2. All non-structural exterior hardware and fasteners shall be stainless steel.

2.5 PERFORMANCE REQUIREMENTS

- A. Aircraft: Passenger boarding bridges shall be capable of servicing the first and, if applicable, second forward door of all commercial aircraft specified in these Specifications and indicated on the Project Drawings.
 1. PBB shall meet the full continuous range of vertical travel required by the specified Aircraft Mix, measured from the apron to the cab spacer leveled edge with the cab fully rotated counterclockwise, as installed, without requiring field modification.
- B. Telescoping Tunnel Slope: Maximum slope shall be 8.33% (1:12) measured along the tunnel floor (except at the transition ramps), for each aircraft type serviced.
- C. Cab Rotation: The cab shall be designed to rotate a total of 125° (90°-95° counterclockwise and 30°-35° clockwise from center) at a maximum speed of 145° per minute in either direction.
- D. Bridge Rotation: The rotunda shall permit the entire unit to rotate 175° (87.5° clockwise and 87.5° counterclockwise).
- E. Drive Wheel Rotation: Steer angle shall be limited to the left and to the right by physical stops, per the PBB manufacturer's standard "steer past 90" limits. Steer speed shall be 23° per minute.
- F. Vertical Lift Speed: 1.5 feet per minute (fpm) to 5 fpm as measured at the cab spacer.
- G. Drive Speed: The drive system shall permit the unit to extend/retract and rotate to any point within its operating envelope at a variable speed between 0 and 90 fpm.

- H. Deceleration: The horizontal drive system shall include a decelerator device to reduce or eliminate shocks when approaching maximum extension or retraction, or when horizontal travel is stopped or reversed suddenly, for protection of the equipment and passenger boarding bridge operator.

2.6 STRUCTURAL DESIGN AND SUPPORT ELEMENTS

- A. Loads: In addition to the dead loads and dynamic effects caused by movement, the entire passenger boarding bridge shall support the following minimum loads, and those of all attachments to the bridge, unless the governing building code prescribes more severe requirements. These loads may be applied in total or in part, singularly or simultaneously. The design shall be based on the combination that imposes the most adverse loading.
 - 1. Live Load PBB (Extended or Retracted) and new Fixed Walkways: See Contract Drawing S-001 for design loads
 - 2. Wind Load: See Contract Drawing S-001 for design loads.
 - 3. Roof (Snow) Load: See Contract Drawing S-001 for design loads.
 - 4. Seismic Load: See Contract Drawing S-001 for design loads.
 - 5. Equipment Minimum Loads (Approximate):
 - a. Preconditioned Air Point-of-Use Unit: 7,000-10,000 lbs. Aft of the drive column.
 - b. Hose Reel or Basket and Hose: 350 lbs.
 - c. 400 Hz Power Unit: 2,750 lbs.
 - d. 400 Hz Cable Hoist: 600 lbs.
 - e. Baggage slide
 - 6. The structural design shall provide sufficient torsional rigidity to minimize sway when the boarding bridge is brought to a gradual stop.
 - 7. All mechanisms for actuating, guiding and restraining the boarding bridge and its components shall be designed to minimize the noise, deflection, and vibration apparent to passengers. No operating vibrations or loads shall be transmitted to the terminal building.

2.7 PASSENGER BOARDING BRIDGE AND NEW FIXED WALKWAY

- A. Electrical and Control Systems
 - 1. Equipment Disconnects
 - a. There shall be lockable, SST, NEMA rated disconnects mounted on the rotunda column and accessible to maintenance technicians standing at ground level for the PBB, PCAir, 400Hz GPU and Tennant Airline supplied 28Vdc Mobile GPU.
 - b. The center of any disconnect handle or circuit breaker shutoff shall NOT be greater than 54 in. from ground level.

- c. Conduits and SO Cord should not enter the disconnect cabinet or the individual disconnect through the top. Penetrations shall be through the bottom or sides.
 - d. If a single SST disconnect cabinet is supplied,
 - (1) Separate circuit breakers for the PBB, PCAir, and 400Hz GPU, the PBB transformer and the various PBB 110/220 auxiliary, lighting and control circuits shall be supplied.
 - (2) A large laminated component layout graphic and wiring schematic shall be affixed to the interior door of the cabinet, indicating name and function of each component.
 - (3) The electrical components and workmanship of the disconnect cabinet shall comply with the items p, q, r in paragraph 2 – General Electrical Requirements below.
 - (4) The cabinet door shall be SST, hinged and gasketed.
 - (5) The cabinet shall have a means to allow condensate or water leakage to drain from the cabinet.
 - (6) The cabinet door handle shall have a lockable latching mechanism that engages at both the top and bottom of the cabinet.
 - (7) Each equipment circuit breaker must be able to be “Lock / Tagged” out in accordance with OSHA’s requirements for Equipment Lock Out / Tag Out requirements. The disconnect cabinet door shall be able to be completely closed and secured when one or more circuit breakers or disconnects are “Locked / Tagged” out.
 - (8) Each equipment breaker shall be labeled with an engraved placard listing the component the breaker is supplying power to and the voltage and amps of the circuit.
 - e. If separate disconnects are supplied for the PBB, PCAir, and 400Hz GPU:
 - (1) Disconnect enclosures shall be SST.
 - (2) Disconnects shall be located on a mounting plate attached to the rotunda support column.
 - (3) The mounting plate shall be painted to the same specifications as the rotunda column.
 - (4) The various PBB 110/220 auxiliary, lighting control circuits shall be located in a separate lockable cabinet in the PBB Cab area.
 - (5) Each SST disconnect enclosure shall be labeled with an engraved placard listing the component the disconnect is supplying power to and the voltage and amps of the circuit.
 - (6) Each equipment disconnect must be able to be “Lock / Tagged” out in accordance with OSHA’s requirements for Equipment Lock Out / Tag Out requirements.
 - (7) The electrical components and workmanship for these separate disconnects shall comply with the items p, q, r in paragraph 2 – General Electrical Requirements below.
2. General Electrical Requirements:
- a. Four (4) four pair CAT6 cable, w/ phone outlet shall be located on the cab wall near the control console. The outlet box must be equipped with a CAT 6 RJ-45 jack for installation of telephone or intercom equipment.
 - (1) Terminate one CAT 6 cable at the jack and coil twelve (12) inches of the remaining three cables within the outlet box.
 - (2) This outlet shall have a SST cover plate.
 - (3) Contractor shall employ a qualified subcontractor to connect the PBB communications (telephone) circuit to the junction box at the terminal face.

- b. Duplex GFI outlets (un-switched 110V, single phase, 20 amp) shall be located:
 - (1) in the Rotunda (near the terminal door or walkway),
 - (2) on the left side of the cab wall, near the telephone outlet
 - (3) All interior outlets shall have a SST cover plate.
 - (4) In new Fixed Walkways, as required by Code
- c. Light switches, receptacles, alarms, indicators, thermostats or other devices shall be located a minimum of 4 in. and a maximum of 16 in. from the terminal end of the corridor or Fixed Walkway.
 - (1) The distance is measured from the terminal edge of the device or cover plate.
- d. Tunnel and service door light switches and any security card reader devices shall be located no further than 6 in. from the interior right edge of the service door.
 - (1) This may require special fabrication allowances of the tunnel structure to the terminal side of the service door.
- e. Interior Lighting – PBB tunnel, rotunda, cab bubble and new Fixed Walkway.
 - (1) The placement of the interior light fixtures and the number (minimum of 2 ea.) of LED tube lamps per fixture shall provide an average light intensity at floor level, throughout the PBB of 20-foot-candles.
 - (2) The first “A” tunnel light shall be located within 24 in. of the rotunda end of the “A” tunnel.
 - (3) The interior PBB tunnel and new Fixed Walkway light fixtures shall be recessed.
 - (4) The interior rotunda and cab bubble light fixture(s) may be recessed or surface mounted.
 - (5) Fixtures shall utilize a minimum of two (2), four (4) ft. 110V LED tube lamps.
 - i) LED arrays are not allowed.
 - ii) No transformers or tube ballasts shall be allowed.
 - (6) Fixtures shall blend with the ceiling design
 - (7) Tunnel and new Fixed Walkway fixtures shall be oriented perpendicular to the center line of the tunnel or new Fixed Walkway.
 - (8) Fixture shall have black trim
 - (9) Fixture frame shall be hinged or removable and shall have self-retaining screws or latches.
 - (10) Prior to the PBB Tunnel or new Fixed Walkway light fixture being installed, the roof of the PBB tunnel or new Fixed Walkway shall be painted per the requirements of 2.7.J.3.
 - (11) The lenses / diffusers for these light fixtures shall be captured in the fixture frame to prevent lens / diffusers or LED tubes from falling out.
- f. Three-way switches shall be located in the Rotunda Corridor or new Fixed Walkway (right side near the terminal door) and on the wall or power panel near the service door.
 - (1) Shall control the interior new Fixed Walkway and PBB tunnel, rotunda and cab bubble lights as well as the exterior Cab light.
 - (2) Shall have SST cover plates.
- g. If there is a light over the Operator Console -
 - (1) It shall be LED tube light
 - (2) It shall be switched on / off from the HMI screen.
- h. Exterior Lighting
 - (1) Floodlights
 - i) Two (2) on the underside of the cab, facing forward, to illuminate the apron area around and under the PBB.
 - (a) Shall be controlled from the PBB HMI screen.

- ii) One (1) at the lift columns to illuminate the PBB wheel area.
 - (a) Located so that the illumination does not interfere with the camera focused on the wheel bogie.
 - (b) Shall be controlled from the PBB HMI screen.
 - (c) Shall also be illuminated whenever the horizontal drive system is activated, regardless if the floodlight is turned off on the PBB HMI screen.
 - iv) Lamps for the exterior floodlights shall be Beacon FL-1/12NB-25/5K/4X4/UNV/YK/BBT
 - v) The three exterior flood lights shall be mounted on the cover of a weather tight, stainless steel (SST), NEMA 3R or 4 rated enclosures.
 - (a) Cover shall SST, hinged with SST latch(s) or SST self-retaining screws.
 - (b) Cover shall have a weather gasket.
- (2) Cab Exterior Light
 - i) Fixture shall be weather proof and surface mounted.
 - ii) Fixtures shall utilize a minimum of two (2), four (4) ft. 110V LED tube lamps.
 - (a) LED arrays are not allowed.
 - (b) No transformers or tube ballasts shall be allowed.
 - iii) Fixture shall be mounted outside the weather doors on the PBB Cab roof and illuminate the cab-aircraft interface.
 - iv) Shall be controlled with the Tunnel light switch and shall be on when the Tunnel lights are on.
 - v) Shall also be controlled by a button on the HMI so the PBB operator can turn the light off / on when docking to the aircraft.
- (3) Service Door Light
 - i) Shall be an LED light
 - ii) Shall have a photo cell which will override the interior light switch.
 - iii) Shall be an ACUITY LITHONIA TWS LED 1 50K or Owner approved equivalent.
 - iv) Shall be controlled by a switch located on the interior wall of the PBB, next to the Service door and in the same switch box as the tunnel 3-way light switch.
 - v) Switch shall have a SST cover plate.
- (4) An LED Amber flashing light shall be mounted at the left and right edge of the wheel bogie cross tube
 - i) Shall be continuously on when the PBB is in OPERATE mode.
- e. Emergency Lighting
 - (1) The PBB and new Fixed Walkway will NOT be on a terminal building emergency power circuit so the PBB lighting circuit shall have an in-line UPS battery backup system.
 - i) A vision window shall be supplied in the access panel for the UPS unit so that the status indicators of the UPS unit can be viewed by a person standing in the cab bubble without opening the access panel.
 - ii) Access panel shall be hinged with self-retaining screws.
 - (2) PBB and new Fixed Walkway lighting circuit shall be energized for a minimum of fifteen (15) minutes in the event power is lost to the PBB and new Fixed Walkway.
 - (3) New Fixed Walkway emergency lighting shall include one fixture at each end of the walkway and every third light in the walkway.
 - (4) PBB emergency lighting shall include one fixture at the:

- i) Cab Bubble
 - ii) B–C Tunnel Transition Ramp
 - iii) A-B Tunnel Transition Ramp
 - iv) mid-tunnel in each PBB tunnel
 - v) Rotunda
- (5) Only those fixtures identified in paragraphs 4 and 5 above shall be part of the emergency lighting system.
- f. Cable Conveyance System
 - (1) The cable conveyance system shall have been in use for a minimum of ten (10) years.
 - (2) The cable conveyance system shall not impede the normal PBB operation or personnel or equipment traffic around the PBB.
 - (3) The cable conveyance system shall include input power cables, each sized for the specific requirements of the PBB, PCAir and 400Hz GPU supplied for this project and any required control, communication, and other security, video or fire alarm system cables, as required.
 - (4) PBB, PCAir and 400Hz GPU power cables **SHALL NOT** be parallel feeders in the cable conveyance system.
 - (5) Cables in the cable conveyance system shall be clamped or strapped to prevent sliding or slippage of the cables.
 - (6) All power and control cabling between the equipment disconnect(s) at the PBB rotunda and the PBB “C” tunnel shall be contained in an exterior cable conveyance system mounted under or on the sides of the “A” and “B” tunnels of the PBB.
 - i) All power and control cabling shall be of a “Flat Pak” design.
 - ii) System shall be accessible at all operational positions of the PBB for maintenance personnel to inspect the system or for replacement or addition of cables.
 - (7) All cabling contained in a cable conveyance system on the side of the PBB
 - i) Shall be either UV resistant or have a separate UV resistant covering.
 - ii) Shall be clamped to the carrier brackets with metal clamps and scuff protection.
 - (8) All power and control, communication, and other security, video or fire alarm system cables from the cable conveyance system shall terminate directly into terminal blocks or the breaker lugs in the equipment disconnect(s) or junction boxes at the PBB rotunda.
 - i) Intermediate junction boxes shall not be allowed.
 - (9) Strain relief shall be provided for all equipment power cables between the cable conveyance system and the equipment disconnect(s) mounted on the PBB Rotunda
 - (10) Power and control cables shall be grouped and supported by straps between the cable tray under the cab bubble floor and their final termination points.
- g. Cable Trays and Flex or Rigid Conduit
 - (1) All cable trays used on the PBB shall be either galvanized, aluminum or SST.
 - (2) Cable trays shall be used to route the power and control cables beyond the cable conveyance system to the PBB cab bubble floor. Cable trays shall extend far enough under the cab bubble floor so that the power and control cables do not interfere with the GPU unit mounted under the cab bubble floor. Cable trays shall also extend far enough to allow the GPU unit to be mounted as close as possible to the cab bubble floor.

- (3) When a Fixed Walkway or Extended Corridor is being supplied
 - i) All power and control circuit cables MUST be routed in rigid conduit under the Fixed Walkway or Extended Corridor.
 - ii) Cable Trays ARE NOT allowed under the Fixed Walkway or Extended Corridor.
- (4) No standard electrical, control or communication service SO Cord shall be permitted on the exterior sides of the Fixed Walkway, Corridor, Rotund, PBB Tunnels, Cab Bubble or Cab.
- (5) All exterior conduits shall be rigid and shall be attached with rigid conduit clamps.
 - i) Flex conduit shall be allowed where required to facility maintenance or movement of PBB components (e.g. ventilator, vertical drive motors, etc.)
 - ii) Flex conduit shall be attached with a flex conduit clamp.
- (6) Any rigid or flex conduit attached to the roof of the PBB Cab, Cab Bubble, Tunnels, Rotunda, Corridor or Fixed Walkway, shall be secured with nelson stud fasteners.
 - i) Drilling or screwing into the roof is NOT allowed.
- (7) Concealed wiring running within walls, ceilings, floors or other inaccessible areas of the PBB and Fixed Walkway
 - i) Must be contained in conduit for the length of the run
 - ii) Must be terminated on a terminal strip in a junction box at each end of the conduit.
- h. Externally mounted electrical equipment panels or cabinets which contain electrical or electronic components and controls (terminal blocks only are not included in this requirement), shall be equipped with a thermostatically controlled heater
- i. Each circuit (e.g. lighting, receptacles, cab floor heat, ventilators, gate sign, etc.) shall be protected by its own circuit breaker
 - (1) Low voltage control circuits of 10 amps 50Vdc / 50Vac OR LESS may be protected by either circuit breakers or fuses.
- j. All circuits shall have suitable overload protection.
 - (1) Each conductor shall be sized to have current carrying capacity as allowed by the National Electric Code (NEC) equal to or greater than the capacity of the circuit breaker provided for the circuit.
 - (2) Circuit breakers
 - i) Shall be grouped in convenient locations
 - ii) Shall be suitably marked for size and name-function.
 - (3) Protection devices shall be sized to protect wiring, motors and other electrical components from damage due to overload and prevent electrical or mechanical damage to any associated PBB components or ancillary equipment due to failure of any PBB component or ancillary equipment.
- k. Quick Disconnect fittings must shall be UL or ETL approved.
 - (1) Quick Disconnect receptacles and plugs shall be labeled with a permanent type label to indicate which receptacle goes with which plug.
- l. Toggle switches must be of MIL-S-3950 quality of equivalent and rated for the loads which they control.
- m. Electrical interlocks shall be of a fail-safe design.
- n. All motors and bearings shall be sealed, not requiring lubrication. Actuator mechanisms shall have adequate allowance made for lubrication requirements.
- o. Spark-producing electrical components must be located at least eighteen (18) inches (0.457 m) above ground level.
- p. All Power and Control Cabinets shall comply with UL 508A and must have an NRTL label attached to the control cabinet door.

- q. Enclosures and Junction Boxes
- (1) All exterior enclosures and junction boxes shall be labeled with engraved placards.
 - i) Placards shall contain the nomenclature used on the drawings or schematics for the enclosure or junction box.
 - (2) All exterior electrical components, including terminal blocks / terminal strips, shall be housed in weather tight, stainless steel (SST) enclosures.
 - (3) All exterior enclosures and junction boxes, including pass through junction boxes, shall:
 - i) be weather tight, stainless steel (SST) enclosures of NEMA 3R or 4 rating
 - ii) shall have a hinged, SST cover, which shall be retained by SST latch(s) or SST self-retaining screws.
 - iii) shall have a weather gasket for the cover.
 - iv) shall have a drain device for condensate.
 - (4) All exterior electrical devices, including, but not limited to, lights, beacons, sensors, temperature probes and switches shall be a weather proof design with a NEMA 3R or 4 rating.
 - i) All mounting boxes for electrical devices shall be SST and be a weather proof design with a NEMA 3R or 4 rating.
 - ii) The enclosure cover shall be hinged, SST and be retained by SST latch(s) or SST self-retaining screws.
 - iii) The enclosure covers shall also have a weather gasket
 - iv) The enclosure shall have a drain device for condensate.
 - v) The device should be mounted to the hinged cover.
 - (5) All enclosures and junction boxes containing power circuits shall have applicable warning or symbol stickers as required by Code.
 - (6) All components mounted in enclosures and junction boxes shall be mounted to a backing plate supplied by the enclosure manufacturer
 - i) Components shall be intended for use in the enclosure or junction box.
 - ii) Mounting directly to the enclosure or junction box wall shall NOT be allowed.
 - (7) Conduits and wiring routed into enclosures, junction boxes or panels shall have clamping fittings and the fitting threads shall have bushings installed.
- r. Wiring and Terminal Blocks
- (1) All wiring shall be brought to mounted terminal blocks.
 - i) Wire splices or wire nuts of any type shall **NOT** be used.
 - ii) Terminal blocks shall **NOT** be allowed to hang free in air
 - iii) In junction boxes where space does not allow for the use of terminal blocks, mounted Wago type connectors are acceptable.
 - (2) Wiring in all enclosures and junction boxes shall comply with the NEC requirement in Table 314.16 for the wiring fill capacity of the enclosure or junction box.
 - (3) Wiring shall be formed and restrained to give a neat appearance.
 - (4) All wires, including spares, within junction boxes, control cabinets, disconnects, other electrical enclosures shall be neatly secured and routed.
 - i) Wire routing trays shall be used when space permits.
 - (5) Grommets and suitable anti-chafe material shall be used where wires are required to pass through structure or similar relief or opening which exposes the wire to possible chafing.
 - (6) All wiring shall be identified using stamped labels or other Owner approved wire labels.

- i) Labels shall be visible and located within 1 in. of their termination point.
 - ii) Wires are to be numbered in a logical sequence
 - iii) All wire numbers are to be indicated on wiring diagrams.
 - (7) Spare wires shall be numbered and also labeled as “SPARE”.
 - (8) Spare wires shall be indicated on the wiring diagrams.
 - (9) Wires must meet the bend radius requirements of NEC.
 - i) Ninety-degree bends shall not be allowed.
 - (10) Ferrules or insulated ring terminals shall be used on any fine stranded wire, depending on the terminal block connection.
 - i) Fork or Spade terminals shall ONLY be allowed to make connections to purchased components that have ring terminals and are assembled into the PBB. No other use of fork or spade terminals shall be allowed.
 - ii) Direct connection of fine stranded wire to a terminal block shall NOT be allowed.
 - (11) Terminal blocks shall be either:
 - i) Finger proof or tamper proof design
 - ii) Stud or open style design with a protective cover supplied by the terminal block manufacturer.
 - iii) Other terminal block designs shall not be accepted.
 - (12) Terminal blocks must meet the applicable requirements of SAE J561, J858 and J928.
 - (13) Wire ties SHALL NOT be used to secure and support any wiring.
 - (14) NEC / UL approved clamps and methods must be used to secure and support wiring.
 - i) Clamps used shall be specifically designed for the wiring being clamped (e.g. clamps for flat pack cable are not the same as clamps for SO cable).
 - (15) Wire ties shall only be used to keep wires together for appearance and routing to various components.
 - s. Transformer and non-linear electrical loads shall not generate frequency in the MHz range to cause EM interference with the FAA frequencies.
3. Control Systems
- a. PBB shall be PLC controlled. The PLC shall provide built in diagnostics to assist with trouble-shooting.
 - b. There shall be an HMI screen on the PBB operator console face plate for the display of PBB status information, warning, error and maintenance messages, operation of certain auxiliary equipment and input of certain PBB control and maintenance commands, as specified herein.
 - c. All PBB motion controls shall be by momentary contact type (dead-man) controls.
 - d. There shall be proximity, laser, radar or other electronic sensors in the Cab floor area of the PBB indicating the presence of the aircraft.
 - (1) Sensors shall be adjustable and shall NOT be mechanical or protrude past the aircraft edge of the aircraft spacer.
 - (2) One set of sensors shall cause the PBB to enter a “slow down” mode approximately 3 feet from the aircraft fuselage.
 - i) The speed in “slow down mode” shall be half the normal operating speed.
 - (3) The second set of sensors shall be activated between 0 to 3 inches from the aircraft fuselage and will stop all forward motion of the PBB.
 - i) The PBB can resume forward travel in the slowdown mode when the PBB spacer bypass is activated by the Operator from the PBB Console HMI screen.
 - ii) Movement away from the aircraft will not be restricted.

- (4) Sensors shall be unaffected by sunlight or aircraft fuselage color.
- e. The PBB shall be equipped with an automatic leveling system (auto-leveler), mounted on the cab floor; interior, right side.
 - (1) The Auto level mechanism must be in full view of the PBB operator.
 - (2) It shall be protected with a guard to prevent accidental damage or activation from passengers.
 - (3) A “DO NOT TOUCH” label shall be affixed to the cover protecting the Auto level wheel.
 - (4) The system shall utilize a deployed arm and allow the PBB to follow changes in the aircraft elevation that occur during aircraft loading and unloading.
 - (5) The system shall function with equal reliability for all aircraft contours and door sill heights.
- f. The auto-leveler is engaged and the Auto Level arm is deployed when the Operator Console Selector Switch is switched to the “AUTO” position.
 - (1) An Auto Level On message shall appear on the PBB Console HMI screen.
 - (2) When the Operator Console Selector Switch is moved from “AUTO” to “OPERATE”, the Auto Level arm shall be retracted to its stowed position.
- g. The auto-leveler circuit shall include a sustained travel timer
 - (1) The timer shall limit auto-level vertical travel to a maximum of six seconds.
 - (2) The timer shall be adjustable from 1.5 to 6 seconds.
- h. An Auto-level fault condition shall occur if the operation exceeds the set time limit. This fault condition shall cause:
 - (1) all vertical motion power to be disconnected
 - (2) a vertical travel brake to be engaged
 - (3) activation of an audible over-travel alarm located on the Operator Console Face Plate or front panel of the Upper Console.
 - (4) a warning message to be displayed prominently on the PBB Console HMI screen.

DANGER AUTO LEVEL FAILURE RE-SET AUTO LEVEL

- (5) activation of an audible auto-level over-travel alarm and an amber flashing light, both of which will be mounted near the terminal door in the Corridor or refurbished Fixed Walkway or New Fixed Walkway above the light switch.
- (6) activation of an audible auto-level alarm on the wheel bogie, which produces a distinctly different sound from other PBB alarms.
 - i) The alarm device shall also have a flashing red-light.
 - ii) The alarm device shall have an engraved label – “AUTO LEVEL ALARM”.
- i. If the auto level wheel does not make contact with an aircraft as it is deployed, the Auto level fault shall be activated.
- j. To prevent the PBB operator from accidentally turning off and disabling the auto level system, the auto-level fault condition and all related audible alarms and warning messages shall be activated whenever the selector switch is moved from “AUTO” directly to the “OFF” position.
- k. When the Operator Console Switch is in the “OPERATE” position:
 - (1) LED amber lights mounted under the cab shall be on and flashing
 - (2) Lights at each end of the wheel bogie cross tube, near the lift columns, shall be flashing.
 - (3) These lights will be off when the Operator Console Switch is in the “AUTO” position.
- l. When PBB horizontal, vertical or steer motion is activated:

- (1) An audible travel alarm bell mounted on the PBB wheel bogie cross tube shall sound at 98 decibels, measured at 10 feet from the wheel bogie
 - i) The travel alarm bell shall be clearly labeled, with an engraved label – “TRAVEL ALARM”.
- (2) The amber lights mounted on the outer edges of the wheel column bogie will flash.
- (3) The flood light over the wheel bogie shall illuminate.
- m. If the PBB manufacturer has any ramp level E-STOP buttons:
 - (1) The E-STOP buttons shall be illuminated w/ 28V LED light.
 - (2) The E-STOP button shall be able to be activated by pressing or hitting the E-STOP button with the palm of the hand.
 - (3) If the ramp level E-STOP is pressed
 - i) The PBB Auto-level function shall NOT be disabled.
 - ii) A large, flashing error message shall be displayed on the HMI identifying a “RAMP E-STOP PRESSED” condition.
- n. Mechanical or electrical interlocks shall be provided to prevent damage to control circuits or PBB components by selecting opposite motions simultaneously.
- o. When the PBB Operator selector switch is in the OFF or AUTO position, the following PBB movement systems shall be inoperative:
 - (1) horizontal movement
 - (2) vertical movement
 - (3) cab rotation
 - (4) ACF floor operation
 - (5) CRJ/ERJ floor operation
 - (6) canopy operation
- p. If the GPU cable hoist is deployed or if either of the PCAir or 400Hz GPU is operating, the controls for all PBB horizontal movement shall be inoperative.
- q. If the
 - (1) GPU cable hoist is deployed, or
 - (2) PCAir is operating in aircraft mode, or
 - (3) 400Hz GPU is operating, AND
 - (4) the PBB Operator selector switch is moved to the “Operate” position,a warning message shall be displayed on the HMI and an alarm on the Operator Console face plate will sound.
- r. If the PBB is equipped with the controls for PCAir Precool, a PCAir Precool interlock enable / disable selection shall be provided on the HMI Maintenance Screen.
 - (1) If the Precool interlock is disabled and the PCAir is operating in Precool mode and the Operator selector switch is moved to the “Operate” position, a message stating that PCAir Precool is operating shall be displayed on the HMI.
 - (2) If the Precool interlock is enabled and the PCAir is operating in Precool mode and the Operator selector switch is moved to the “Operate” position, an alarm on the Operator Console face plate will sound and message stating that PCAir Precool is On and the PBB cannot Operated be shall be displayed on the HMI.
- s. If the PBB has an electro-mechanical vertical drive system,
 - (1) PBB shall be equipped with Lift Column sensors to detect a Lift Column “Rack” fault.
 - (2) If a “Rack” fault occurs:
 - i) power shall be removed from the vertical lift columns
 - ii) a distinct, large warning message shall be displayed on the PBB Console HMI screen.

- t. When the canopy is deployed, the controls for all forward and reverse PBB horizontal movement shall be inoperative.
- u. The PBB shall have the following “soft” travel limits, which can be set and adjusted by the Owner.
 - (1) PBB Swing – Left and Right
 - (2) Lift Column Vertical – Up and Down
 - (3) Slope Limits – Up and Down
 - (4) PBB Tunnel Extend / Retract
 - (5) Cab Rotate – Left and Right
- v. When the PBB reaches a soft limit:
 - (1) an audible alarm shall sound on the Operator Control Console
 - (2) a distinct, large warning message shall be displayed on the PBB Console HMI screen.
 - (3) the PBB horizontal and vertical motion shall be stopped
 - (4) The operator shall be able to clear the soft limit by operating the PBB in the reverse direction.
- w. Mechanical “hard” limit system shall be provided for PBB for the following:
 - (1) Swing
 - (2) Lift Column Vertical Up / Down Travel Limits
 - (3) Tunnel Extend / Retract Travel Limits.
 - (4) Cab Rotate Travel Limits
- x. If the swing or vertical up/down “hard” limits are reached
 - (1) all operational control power to the PBB shall be switched off so the PBB cannot be moved or operated.
 - (2) a Keyed By-Pass Switch located inside the lockable Operator Control Station, must be used to return power to the PBB so it can be brought back into safe operating limits and conditions.
 - i) Six (6) keys per PBB, for the keyed by-pass switch shall be provided to the Owner.
- y. Smoke Detector / Alarm
 - (1) There shall be a smoke detector mounted in the interior PBB Cab Bubble near the roof in the area of the PBB operator console.
 - (2) If the smoke detector is activated:
 - i) The PBB ventilator and PCAir Pre-cool / heat function shall be disabled.
 - ii) A warning message and Smoke Detector Reset Button shall be displayed on PBB HMI
 - iii) An enunciated alarm shall sound on the PBB console
 - (3) When the displayed Smoke Detector Reset button on HMI is pushed, the smoke detector shall be reset, the warning message on the HMI shall disappear, the Smoke Detector Reset button shall disappear, the enunciate alarm shall be turned off and ventilator and PCAir Pre-cool / heat functionality shall be restored.

B. Operator Control Station

- 1. The Operator Control Station shall be located in the PBB Cab and shall provide the operator with a control console and the service utilities required to accomplish PBB operation and docking to the specified aircraft.
- 2. The Operator Control Station shall be forward facing and positioned so the operator has an unrestricted full view of the aircraft door during maneuvering and docking op-

erations.

3. The Operator Control Station area shall be protected from the outside environment by closable weather doors
 - a. Operation of the PBB shall be accomplished without opening the weather doors.
4. The Operator Control Station shall be housed in a NEMA-rated enclosure.
5. The Operator Control Station shall be located so as to provide minimum obstruction to passenger traffic and to minimize the possibility of passengers tampering with the PBB controls.
6. The Main Power Panel, Operator Control Cabinet and Upper Control Cabinet (if supplied) shall have a front access panel that:
 - a. Is latched at the top and bottom or side to side.
 - (1) Each latch is lockable with a key.
 - (2) 12 ea. keys shall be provided to the Owner for each type of lock / latch
 - b. Utilize an interlock switch with by-pass capability.
 - c. Shall be either:
 - (1) Hinged with a door hold open cylinder, or:
 - (2) Removable with self-retaining screws.
 - d. Shall have vision window(s) to provide viewing of the horizontal drive VFD's and their status and fault indications and / or messages.
7. The interior of all main power panels or control cabinets shall have an LED light
 - a. The light shall have a switch to be used by maintenance.
 - b. The light switch shall be easily accessible to maintenance personnel standing at the PBB operator console.
8. The interior of all main power panels or control cabinets shall have a thermostatic controlled heater.
9. The Operator Control Console shall be located at the Operator Control Station.
10. The Operator Control Console face plate:
 - a. Shall be hinged to allow for working access to components.
 - b. Shall be equipped with hold open latch.
 - c. Shall have an interlock switch with by-pass capability.
 - d. Shall have a braided ground strap if any components on the face plate are 110V.
 - e. Shall have a wiring harness of sufficient length to allow the face plate to be removed and turned over to facilitate repairs.
11. There shall be a component layout graphic attached to the inside of the lower and upper console doors identifying each component's noun nomenclature. A laminated photo of the inside of the lower and upper console with each component labeled is acceptable.
12. Laminate PBB electrical and controls wiring diagrams shall be in a holder attached to the lower console door. Wiring diagrams shall be completely bound on one edge (e.g. coil binding)
13. PBB Operator Camera System.

- a. The PBB Operator Camera System monitor shall be:
 - (1) LCD Color
 - (2) 10" or greater
 - (3) Four channel
 - (4) Split Screen
 - (5) mounted on an adjustable / swivel base
 - (6) located at operator eye level on the left side of the Operator Control Station, not in the Operator Control Console face plate.
 - (7) equipped with a switch to toggle between images from cameras #1, 2, 3 or 4 OR display the image from all 4 cameras.
 - (8) In the PBB Operate mode, the view of the wheel bogie MUST be displayed regardless of any toggle switch settings.
 - (9) not operated by any remote control device
 - (10) powered on and become automatically viewable when the PBB "Power On" button is activated and shall remain in operation and viewable while power is on to the PBB.
- b. LCD monitor shall display images from four (4) Color Cameras:
 - (1) #1 – Apron area to the front of PBB. Camera shall:
 - i) be mounted on the underside of the C Tunnel
 - ii) be centered on the C Tunnel
 - iii) be mounted towards the cab end of C tunnel, forward of the PCAir unit, before the lift columns
 - iv) show the complete wheel bogie area.
 - (2) #2 – Apron area towards the PBB rotunda. Camera shall:
 - i) be mounted on the underside of the C Tunnel
 - ii) be mounted towards to rotunda, past the PCAir unit
 - iii) be centered on the C Tunnel
 - iv) show the area under the PBB towards the rotunda.
 - (3) #3 – Landing, service stair, apron around service stair. Camera shall
 - i) be mounted above the aircraft side of the service door
 - ii) be mounted on galvanized uni-strut, minimum 4 ft. long, bolted on the PBB Cab roof using a stud bolt system.
 - iii) be able to be mounted at any position on the uni-strut.
 - iv) show the service platform, stairs and ramp area around the stairs.
 - (4) #4 – Apron area at the left side wheel bogie location of the PCAir and GPU Pushbuttons. Camera shall:
 - i) be mounted on galvanized uni-strut, minimum 4 ft. long, bolted to the PBB Cab or PBB C tunnel using a stud bolt system.
 - ii) be able to be mounted at any position on the uni-strut.
 - iii) be mounted far enough away from the PBB C Tunnel so that the PCAir / GPU Pushbutton and PCAir hose basket area are clearly shown.
- c. If not routed internally in the PBB, the video / power cable for cameras #3 and #4 shall be routed, in galvanized or aluminum conduit, open on each end, up either side of the PBB cab bubble.
 - (1) Conduit shall be routed and attached using Adel clamps that utilize the fasteners for attaching the cab curtain to the cab bubble frame.
 - (2) Conduit shall have an offset, 90° bend at the top.
- d. A remote function shall NOT be used to operate any of the monitor or camera system functions.

14. The Operator Control Console shall include, as a minimum, the following "dead man"

- controls located on the console faceplate.
- a. A lever arm 4-way (“Joy” stick) that shall provide control over horizontal forward and reverse movement of the PBB.
 - (1) The Joy stick shall, when moved progressively, allow PBB horizontal speed to increase proportionally to the position of the Joy stick.
 - (2) The word “Reverse” shall be silk screened below the Joy stick and the word “Forward” shall be silk screened above the Joy stick.
 - (3) Any horizontal movement “delay”, “not ready”, “ready”, etc. indicators shall be:
 - i) mounted on the console face plate, directly above the Joy stick.
 - ii) shall have labeled placards identifying their meaning.
 - iii) illuminated with an LED bulb
 - (4) A large message, similar to the Auto Level Alarm message, shall display on the HMI whenever the horizontal drive is not engaged but the operator has pressed the joy stick.
 - ii) This message should be explanatory as to why the PBB is not moving even though the joy stick has been pressed.
 - b. Steer Left / Right push buttons for horizontal drive direction.
 - (1) Illuminated white lens, with LED bulb, labeled with “Steer”.
 - (2) Blue directional buttons labeled with “Left” and “Right”
 - c. Vertical Up / Down push buttons for raising and lowering the cab end of the PBB.
 - (1) Illuminated white lens, with LED bulb, labeled with “Vert Drive”.
 - (2) Black directional buttons labeled with “Up” and “Down”
 - d. Cab Rotate push buttons for cab rotation, left or right
 - (1) Illuminated white lens, with LED bulb, labeled with “Cab Rot”.
 - (2) Blue directional buttons labeled with “Left” and “Right”
15. The Operator Control Console shall also have the following controls, indicators and devices.
- a. PBB Power On / Off black push button, with illuminated green labeled “Power On” lens with LED bulb,
 - b. A three-position master Console Switch used to select “OFF”, “OPERATE” or “AUTO” (automatic leveling).
 - (1) This master Console Switch shall be mounted on the Operator Control Console face plate.
 - (2) The “OFF”, “OPERATE” or “AUTO” identification shall be on a labeled placard.
 - c. An illuminated, mushroom type emergency stop button on the left side of the console face plate that shuts down all PBB movement when pressed. The “E-STOP” identification can be silk screen onto the face plate or can be on a labeled placard. In addition,
 - (1) All PBB movement controls shall be inoperative.
 - (2) All illuminated push buttons should go off.
 - (3) An alarm shall sound at the Operator Console.
 - (4) A large, flashing warning message shall be displayed on the HMI that OPERATOR CONSOLE E-STOP PRESSED.
 - d. Annunciator for alarms.
 - e. A blue push button to ring the Travel Alarm Bell labeled with “Travel Warning Bell (Push)”.
 - (1) Shall be operational while the PBB is in “OPERATE” or “AUTO” mode.
 - f. Canopy buttons to extend and retract the canopy.
 - (1) One each for the left and right side of the canopy.

- i) Each side of the canopy shall be able to be extended or retracted independently.
 - (2) Illuminated white lens, with LED bulb, labeled with “Canopy”.
 - (3) Green directional buttons labeled with “Extend” and “Retract”
 - h. ACF Floor Auto button to select automatic mode for the ACF floor.
 - (1) Illuminated white lens, with LED bulb, labeled with “Cab Floor In Auto”.
 - i) Illuminated when “On” button pushed.
 - (2) Black “On” button
 - (3) Red “Off” button
 - i. Manual ACF Floor Operate button to move ACF floor up or down
 - (1) Illuminated white lens, with LED bulb, labeled with “Cab Floor in Manual”
 - i) Illuminated when ACF Floor Auto is Off.
 - (2) Black directional buttons labeled with “Up” and “Down”
- 16. The Operator Control Console shall include an HMI touch screen that -
 - a. Shall be a Schneider Electric Magelis Advanced 15” color touch panel, or Owner approved equal.
 - b. Shall be easily readable and suitable for the environment
 - c. Shall include the required coatings so that the Operator can read the HMI screen regardless of sun glare and protect the surface of the HMI.
 - d. Shall display Operator Error or Warning Messages and PBB Status Conditions
 - (1) PBB Status Conditions shall include, but are not limited to:
 - i) POWER ON
 - ii) PBB ON or OPERATE
 - iii) AUTO LEVEL On
 - iv) Canopy Deployed
 - v) GPU Cable Hoist Deployed
 - vi) GPU ON
 - vii) PCAir ON
 - (2) Operator Error or Warning Messages shall include but are not limited to:
 - i) AUTO LEVEL Warning – minimum 1” x 3”
 - ii) Console E-STOP Warning – minimum 1” x 3”
 - iii) Ramp E-STOP Warning, different from Console E-STOP message – minimum 1”x 3”
 - iv) Column Fault Error – minimum 1” x 3”
 - v) PBB Motion “Soft Limit” Warnings
 - vi) PBB Motion “Hard Limit” Errors – minimum 1” x 3”
 - vii) Cab Rotate Warning
 - viii) Aircraft Spacer Warning
 - ix) A warning if Console Switch is moved to OPERATE and the PCAir or GPU are running or the GPU Cable Hoist is displayed.
 - x) A warning if there is an input power phase error that impacts any power or control system of the PBB.
 - (3) All messages displayed shall have an appropriate LARGE text message informing the Operator of the nature of the alarm or PBB status.
 - (4) APPENDIX II** contains a Summary Chart for the various messages and alarms required.
 - e. Shall provide non-movement PBB Controls on one screen and shall include, but not limited to:
 - (1) On / Off for light over PBB console
 - (2) On / Off for floodlights that illuminate the apron area under the aircraft and under the cab.

- (3) Spacer limit override, which will override the aircraft proximity sensor and all for final positioning of the PBB.
 - (4) PBB Pre Cool On / Off
 - (5) Ventilator On / Off
 - (6) Cab Floor De-ice on / off
 - (7) Smoke Detector Reset – when smoke alarm on.
 - f. Shall display PCAir status and error messages, including, but not limited to:
 - (1) A graphic representation of the PCAir unit and its major components
 - (2) Status of each compressor
 - (3) Status of each condensing coil
 - (4) Status of each blower motor
 - (5) Status of each condenser fan
 - (6) Status of condensate pump
 - (7) Status of filters
 - (8) Status of PCAir smoke / CO2 alarm
 - (9) Temperature readings – ambient, discharge, temperature probe
 - (10) Pushbutton Setting
 - (11) Any fault or error messages
 - g. Shall display GPU status and error messages, including, but not limited to:
 - (1) A graphic representation of the GPU unit and its major components
 - (2) Status of inverters / IGBT's
 - (3) Status of transformers
 - (4) Status of cooling fans
 - (5) Input voltage
 - (6) Output voltage / amps
 - (7) Output frequency
 - (8) E&F bypass setting
 - (9) Any faults or error messages
17. The manufacturer's proposed Operator Console face plate layout shall be submitted to the Owner for approval.
18. When the OFF/OPERATE/AUTO selector switch is moved from OFF to OPERATE, the HMI screen should come on with an Intro / Logo screen.
- a. This Intro / Logo screen should contain Owner logo and PBB Manufacturer graphics.
 - b. Layout of this screen shall be submitted to the Owner for approval.
 - c. No PBB functions shall be available from this Intro / Logo screen.
19. Once the PBB Power On button is pushed, the HMI function screen should come up so that the Operator can perform functions from the HMI.
20. When the OFF/OPERATE/AUTO selector switch is moved from OPERATE to OFF, the HMI screen should go off.

C. Vertical Drive

- 1. The PBB shall move vertically by means of two lift column assemblies. Each assembly shall be capable of supporting the PBB under full design load, providing 100% redundancy.
- 2. The Contractor may supply either:

- a. a hydraulic vertical drive system, or
 - b. an electromechanical vertical drive system.
3. If a hydraulic vertical drive system is supplied -
- a. The lift cylinders shall be equipped with a safety system to prevent the bridge from descending in the event of fluid loss or other hydraulic system failure,
 - b. Mechanical stops in the cylinders shall be provided to prevent over-travel of the lift column. The system shall not be damaged if the bridge is raised or lowered into the cylinder stops.
 - c. The lift cylinders shall be removable for replacement without the requirement to modify, cut or damage any PBB component.
 - d. The lift cylinders and the entire hydraulic system shall incorporate a bleeder valve to relieve any air entrapment in the system.
 - e. The hydraulic system shall include –
 - (1) SST hydraulic reservoir tank
 - i) All tubing connections shall be welded or high pressure compression fittings.
 - (2) A drain pan to prevent hydraulic fluid from dripping onto the ramp. Drain pan shall be equipped with a drain valve in the bottom of the drain pan.
 - (3) Relief valves to prevent system over pressurization
 - (4) Replaceable Hydraulic Fluid / Water Separator Filter OR Replaceable Desiccant Breather
 - (5) Pressure Gauge
 - (6) Temperature Gauge
 - (7) Fluid Level Gauge
 - (8) Tank and block heaters to keep hydraulic fluid warm in cold weather
 - f. Hydraulic lines that are routed through the cross tube of the wheel bogie shall be protected by a plate on both sides of the wheel bogie cross tube.
 - (1) The Pushbutton mounting plate may be used for this protection of the left side of the wheel bogie cross tube.
 - g. They hydraulic system shall include a key operated emergency release system that will allow the hydraulic system to “bleed down” and let the PBB slowly lower.
4. If an electromechanical vertical drive system is supplied –
- a. Each assembly shall be independent with individual drive systems.
 - b. All motors and bearings shall be sealed, not requiring lubrication.
 - c. Ball screws, bearings and couplings shall have adequate allowance made for lubrication requirements and ball screw inspection.
 - d. The lift column shall have an access panel, accessible from the PBB roof, for inspection and servicing the motor chain and coupling and for access to the ball screw inspection and lubrication hole.
 - (1) Access panel shall meet the requirements of 2.4.F.3.
 - e. Upper column mounting plate shall have a 1-1/2” diameter hole for inspection and lubrication of the ball screw assembly.
 - (1) This opening shall be plugged with a removable plastic threaded plug.
 - (2) Access to this hole shall be gained through the access panel specified in paragraph “d” above.
 - f. A fault detector shall sense differential motion of the lift column assemblies. If a fault is detected,
 - (1) electrical power shall be disconnected from the vertical drives and vertical drive brakes shall be engaged.

- (2) horizontal PBB motion and Cab Rotation shall be disabled.
 - (3) A fault message / alarm shall be displayed on the HMI screen.
- g. Mechanical stops on the ball screws shall be provided to prevent over travel of the lift columns.
- 5. The vertical travel speed shall be 1.5 to 5.0 feet per minute.
- 6. If the vertical drive system includes outriggers for stabilization, the outrigger system shall –
 - a. include a manual retraction method
 - b. include a warning bell that will sound when the outriggers are being extended or retracted.
 - c. include a PBB interlock that prevents the horizontal drive function to operate if the outriggers are extended.

D. Horizontal Drive

- 1. The horizontal drive system shall:
 - a. permit the PBB to extend or retract and rotate to any point within the operational envelope of the PBB
 - b. allow this horizontal movement at variable speeds from 0 to 65 feet per minute.
 - c. allow steering in a varying path while simultaneously extending and retracting the PBB Tunnels.
 - d. shall also be capable allowing the PBB to move in a straight line when required.
- 2. Design and control of the horizontal drive system shall provide smooth starts and stops and positive fail safe braking.
 - a. The brakes shall remain engaged with power removed from the PBB.
- 3. Horizontal drive shall be electro mechanical.
- 4. The horizontal drive shall be equipped with physical stops to prevent the PBB wheels from rotating past 110° to the left and 105° to the right.
- 5. Tires shall be solid, with either an aircraft tire style tread (e.g. straight line) or a smooth tread and shall be designed specifically for the proposed PBB model.
- 6. Grease fittings shall be provided to lubricate the wheel bearings if the wheel bearings are not contained within an oil filled gear box.
 - a. The grease fittings shall be located one (1) on the outward side and one (1) on the inward side of the wheel hub so that grease pumped in through the grease fittings flows outward through the bearings pushing out any water or dirt.
- 7. Grease fittings shall be provided to lubricate the front and back trunnion pins of the wheel bogie assembly.
- 8. The PBB horizontal drive system shall use an AC gear motor, with an integral brake and drive system.
 - a. A variable frequency motor controller shall drive the AC motor.
- 9. The PLC shall provide a variable frequency signal to adjust speeds from 0 feet to 65 feet per minute.

- a. The speed shall be proportional to the depression of the Joy stick.
10. An integral spring-applied electrically released brake shall be provided with the drive motor.
 - a. The brake shall lock the PBB in place when electrical power is disconnected.
 - b. The brake shall also lock when the joystick is in the neutral position.
11. The horizontal drive motor shall be equipped with a manual brake release to permit the PBB to be towed in the event of power failure.
 - a. The brakes shall automatically reset if power is reapplied to the horizontal drive motor.
12. Tow lugs, permanently affixed, shall be provided on the lower wheel frame.
13. Provide positive FRONT – REAR identification for both the front and backsides of the wheel bogie cross tube.
 - a. Such identification shall be clearly readable, via the camera system, by the PBB operator while operating the PBB from the operator control console.
14. All drive chains, drive shafts or couplings shall be protected with guards.
 - a. Guards shall have a hinged access plate, with retaining latch, for servicing chains.
15. All motors and motor bearings shall be sealed, not requiring lubrication.
16. The horizontal drive system shall include a wheel guard system that fully encompasses both wheels and will stop all horizontal motion of the PBB when the wheel guard system is contacted or activated by a person or obstruction on the ramp near the PBB wheels.
 - a. The design of the wheel guard system shall not cause injury or damage to the individual or object contacted.
 - b. The wheel guard system shall be bolted to the lift column cross tube assembly or wheel bogie and shall be easily un-bolted and removed for maintenance purposes.
 - c. Electrical connections for the wheel guard system shall be plug-in type connections. Any and all electrical components shall comply with the requirements of this Specification.
 - d. The wheel guard system shall utilize contact pressure type pads / switches or radar sensing technology that shall run the along the front and back of the wheel guard system.
 - e. If ANY part of the wheel guard system is contacted or activated:
 - (1) The PBB horizontal drive system shall be disabled.
 - (2) An audible alarm shall sound on the operator console
 - (3) A large warning message shall be displayed on the HIM screen stating –

DANGER Wheel Guard Contact / Obstruction DANGER Horizontal Drive Movement STOPPED Identify and Clear Obstruction Before Continuing any PBB Movement or Oper-

- f. Once the wheel guard obstruction has been cleared “Resume Horizontal Drive” box and a large message shall be displayed on the HMI stating:

Wheel Guard Contact / Obstruction CLEARED
Press “Resume Horizontal Drive”
To Continue Operation

- g. The wheel guard system shall not interfere with the normal operation of the PBB or any of the ancillary equipment attached to the PBB, including the PCAir hose basket or reel.
- h. The wheel guard system shall not have any horizontal surfaces greater than three (3) inches. This does not apply to the pressure type pads / switches.

E. Rotunda

- 1. The rotunda assembly shall be designed as the self-supporting terminal end pivot for the PBB's vertical and horizontal motion.
- 2. The rotunda column height shall be determined by the PBB manufacturer as a result of their site survey of the existing PBB foundations and their survey of either the terminal floor height or the existing fixed walkway floor height.
- 3. All new Rotunda base plates shall have
 - a. a #7 bolt hole pattern for 2-1/4" anchor bolts
 - b. a grout installation hole.
 - c. a ground lug shall be provided on the rotunda base plate, near the rotunda column pipe so the PBB can be grounded to the ground wire at the PBB rotunda foundation.
 - d. For those gates that do not have an existing #7 anchor bolt pattern, a "spool" piece shall be incorporated to the standard #7 base plate attached to the rotunda column so that the PBB rotunda can be installed on the existing foundation anchor bolt pattern. **THE CONTRACTOR MUST COMPLETE A SITE SURVEY AT EACH GATE TO DETERMINE WHAT THE EXISTING ANCHOR BOLT PATTERN IS AND WHERE ADAPTOR SPOOLS WILL BE REQUIRED. EXISTING ANCHOR BOLT PATTERNS VARY.**
- 4. The rotunda shall be designed so that there are no physical connections to the Terminal Building that could transmit loads or vibrations to the Terminal Building.
- 5. The rotunda shall include flap type seals to provide weather and bird intrusion protection
 - a. These flap seals shall be between the rotunda and the hinged telescoping tunnel section **AND** at the connections of the Rotunda curtain to the exterior roof of the Rotunda structure.
 - b. These seals shall be both interior and exterior at the top, bottom, left and right sides, and shall comply with NFPA 415 2022 Section 6.3.
 - c. Brush type seals are acceptable on the exterior between the rotunda curtain cover and the rotunda curtain.
 - d. On the exterior, between the rotunda roof and the curtain, a large, flap top seal shall completely cover the gap between the curtain and rotunda roof.
- 6. The Rotunda shall have exterior hinged Rotunda Curtain covers.
 - a. Hinges shall be SST or galvanized

- b. Hinges shall be piano type
 - c. Hinges shall run the full length of the cover.
 - d. SST or galvanized clips or latches shall be provided to secure the hinged covers.
7. The Rotunda Curtains shall have:
- a. galvanized steel slats
 - b. two (2) rows of wire / glass vision windows in each slat of both curtains, centered from top to bottom.
 - c. wind-lock and tabs on the curtain slats.
 - d. stainless steel bottom dome sections that the curtains ride on when rolling-up or un-rolling from the barrel
 - e. stainless steel chains if chains are used to connect the two (2) curtain barrels
8. The rotunda assembly shall swing through a range of 175° total; 87.5° clockwise and 87.5° counterclockwise from the terminal door centerline.
9. The Rotunda roof shall have OSHA Compliant fall protections tie off points for harnesses clevis to be attached to.
- a. These attachment points shall be labeled or identified as tie off points and not lifting point connections.
 - b. Labels or identification must be adjacent to the tie off point and visible through the full operating range of the PBB.
10. If access from the Rotunda roof is required to perform any equipment or component adjustments, servicing, repair or replacement, the Rotunda roof shall have either:
- a. Access panels
 - (1) Access panels shall comply with the requirements of 2.4.F.3.
 - b. A one removable Rotunda roof access cover
 - (1) Cover shall be secured in place using SST lift off hinges and SST Nelson studs with SST nuts.
 - (2) Cover shall be painted per the exterior PBB paint process and color.
11. The rotunda shall utilize a columnar support and be capable of mounting to a foundation utilizing the existing foundation anchor bolt pattern.
- a. The Contractor shall verify the anchor bolt pattern and distance from the face of the terminal building or walkway to the center of the existing anchor bolt pattern.
 - b. The Contractor shall be fully responsible to ensure the new PBB rotunda will install correctly using the existing or new PBB foundation anchor bolts
12. The rotunda bearing shall have a sufficient number of grease fittings, so that all sections of the rotunda bearing can be lubricated, both on the upper and lower sides.
- a. Grease fittings shall be a minimum of 12 in. apart.
13. The rotunda floor shall:
- a. remain stationary regardless of PBB movement.
 - b. remain level at all times.
14. Limits located on the rotunda assembly shall include PBB slope and PBB over-travel swing.
- a. Slope limits shall be adjustable up to 8.33 percent (4.8°) for both up and down slopes. This limit shall be adjustable to meet local operating conditions and re-

quirements.

- b. The over-travel swing limit system shall be adjustable to meet local conditions. When activated, the system shall disable PBB movement in the direction of fault, but allow the PBB to move in the opposite direction.
- c. The over-travel swing limit system shall activate the warning alarm and the warning message display two (2) degrees prior to the activation of the PBB motion-disabling capability of the over-travel swing limit system.

15. Anchor Bolts:

- a. If requested by the Owner, provide plywood or metal template of required spacing and alignment of #7 bolt pattern to be used to align anchor bolts during construction of any new PBB foundations.

F. Rotunda Corridor or Fixed Walkway

1. Corridor:

- a. The rotunda entry corridor shall be a fixed rectangular section attached to the rotunda to provide the internal transition from the rotunda to the terminal door or fixed walkway opening.
- b. The design of the corridor shall allow the installation of interior sheet metal and exterior flexible weather seals and a floor threshold between the corridor and the terminal building or fixed walkway without reliance on the terminal building or fixed walkway to provide any degree of structural support
- c. The Corridor shall be painted with the same interior and exterior paint system as the PBB rotunda.
- d. The size of the Corridor shall be determined by the PBB manufacturer as a result of their site survey to determine the distance from the center of the existing or new PBB foundation to the face of the terminal building, or new fixed walkway.
- e. For the Gate E2 fixed walkway, the contractor shall provide a “neck extension” that matches the width of the existing terminal wall mullions. The “neck extension” must be welded all around. A bolt-on extension will not be acceptable. The contractor must provide submittal drawings to DOA for approval prior to construction.

2. Fixed Walkway Design and Construction:

- a. Length and slope shall be per the Project drawings or these Specifications.
- b. Interior height shall be the same as a PBB “B” tunnel height and width.
- c. All structural loading requirements specified for the PBB shall also apply to the Fixed Walkways.
- d. All interior and exterior finishes specified for the PBB tunnels shall apply to the Fixed Walkways. This includes floor covering, wall covering, paint finishes, ceiling, insulation and lights
- e. There shall be ADA compliant handrails, full length, on both sides of the Fixed Walkways.
- f. Fall protection cables, as specified for the PBB “B” tunnels shall be supplied for the entire length of the Fixed Walkway.
- g. All electrical power, control and communication circuits required to route the same from the PBB rotunda or the terminal building face shall be in conduit under the Fixed Walkway. Cable trays or wire racks are not acceptable.
- h. The design of the rotunda corridor or new Fixed Walkway shall allow the installation of flexible weather seals and a floor threshold to the face of the terminal building (where there is no Fixed Walkway) or to the Fixed Walkway without reli-

ance on the terminal or fixed walkway to provide any degree of structural support.

3. Fixed Walkways shall be rectangular in cross section and constructed in the same manner as the PBB tunnels.
 - a. Fixed Walkways shall be PBB “B” tunnel width and height.
4. Sheet metal interior flashing shall be installed between the rotunda corridor or existing Fixed Walkway and the terminal building or between the rotunda corridor and the existing Fixed Walkway.
 - a. Sheet metal shall be galvanized or galvanealed.
 - b. Interior flashing shall only be attached to the terminal door frame and not the PBB rotunda corridor or Fixed Walkway at the terminal building or attached to the Fixed Walkway and not the rotunda corridor at the existing Fixed Walkways.
 - c. Flashing shall be painted to match the interior paint of the PBB.
 - d. Felt backing shall be installed on flashing to protect the surfaces of the terminal building or Fixed Walkway from damage caused by the movement of the flashing.
5. Exterior flashing shall be installed between the rotunda corridor or Fixed Walkway and the terminal building or Fixed Walkway.
 - a. The flashing material shall meet the requirements of NFPA 415 2022, Section 6.3 and 6.4.10.
 - b. Flashing shall be a watertight seal.
6. The Fixed Walkway shall utilize one columnar support and one haunch support from the PBB Rotunda Column.
7. The Fixed walkway shall have a lighted EXIT sign mounted on the ceiling at the terminal end of the walkway.

G. PBB Tunnels

1. All tunnels shall be rectangular in cross section and constructed from corrugated or “C” type steel panels
 - a. If the tunnels are constructed using a “C” type steel panel and the seams between the panels are not fully welded
 - (1) The seams shall be sealed prior to painting.
2. Minimum interior clear dimensions for the tunnel sections are as follows:
 - a. Minimum Floor Width 4’ – 6” (1372 mm)
 - b. Minimum Interior Height 6’ – 11” (2110mm)
3. A transition ramp shall accommodate the difference in elevation where telescoping tunnel sections overlap.
 - a. The transition ramp(s) shall meet a slope of 1:20 when the PBB is level.
 - b. The transition ramp shall have a safety yellow strip running the full width of the ramp nosing. The yellow strip must be durable and withstand the wear of passenger and roller bag traffic.
 - c. The Transition ramp nosing shall be designed to provide a smooth, even, unobstructed walking surface area, from the tunnel floor to the ramp.
 - d. The transition ramp shall be hinged, with a SST “piano” style hinge or an

- integrated “finger” system that allows for free movement of the ramp when the PBB is moved vertically or horizontally.
- e. The transition ramp shall be designed and installed so that the ramp does not mark or wear the PBB tunnel carpet when the PBB is extended or retracted.
4. Access panels required for tunnel roller adjustments shall meet the requirements of 2.4.F.3.
 - a. Panels shall have a rubber gasket to prevent water intrusion.
 5. If the tunnels utilize interior rain gutters in the B and C tunnels, they shall be continuous aluminum extrusion, yellow rubber rain gutters or other Owner approved design.
 - a. If aluminum extrusion gutters are supplied:
 - (1) yellow / black safety tape shall be installed full length of the gutters
 - b. If yellow rubber rain gutters are supplied, the following installation requirements shall apply.
 - (1) Both the tunnel metal floor surface as well as the rubber gutter material shall be cleaned with Methyl Ethyl Ketone (MEK) and allowed to dry.
 - (2) 3M 1099 Adhesive or Owner approved equal shall be applied to both the tunnel metal floor and rubber gutter material.
 - (3) The rubber gutter shall be placed on the tunnel metal floor and rolled smooth to ensure an even coating of adhesive on both surfaces.
 - (4) The rubber gutter material shall then be removed to allow the adhesive to dry on both surfaces.
 - (5) Once the adhesive is dry the rubber gutter material shall be placed back on the tunnel metal floor and rolled smooth to ensure a proper bond.
 6. The rain gutter diverters from A to B and B to C tunnel shall be free of obstructions that prevent the free flow of water and debris
 - a. Diverters shall have a stainless steel cover that is removable, retained by SST 3/16 or 1/4 in. bolts and SST rev-nuts or SST nut-certs, for cleaning and to prevent passengers from stepping into the drain hole.
 7. The Tunnels shall include exterior flap type seals to provide weather and fire protection between the A tunnel and the Rotunda and B Tunnel and between the B Tunnel and the C Tunnel.
 - a. Seals shall be installed on both ends of the A tunnel and the Cab end of the B Tunnel.
 - b. Seals shall prevent rain, snow, wind, air or light infiltration from penetrating the interior of the PBB rotunda or PBB tunnels.
 - c. Seals shall be installed on the sides, top and bottom of the tunnels
 - d. Seals shall be constructed of one (1) layer EPDM rubber and one (1) layer alpha fire material.
 - e. Alpha fire material shall be exposed to the exterior.
 8. When the PBB is in the positive slope condition, e.g. the Tunnels are raised above the level position of the rotunda floor elevation, water shall not leak into the Rotunda area from the exterior seals surrounding the entrance/connection of the A-Tunnel into the Rotunda.
 - a. Water diverters shall be added on the A-Tunnel roof to prevent rain water from running back into the Rotunda.
 - b. Water diverters shall be welded on prior to the tunnel being prepped and painted.

9. The tunnels shall have interior fire seals, top rain gutter water diverter blocks, interior rain water diverters and underside rubber splash diverters.
10. All seals, both interior and exterior, shall comply with NFPA 415 2022 Section 6.3 and 6.4.10
11. The tunnel ceilings shall be insulated the full width and length of the ceilings, including above and beside the lighting fixtures.
 - a. If insulation cannot be installed above the lights, a corrosion resistance coating, in addition to any interior tunnel paint, shall be applied to the tunnel roof before the light fixture is installed.
 - b. The tunnel ceiling shall be fully insulated to have a minimum R-value of 7.5.
 - c. The tunnel wall shall be fully insulated to have a minimum R-value of 8.5.
12. The PBB C Tunnel shall contain a PCAir pre-cool supply air plenum to deliver pre-conditioned air into the PBB in an efficient and unobtrusive manner.
 - a. Excessive air velocity or condensation into the PBB shall not be allowed.
 - b. The plenum shall be constructed with double aluminum panels and 1 in. foam insulation between the panels to keep moisture from causing rust on the exterior or interior metal surfaces of the plenum.
 - c. Plenum shall be painted to exterior color of the PBB.
 - d. There shall be a means to allow condensate to drain from the bottom of the plenum.
 - e. The interior of the supply air plenum shall be covered with an aluminum vent / grill, matching the interior finishes of the PBB.
 - f. The PCAir pre-cool plenum shall be placed as close as possible to the Cab Bubble end of the C Tunnel on the right side.
 - g. It is understood that at PBB full retraction, the PCAir pre-cool plenum may be blocked by the overlapping B Tunnel.
13. The A and B tunnels and the portion of the C tunnel not covered by handrails shall be equipped with OSHA compliant SST fall protection cables capable of supporting two (2) individuals, with each individual weighing up to 300 lbs.
 - a. There shall be 2 SST cables – one on either side of the PBB tunnel center line.
 - b. There shall be enough clearance between the SST cable and the PBB tunnel roof to allow the fall protection harness's clevis to slide easily along the cable.
 - c. The location of the SST fall protection cables shall be located far enough above the roof of the PBB tunnels to prevent interference with any water diverters mounted on the tunnel roof.
 - d. The mounting brackets and ALL hardware, used to attach, or otherwise used by the SST fall protection cables or system shall be SST.
 - e. Brackets shall not damage exterior tunnel weather seals or become damaged themselves when PBB is fully retracted.
 - f. A 24 to 30 in. wide area of anti-skid material shall be incorporated into the PBB roof paint system.
 - (1) This Anti-skid material shall be installed the full length of the SST fall protection cables, adjacent to the cables.
14. The C tunnel shall be equipped with galvanized roof top hand rails.

- a. Handrails shall be OSHA 1910.23(c)(1) compliant and shall be installed from the PBB Cab Bubble roof to a minimum of five (5) feet beyond the lift columns on the “B” tunnel end of the C tunnel.
 - b. An OSHA compliant opening, protected by a swing gate shall be provided for access to the Cab Bubble roof and the B Tunnel end of the C tunnel.
 - c. Cab Bubble roof handrail section shall extend far enough forward so that the Cab Roof bearing can be serviced from inside the handrail area.
 - d. An OSHA compliant toe rail shall be supplied for the full perimeter and in all sections of the handrail.
 - (1) The toe rail section in the Cab Bubble area may have to be raised up to provide clearance for the rotation of the cab support rods.
 - e. The top rail of the handrail shall be continuous past the lift columns.
15. Provide adjustable tunnel ice scrapers, installed on the tunnel ends, that ride on A and B tunnel rails. Must be adjustable for 0 to ¼ inches. Ice scrapers shall NOT be part of the tunnel roller.
16. GPU cable hoist mounting.
- a. GPU cable hoist(s) shall be mounted on the PBB C tunnel, forward of the lift columns.

H. PBB Cab

1. The PBB Cab shall rotate 125°; 92.5° counter clockwise and 32.5° clockwise from the tunnel centerline.
2. The PBB Cab shall rotate at a speed of 0° to 145°/min (2.41°/sec).
 - a. Limit switches or sensors and physical hard stops shall prevent over-rotation of the Cab.
 - b. Cab rotation shall be disabled when the PBB is in the Auto Level mode or the Canopy is deployed.
 - c. Cab rotation shall be controlled by a Variable Frequency Drive (VFD).
 - d. Cab rotation drive chain shall be SST.
 - e. If the idler chain sprockets are not sealed, the sprocket bearings shall have a grease fitting to lubricate the bearing and shaft.
3. An aircraft spacer shall be located at the aircraft end of the Cab floor
 - a. The spacer shall span the full width of the Cab floor.
 - b. The spacer material shall be an E.P.D.M or other suitable polymer and have passed the fire test specifications of NFPA-415.
 - c. The spacer material must be sufficiently flexible and non-abrasive to prevent scratching or other damage to the aircraft fuselage.
 - d. The aircraft spacer shall be yellow and the contact surface with the aircraft shall be flat and the contact surface with the aircraft shall be a minimum of five (5) inches.
4. Cab shall have an Adjustable Cab Floor (ACF), which shall:
 - a. be self-leveling regardless of PBB slope and cab orientation to the aircraft.
 - b. provide a surface that parallels the centerline of the aircraft fuselage such that passengers transiting between the PBB and the aircraft step onto a level surface.
 - c. level automatically and shall also be adjustable by means of a manual operate override.

- d. shall utilize a piano style hinge
 - (1) minimum 1-1/2 in x 1-1/2 in x 1/8 in
 - (2) continuous the full length of hinged area
 - (3) SST or coated for corrosion protection.
- 5. The exterior cab floor shall have a cab floor heat system
 - a. There shall be a manual control switch on the HMI to turn the cab floor heat On / Off, and indicator light located on the HMI.
 - b. Floor heat system shall be thermostatically controlled and the thermostat shall be adjustable.
 - c. Floor heat circuit shall be protected with a GFIC breaker.
- 6. The area of the Cab where the Operator stands shall have windows for operator visibility.
 - a. The windows shall be located in front, left and right of the operator.
 - b. Glass in the front and right shall be safety glass.
 - c. Glass in the left shall be wire reinforced glass.
 - d. A tinting shall be applied to each window to minimize glare but shall not limit visibility.
- 7. Weather doors shall be provided adjacent to the console to seal and secure the interior when the PBB is not in use.
 - a. These doors shall be swinging double doors that open inward and can be latched closed.
 - b. The latch mechanism shall be a SST sliding rod that latches the door closed to the door frame.
 - (1) A foot operated door latch shall not be allowed.
 - (2) A door to door latch shall not be allowed.
 - c. The door shall also have a hold open mechanism mounted between the top of the cab swing door and the door frame.
 - d. The clear width of the weather doors when open shall be a minimum of 43".
 - e. The doors shall have full length window centered vertically (approximately 1 ft. down from top and 1 ft. up from bottom) and horizontally in the door.
- 8. Provide a metal cab safety chain installed forward of the cab weather doors with red plastic sleeve.
- 9. The Cab Curtains shall have:
 - a. galvanized steel curtain slats.
 - b. two (2) wire glass vision windows per panel.
 - c. windows in the right cab curtain located 30" up from the floor.
 - d. windows in the left cab curtain located 30" down from the ceiling.
 - e. wind-lock and tabs on the curtain slats.
 - f. a stainless steel bottom dome sections that the curtains ride on when rolling-up or un-rolling from the barrel
 - g. stainless steel chains if chains are used to connect the two (2) curtain barrels
- 10. The Cab shall include flap type seals to provide weather protection between the Cab structure and the Cab Curtain.
 - a. The seals shall be both interior and exterior
 - b. The seals shall comply with NFPA 415 2022 Section 6.3 and 6.4.10.

- c. Brush type seals are acceptable on the exterior.
 - d. Interior seals shall
 - (1) be EPDM Rubber
 - (2) run the full length of cab curtain – floor to ceiling,
 - (3) be folded over / doubled to make a flap
11. The Cab shall have exterior hinged Cab Curtain covers.
- a. Hinges shall be SST or galvanized
 - b. Hinges shall be piano type
 - c. Hinges shall run the full length of the cover.
 - d. SST or galvanized clips or latches shall be provided to secure the hinged covers
12. The Cab shall be equipped with an adjustable type aircraft closure (canopy) to “seat” the Cab against the aircraft fuselage and surround the opening between the Cab and the aircraft.
- a. The aircraft closure must conform to the contours of the aircraft types specified in the Aircraft Mix and provide a reasonably tight weather seal.
 - b. The aircraft closure shall be compliant with the specifications outlined in Chapter 6 of NFPA Latest Edition.
 - c. The aircraft closure covering will not absorb water, shall be highly tear resistant, and remains flexible from -31°F (-35°C) to 127°F (52.8°C).
 - d. The canopy frame structure shall be an A-300 structure.
 - e. If RJ aircraft are in the Specified aircraft mix, the canopy frame and system shall be able to be used for the CRJ and ERJ aircraft.
 - f. If the canopy frame members would be exposed to the interior of the cab, an inner liner shall cover the canopy frame members.
 - g. The aircraft closure color shall be gray.
 - h. The aircraft closure shall be a deployable and retractable bellows type canopy and when deployed against the aircraft, the aircraft closure system shall be designed to maintain a slight pressure and seal against the aircraft fuselage.
 - i. If the aircraft closure is mechanically actuated:
 - (1) The outer canopy assembly shall have 3 top support straps, located at the: Left side, center and right side.
 - i) These straps shall be part of the canopy material and shall be fasten at one end to the cab wall frame and the other end attached to the front of the canopy.
 - (2) Pressure sensitive switches shall be incorporated into the closure mechanisms to prevent excessive pressure on the aircraft.
 - (3) Covers (i.e. fiberglass) shall be installed to conceal the canopy mechanism and switches. Covers shall be installed using:
 - i) factory pre-drilled mounting holes in the cover
 - ii) 1 in. wide x 1/8 in. thick stainless or aluminum bar the full length of the cover with factory pre-drilled holes to match the pre-drilled holes in the cover.
 - iii) Hex head 3/16 in. or 1/4 in. SST bolts and SST rev-nuts or SST nut-certs.
 - iv) Mounting holes in PBB cab wall shall be factory pre-drilled to match cover and 1 in. bar.
 - j. The canopy material contacting the aircraft shall be a soft material to prevent scratching or damage to the aircraft skin.
 - k. The sections of the canopy material that contact the aircraft shall be segmented for easy replacement.
 - l. The outer layer shall be a weather and UV resistant material with seams sealed

- to prevent water from leaking into the inner layer of material.
- m. All contact points of the canopy (canopy pads) shall be attached to the main canopy structure using Velcro fasteners.
 - n. There shall be an A-300 type Canopy Hood Cover to protect the retracted canopy material from being affected from heavy snow or rain.
 - (1) This cover may be a permanent part of the cab structure or may be a removable hood cover for shipping and/or fabric replacement.
 - (2) This cover shall be painted the same color as the exterior of the PBB.
13. The PBB Cab for the PBB's at Gates D2, D6, D8, D10, D11 shall incorporate the required features in the aircraft closure, auto level, Cab bumper and Cab floor necessary for the PBB to dock to the ERJ 135/145 with a swing door and a CRJ 200/700/900 with fold down door, handrails down.
- a. If any parts of the Cab floor require actuation such as extending, opening, etc. to dock to the ERJ or CRJ, such actuation must be controlled at the Operator Control console.
 - b. The PBB Cab shall be equipped with moveable OSHA compliant hand rails to guide passengers to the ERJ / CRJ aircraft door opening and prevent passengers from getting to areas of the PBB Cab where there may be gaps between the aircraft and the Cab aircraft spacer.
 - (1) Handrails shall be painted Safety Yellow.
14. The Cab roof bearing shall be able to be lubricated via a grease fitting.
- a. The bearing bracket shall be designed to prevent the bearings from being pulled or pushed out of the bracket.
15. The Cab bubble roof shall have OSHA compliant fall protections tie off points for harnesses clevis to be attached to.
- a. These attachment points shall be labeled or identified as tie off points and not lifting point connections.
 - (1) Labels or identification must be adjacent to the tie off point and visible through the full operating range of the PBB.
 - b. All attachment hardware, brackets and fasteners shall be SST.
16. There shall be two (2) OSHA compliant fall protection tie off points on the exterior cab wall.
- a. Exterior cab wall is the wall that contains the cab swing doors.
 - b. One on the left and one on the right.
 - c. Labels or identification must be adjacent to the tie off point
 - d. All attachment hardware, brackets and fasteners shall be SST.
17. All sections of square tubing, boxed sections, areas that can hold water or are used as structural support for the cab bubble and cab floor, shall have a 1/4" drain hole in the underside of the tube.
- I. Service Door, Landing, Stairs
- 1. The service stairs shall face the terminal building and shall not interfere with any auxiliary equipment mounted on the side of the PBB.
 - 2. The PBB shall have a caged, OSHA compliant, roof access ladder, which shall be

- accessed from the Service Stair Platform.
3. The roof access ladder, cage and roof handrails shall be hot-dipped galvanized.
 - a. They shall be free of any sharp edges or excess galvanizing material
 - b. Uneven or dull finished galvanized coating shall not be acceptable.
 4. A service door, landing and stair leading to the apron area constitute the service access.
 5. The service access shall be located on the right hand side of the cab end of the PBB.
 6. The service access door shall be fully accessible, from both inside the PBB and from the service landing, in all possible extend / retract conditions of the PBB.
 - a. The transition from the service landing, through the service door to the PBB interior shall be smooth and flat, free of any step or ledge between the PBB interior floor and the service landing.
 - b. A latch shall be provided to hold the service door open and shall be located on the service platform railing a minimum of twenty-four (24) in. above the service platform.
 - (1) The latch shall be bolted to the middle hand rail of the service platform.
 - (2) The latch shall be a McMaster-Carr 1407A5 latch or Owner approved equal.
 - c. The service door shall:
 - (1) be steel, hollow core
 - (2) have a 20" x 29" minimum wire glass window
 - i) The wire glass window shall be securely captured within the door so it will not move or shift with PBB movement.
 - (3) meet or exceeds the 3/4-hour fire rating per ASTM E152
 - (4) be a minimum of 2'-6" wide and 6'-8" high.
 - (5) be equipped with medium-duty commercial-type hardware and automatic door closure.
 - (6) have heavy duty, stainless steel hinges / pins.
 - (7) open outward onto the landing.
 - (8) be equipped with Simplex Model EE-1021B 5-push button, double punch combination lock, with Best Lock core and key override on the outside of the service door.
 - (9) have a 32" stainless steel kick plate on both sides of the door.
 - d. The service door frame shall have 1/4" water drain holes at the bottom / underside of the tubing frame to allow condensate water to drain out.
 7. The service stair platform shall be constructed of hot-dipped galvanized steel, with a metal Deckspan / Gripstrut walking surface and shall:
 - a. have a one-piece galvanized modesty plate installed under the platform Deckspan / Gripstrut or the apron side of the landing frame.
 - (1) If the modesty plate is attached to the apron side of the landing frame, it shall be bolted, not screwed, directly to the apron side of the landing frame and NOT be bolted to the Deckspan / Gripstrut.
 - (2) Attachment bolts, washers, nuts shall not be on the platform walking surface.
 - b. be protected on the open sides by SST steel handrails and toe rails that are designed to meet OSHA standards.
 - (1) The hand rail at the outer edge of the platform shall be equipped with a baggage transfer opening, at the center railing area, to afford use of a baggage slide or baggage transfer ramp operations.

- (2) The opening shall be protected with a galvanized chain secured on one end and detachable on the other end.
 - (3) The top hand rail section and bottom toe rail section of the opening must remain.
 - c. be equipped with an additional support arm bracket, (bolted) installed from the cab beam to the main platform tube galvanized support bracket.
 - (1) This support is to add additional support to the platform for installation of baggage slide system etc.
 - (2) This shall be a requirement even if the Project does not include the supply of a bag slide.
 - d. All sections of square tubing used as structural support for service platform and bag slide shall have a 1/4" drain hole in the underside of the tube
- 8. The service stair shall be equipped with self-adjusting risers and tread, of a metal Deckspan / Gripstrut, with a serrated edge for a gripping surface.
 - a. All steps shall have an equal rise. The tread width shall be 28" (711 mm) and the maximum tread rise is 9 1/2" (241 mm).
 - b. Treads shall remain level with the ramp regardless of the height of the PBB.
 - c. Length of the service stairs shall be determined by the Contractor and shall meet the inclination requirements of OSHA 1910. 24 when the PBB is in the highest position to service the specified aircraft mix.
 - d. The service stair shall be equipped with galvanized handrails on each side that comply with OSHA standards for handrails located at stairs.
 - e. The entire service stair assembly shall be galvanized.
 - f. The service stair shall be accessible to ramp service personnel at all operational heights and positions of the PBB.
 - g. Service Stair bolting bracket/tubes at the attachment points of the Service Stairs to the Service Platform (i.e. 4 bolts) shall have 1/8" to 3/16" dia. holes drilled for provisions to grease the attachment bolted connection.
 - h. The service stair wheels shall have grease fittings in wheel axel and swivel bearing. The wheel tread shall be designed with a tread to minimize wear. The stair wheels shall be designed to accommodate the additional weight of the Baggage Slide.
- 9. Contractor shall supply a gate check baggage slide mounted to the PBB landing and service stairs.
 - a. Baggage slide shall be specified and approved by the Owner.
 - b. Baggage slide shall include the necessary additional supports
 - (1) under the service landing
 - (2) at the bottom of the service stairs for the extended wheel caster mounting bracket.
 - c. Baggage slide shall be the full length of the service stairs.
- J. Architectural Requirements
 - 1. Fixed Walkway: All the requirements listed below for the PBB tunnels, shall apply to the new fixed Walkways
 - 2. Ceiling:

- a. The ceiling in the Rotunda, Tunnels, Cab Bubble and Cab shall be plank type ceiling panel design or pre-painted, galvanized steel sheets painted per color approved by the Owner.
 - b. If the painted steel sheet system is used, it must allow for compliance to the Rotunda, Tunnel and Cab Bubble light fixture requirements in paragraph 2.7.A.2.c.
 - c. If a plank type ceiling system is supplied, the panels shall be approximately 8" wide with a 3/4" in space between panels.
 - (1) Planks shall be perpendicular to the centerline and continuously from wall to wall.
 - (2) Planks located at the ends of light fixtures shall have a finish color that matches the ceiling light fixture trim.
 - d. Aluminum corner molding shall be supplied between the ceiling and the wall panels.
 - (1) If this molding has a filler, the color shall match the color of the trim around the lights and the trim in the wall panel hat sections.
 - e. Insulation:
 - (1) Plank type ceilings in the Tunnels, Rotunda, Cab Bubble and Cab
 - i) shall be insulated with fire resistant fiberglass insulation thick enough to meet the required minimum R-values listed above.
 - (2) Steel sheet ceilings in the Tunnels, Rotunda, Cab Bubble and Cab
 - i) shall be insulated with fire resistant fiberglass insulation thick enough to meet the required minimum R-values listed above.
 - (3) Insulation shall provide full coverage left to right side and shall fit tightly against light fixtures
3. Paint specification
- a. Interior – Exposed to passengers –
 - (1) Carbon steel surfaces shall be mechanically cleaned per requirements of SSPC and paint manufacturers requirements.
 - (2) Galvanized steel surfaces shall be cleaned with solvent.
 - (3) Paint shall be a two (2) coat system with rust inhibiting epoxy primer and polyurethane top-coat.
 - (4) The Owner shall choose interior paint color from the standard colors available from the PBB manufacturer.
 - b. Interior – Not exposed to passengers –
 - (1) Carbon steel surfaces shall be mechanically cleaned per requirements of SSPC and paint manufacturers requirements.
 - (2) Galvanized steel surfaces shall be cleaned with solvent.
 - (3) Paint shall be one coat of rust inhibiting epoxy primer.
 - c. Interior – Tunnel roof area where tunnel light fixtures are installed.
 - (1) The entire area of the PBB tunnel roof area that comes in contact with the light fixture shall be primed with a rust inhibitor primer that will prevent the formation of condensation.
 - d. Exterior –
 - (1) Carbon steel surfaces shall be mechanically cleaned per requirements of SSPC and paint manufacturers requirements.
 - (2) Galvanized steel surfaces shall be cleaned with solvent.
 - (3) Paint shall be a three (3) coat system:
 - (4) Primer
 - i) a rust inhibiting organic zinc epoxy primer containing NO OSHA or EPA reportable heavy metals.
 - ii) The primer shall provide corrosion protection comparable to that of chro-

- mate primers.
- (5) Second Coat
 - i) Shall be a rust inhibiting high build Epoxy primer.
 - ii) This coat should be tinted to contrast slightly with the finish coat to assist in achieving a full coat on the final application.
 - iii) If a flexible latex mastic coating is applied to the roof, a second coat on the roof shall not be required.
- (6) Finish Coat
 - i) Shall be a high solids, two component, aliphatic acrylic Polyurethane coating.
 - ii) The Owner shall choose exterior paint color from the standard colors available from the PBB manufacturer.
- (7) Exterior paint system MUST be submitted to the Owner for review and approval.
- e. Tunnel end caps shall be painted to match the Owner selected interior paint color.
- f. Interior of the PBB Cab area (e.g. outside the cab weather doors) shall be painted the same color as the PBB interior color.
 - (1) This includes ALL surfaces in this area, including canopy actuator covers and other components.
- g. Metal parts bolted to the PBB or any other loose components.
 - (1) These loose parts shall be painted per the same exterior paint process specified in Item “d” above
 - (2) Color shall match the exterior color of the PBB.
 - (3) Alternatively, these loose parts can be galvanized and then etched primed with an epoxy primer and top coated with polyurethane. Top coat color shall match the selected finish coat color of the PBB tunnels.
 - (4) Alternatively, these loose parts can be blasted, cleaned, primed with a zinc epoxy primer and powder coated with Polyester top coat. Powder coat color shall match the selected finish coat color of the PBB tunnels.
 - (5) Aluminum parts shall be cleaned and painted with top coat per item (3) or (4) above. Color shall match the exterior color of the PBB tunnels.
- 4. Tunnel Wall Treatments,
 - a. The interior tunnel wall treatment shall consist of floor to ceiling high rigid panels faced with velvet finish laminated plastic panels by “Wilson Art” or Owner approved equivalent.
 - b. The panels will be 1/2 in. thick fire retardant, high pressure laminated plastic.
 - c. The panels shall be a minimum of 3.5 ft. to a maximum of 5.5 ft. on center
 - d. The panels shall be supported by clear anodized aluminum trim with a black plastic accent strip.
 - e. The design shall permit each panel to be removed individually.
 - f. The toe rail spacer used in the B and C tunnels between the bottom of the wall board and the bottom roller rail shall
 - (1) have a 3/16 to 1/4 in. gap between the toe rail spacer and the bottom roller
 - (2) have other suitable means for water to drain from behind the toe rail spacer.
 - (3) be aluminum, SST or steel with a multi-coat rust preventative paint system.
- 5. Wall treatments in the pivoting sections (rotunda and cab) shall consist of galvanized, steel- slat curtains.
 - a. The Rotunda and Cab Curtains shall have passed the fire test and meet the

requirements of NFPA 415 2022, paragraph 6.2.8 and 6.4.8.

6. Flooring
 - a. Rotunda, Walkways and Tunnels –
 - (1) ¾" Marine Grade Plywood or Metal subfloor
 - (2) Marine Grade plywood shall conform to the requirements of BS 1088.
 - (3) Wall to wall carpet, as specified by the Owner.
 - (4) A radiused 4" wide diamond threshold plate shall be used between the circular rotunda floor and the floor to the PBB "A" tunnel
 - (5) No carpet pound down shall be required around the circumference of the rotunda floor.
 - (6) If a diamond threshold plate is not used in the rotunda,
 - i) carpet pound down shall be installed around the circumference of the rotunda floor.
 - (7) If there is a wide, hinged diamond threshold plate between rotunda floor and the A tunnel floor,
 - i) carpet shall be installed on this plate, covering the full width of the plate as close to the A tunnel wall as possible.
 - b. If a "C" pan metal sub floor is supplied,
 - (2) The PBB manufacturer shall ensure the floor is level and flat. The floor shall contain no dips or bumps. Any uneven surface will be repaired to the engineer's approval at the PBB manufacturer's expense prior to leaving the manufacturing facility.
 - c. Transition Ramps –
 - (1) 1-1/2 in Marine Grade Plywood or 10-gauge sheet steel subfloor
 - (2) Marine Grade Plywood shall conform to the requirements of BS 1088
 - (3) Wall to wall carpet as specified by the Owner
 - (4) Carpet shall be extended from PBB tunnel over transition ramp hinge in one piece to cover transition ramp.
 - d. Cab Bubble –
 - (1) ¾" Marine Grade Plywood or Metal sub floor
 - (2) Marine Grade Plywood shall conform to the requirements of BS 1088
 - (3) Any subfloor system used in the cab bubble shall have been tested or shall be certified to meet the burn test requirements of NFPA 415 2022 Section 6.4.6.
 - (4) Minimum 1/4 in. thick black ribbed rubber floor covering.
 - (5) A radiused 4" wide diamond threshold plate shall be used between the cab bubble floor and cab floor
 - (6) No carpet pound down shall be required around the circumference of the cab bubble floor.
 - e. Cab Exterior - Metal subfloor with 1/4 in. minimum thick black ribbed rubber floor covering
 - f. For marine grade plywood used as subfloor -
 - (1) Marine grade plywood shall comply with BS 1088. Documentation that plywood supplied complies with BS100 shall be submitted for Owner's review and approval.
 - (2) each wood piece shall be sealed a minimum of 3 in. from all edges with a fiberglass marine resin.
 - (3) All plywood floor seams and fastener holes shall be filled and sanded smooth
 - (4) Seams in plywood sub floor shall be staggered and shall not run the full width of the PBB Tunnel or Walkway.
 - (5) All seams shall be filled, blended and sanded smooth.

- (6) Any screws used to attach subfloor that protrude through metal panels of Tunnels, Walkways, Rotunda or Cab, shall be trimmed off and painted.
- g. Carpet:
 - (1) Carpet bars shall be attached with screws or rivets
 - (2) Carpet shall be installed at the PBB Manufacturer's factory before shipment.
 - (3) Predominant lines shall not run parallel to tunnel or walkway centerline.
 - (4) Provide specific carpet manufacturer's lifetime warranties for carpet and backing. Warranties shall be from the carpet manufacturer directly to the Owner and shall be specific to this Project.
 - (5) Install carpet with manufacturer's recommended, Low-VOC, outdoor adhesive suitable for use.
 - (6) Submit color selection samples, carpet product data, adhesive technical data sheet and installation drawing for Owner's review and approval.
- 7. Tunnel, Walkway, Corridor Handrails
 - a. Handrails shall meet the requirements of ADA Section 505.
 - b. SST or brushed aluminum handrails shall be provided the full length and on both sides of the A Tunnel, Walkway and Extended Corridors.
 - c. SST or brushed aluminum handrails shall be provided at the A to B and B to C tunnel transition ramps, both sides.
 - d. The handrails in the ramp area shall run the full length of the transition ramp.
 - e. Handrails shorter than the length of the floor transition ramp shall not be accepted.
 - f. Handrails shall be curved toward the walls, capped and tight against the wall to prevent snagging by passenger clothing and luggage.
 - g. Handrails shall terminate within one (1) inch of the Tunnel or Walkway end cap.
 - h. Handrail mounting brackets shall be located –
 - (1) within six (6) inches of each end of the handrails
 - (2) in the center of each Tunnel or Walkway wallboard.
- 8. Architectural Exterior and Interior Finishes.
 - a. The architectural interior finishes for the PBB's and new fixed walkways shall be the Owner's standard, as follows.
 - (1) Exterior paint color – RAL 7044 – Seidengrau (Silk Grey)
 - (2) Interior metal surface – color shall match Wall Panels
 - (3) Wall Panels – Wilsonart White 1570-60
 - (4) Ceiling tiles – RAL 7038 – Agate Grey
 - (5) Tunnel A, B, C floors – Carpet: Shaw Broadloom – Dawn 60764 – Fitness AM (Color # 89549)
 - (6) Fixed and Rotating Cab – Black Ribbed Rubber
 - (7) All interior light switches and outlets shall be SST.

2.8 ACCESSORIES

A. Ventilator:

- 1. The PBB shall have a 3,000 CFM roof mounted ventilator mounted in the PBB Rotunda roof.
- 2. The ventilator shall have a seal between the rotunda ceiling panels and the ventilator

- intake so air and other material from above the ceiling are not drawn into the ventilator.
3. The ventilator shall be designed and installed so that it does not limit the retraction of the PBB.
 4. The ventilator shall be equipped with a removable cover and a back draft damper assembly.
 5. The ventilator shall be on when the PCAir Pre-cool function is operating.
 6. If the PCAir Pre-cool function is NOT operating, the ventilator shall be thermostatically controlled
 7. There shall also be a ventilator on/off control on the HMI at the PBB operator console.
 8. The thermostat shall be located in the rotunda end of the A tunnel or Rotunda Corridor, left hand side. Thermostat shall -
 - a. be standard rheostat, non-digital and non- battery operated
 - b. be fully adjustable.
 - c. be designed so that it is unaffected by the movement of the PBB.
 - d. have a clear Lexan lockable cover.
 9. The ventilator shall be linked to the smoke detector located in the PBB Cab Bubble
 - a. Shall automatically shut down in the event of a fire emergency as per the requirements of NFPA 415 2022 Section 6.2.5.
 10. Ventilator shall have a power disconnect switch in the fan housing.
- B. A-Frame and Tow Bar:
1. The Contractor shall supply one (1) "A" frame and one (1) PBB "A" frame tow bar for this Project.
 2. The "A" frame:
 - a. will be used for PBB maintenance activities, such as changing PBB tires.
 - b. shall have wheels for ease of transport.
 - c. shall have a tow bar bracket so that the tow bar can be attached to the "A" frame.
 - d. shall have fork truck brackets so that the "A" frame can be transported with a fork tuck.
 - e. shall be painted Safety Yellow
 3. The tow bar shall
 - a. attach to the "A" frame so the "A" frame can be towed.
 - b. attach to the lugs on the PBB horizontal drive for towing the PBB in the event of loss of power.
 - c. be painted Safety Yellow.
- C. Gate Sign.

1. Supply new triangular lighted gate sign.

2. Light in gate sign shall be LED.
3. Each side shall be a minimum of 42 in. wide and a minimum 30 in. tall.
4. Location shall be on the right side of the rotating cab
5. Sign shall be mounted on a post:
 - a. bottom of the sign shall be a minimum of 2' – 2" above the cab roof.
 - b. Post mounting bracket shall be welded, not bolted, to the PBB Cab frame.
 - c. Mounting Bracket shall be installed at the factory prior to blast and paint.
6. Lenses shall be 24" with white letters on black background.
 - a. Character Font shall be Swiss 721 Heavy Bt.
7. Gate sign frame shall
 - a. be galvanized, smooth, even finish.
 - b. have water drain holes drilled in any square tubing frame members
8. Bottom plate of gate sign shall have a drain hole to allow water to escape.

D. Brackets for Equipment Mounting:

1. Provide factory mounting brackets for 400Hz GPU, GPU Cable Hoist(s) and PCAir unit.
2. The contractor shall coordinate with the equipment manufacturer for specific hardware style and size to be used for reinstalling PCA, GPU and accessories.
3. The contractor shall check with the manufacturer if existing equipment mounting brackets can still work with new PBBs and if not, contractor to provide new brackets at no cost to the owner.
4. Brackets for PCAir unit shall be bolted THROUGH the PBB roller rail and not just clamped to the rail.

E. PCAir Condensate Return:

1. The PCAir condensate shall be discharged directly to the ramp, so no condensate return system to the PBB rotunda or terminal building shall be required.
 - a. PCAir condensate line shall be routed from the PCAir unit, to the PBB lift columns, through the cable scissor and terminated at the left side of the wheel bogie cross tube.
 - b. Sufficient "whip" shall be left so that the condensate line hangs down approximately 4-6 in. from cable scissor.

F. Mirrors

1. Two (2) mirrors shall be supplied that can be used to view the service stairs and the area around the left side of the wheel bogie where the PCAir and GPU Pushbuttons

are located.

- a. One mirror shall be mounted on the landing handrail outside the Service Door and shall allow the operator standing at the console to view the service stairs and ramp area at the bottom of the service stairs through the Service Door Window.
- b. One mirror shall be mounted on the left side exterior of the PBB cab and shall allow the operator to view the ramp area around the wheel bogie where the PCAir and GPU Pushbuttons are located through the left side cab window.
- c. Mounting system of mirrors shall allow for adjustment to provide flexibility of line of sight from the operator console.
- d. Mounting brackets for the mirrors shall painted per the requirements of 2.7.J.3.g.

SPECIFICATION CONTINUED ON NEXT PAGE

PART 3 - EXECUTION

3.1 SITE EXAMINATION

A. Verification of Conditions:

1. The Contractor shall submit their proposed Site Survey process and forms it intends to use to record pertinent site data within 30 days of the NTP.
2. The Contractor shall be fully responsible to conduct a site survey to verify the site conditions, which shall include, but are not be limited to:
 - a. Center of PBB anchor bolt pattern to the face of the terminal building or face of the walkway. **NOTE - It is likely that there may be several locations where the center of the PBB anchor bolt pattern to the face of the terminal building or existing fixed walkway may NOT the standard 4'-6". The existing walkway at Gate E2 has a custom "neck" connecting to the terminal side.**
 - b. Existing PBB anchor bolt placement, size and projection, elevation and orientation to face of terminal building or walkway and centerline of the terminal door or walkway opening.
 - c. Condition and makeup of terminal building or walkway fascia and how interior and exterior flashing will be installed.
 - d. Any terminal building overhang that will impede installation of the new PBB rotunda.
 - e. Elevation of the terminal floor at the terminal door or the walkway floor at opening to PBB rotunda.
 - f. Planned location of electrical service for PBB / GPU and PCAir. Shall be coordinated by General Contractor.
 - g. Proposed location of communication circuit for PBB. Shall be coordinated by General Contractor.
3. The Contractor shall conduct such site survey of ALL gates and submit their report of the survey results, within 60 days of the NTP.
4. The Contractor shall notify the Owner PM of any discrepancies with Contract Documents, passenger boarding bridge, or fixed walkway requirements
5. Contractor shall be fully responsible to ensure that the new PBB's, rotunda corridors, rotunda spool pieces, and fixed walkways supplied for this Project are designed and manufactured to conform to the existing PBB foundation conditions, existing walkway conditions and existing building face conditions. The Contractor **SHALL NOT** rely on the Project Drawings for their design as the information on these drawings is for reference only. The Contractor **SHALL** base their designs on the results of their own site survey information.
6. PBB manufacturer shall coordinate with responsible General Contractor the locations and requirements for new electrical service and communication junction boxes to be install at the face of the terminal building. **NOTE – There is another active PCA/GPU Replacement Project that is replacing and providing new PCA and GPU disconnects at the face of the terminal building. The Contractor shall verify existing conditions and notify the Engineer of any conditions that differ from**

the contract documents.

7. If any discrepancies are identified during the installation process that prevent the PBB and any new walkway from being installed, any and all costs incurred by the Contractor or the Owner to resolve such discrepancies shall be borne by the Contractor.

3.2 INSTALLATION

A. General Requirements

1. The installation activities for this project shall be planned and executed in a manner so as to minimize the impact on existing airport operations. Within ninety (90) days from the Notice to Proceed, the Contractor shall submit an Installation Methods Statement, which shall include, but not be limited to:
 - a. Site Safety Plan and Program
 - b. How Contractor / Subcontractor will ensure compliance to all relevant codes and regulations during installation activities. These shall include, but are not limited to
 - (1) FAA Regulations
 - (2) OSHA Regulations
 - (3) PHL Safety and Security Procedures
 - (4) State, County and Local Construction and Electrical Codes
 - (5) NEC
 - (6) NEMA
 - c. Detailed Installation Schedule and Phasing Plan. Below is a suggest phasing plan for the installation activities. However, the Contractor shall provide a comprehensive installation schedule and phasing plan as part of their Installation Methods Statement. The PBB installation schedule will need to be coordinated with the other disciplines and the associated scopes of work.
 - (1) Site Survey of existing conditions, PBB foundations, anchor bolt information and orientation, distances from center of foundation to terminal building or fixed walkway, center line of foundation to centerline of terminal door or fixed walkway, height from top of pier to terminal door or fixed walkway, electrical and communication supply at the terminal building face, face of terminal building construction and any potential issues with flashing, any terminal building overhang and any other information contained in the PBB Manufacturer's approved site survey form.
 - (2) Removal and scrap (or storage) of existing PBB, PCAir and GPU
 - (3) Foundation modifications/reconstruction.
 - (4) Holdroom door upgrades.
 - (5) Install the new PBB and Associated Equipment.
 - (6) Striping demolition and installation.
 - (7) Complete installation and testing and obtain Substantial Completion. Begin working on Punch List Items.
 - (8) The one (1) week airline familiarization period. One (1) week for each airline (first PBB installed on their respective gates).
 - (9) Conduct Operator training.
 - (10) Conduct Maintenance training.
 - (11) Complete Punch List Items and obtain Final Acceptance.
 - d. Site Survey procedure and site survey form.

- e. Description of equipment delivery and off-loading process to be used.
 - f. Description of how existing PBB, PCAir and GPU will be removed and scrapped.
 - g. Description of PCAir removal and storage.
 - h. Description of equipment installation procedures. There should be procedures for each piece of equipment (e.g. PBB, Walkway, PCAir, GPU, etc.)
 - i. Description of equipment acceptance testing.
 - j. Description of how punch list items are identified, fixed, tracked and verified as complete.
 - k. Use of and compliance to Equipment Manufacturer's Installation Manual and Procedures.
 - l. Use of barriers to segregate installation activities from other AOA activities.
 - m. Proposed Site Manager and his / her qualifications.
 - n. Evidence of training / experience of Installation Subcontractor.
2. The Installation Methods Statement shall be based on the Equipment Manufacturer's Installation Manual, which may be modified to include the specific requirements of this Project.
 3. The purpose of this Methods Statement is to ensure the Contractor and their Subcontractor(s) completely understand and have planned for ALL of the Installation requirements for this Project.
 4. The Contractor shall utilize a specialized PBB Installation Subcontractor, who has been approved and trained by the PBB manufacturer, to remove and scrap the existing PBB's, PCAir's and GPU's and install the new PBB, Fixed Walkway, PCAir and GPU's. Evidence of this approval and training shall be submitted with the Installation Methods Statement.
 5. The following PBB Installation Subcontractors are recommended. However, the PBB manufacturer may have additional recommendations.
 - a. AERO Bridgeworks
 - b. Oxford Technical Services
 - c. Builder's Chicago
 - d. VRH Construction
 6. The PBB Installation Subcontractor SHALL be approved by the Owner and only the approved PBB Installation Subcontractor shall perform the PBB, Fixed Walkway, PCAir and GPU removal, scrap, installation, testing and commissioning and Fixed Walkway Refurbishment scope of work.
 7. The "demarcation" with respect to power and communications connections from the terminal building to the new PBB, PCAir and GPU shall be the junction boxes at the face of the terminal building.
 - a. In other words, it shall be the responsibility of the PBB Installation Subcontractor to make any and all connections from the PBB, PCAir, GPU and Fixed Walkway to the electrical power and communication junction boxes at the terminal building face.
 - b. This "demarcation" shall also apply to the removal and scrap of the existing PBB, PCAir and GPU, unless otherwise noted in the plans.
 8. As some of the work associated with these power and communication or other func-

- tion connections to the terminal building may be claimed by the local electrical union, the PBB Installation Contractor shall coordinate any electrical power and communications to the terminal building with the General Contractor and his / her Electrical Contractor.
9. All terminal building electrical power feeders and junction boxes and communication or other function circuits and junction boxes shall be the responsibility of the General Contractor.
 10. A full time Site Manager shall be utilized by the PBB Installation Subcontractor and he/she shall be present at PHL for ALL project Installation Activities and shall directly supervise and control all work activities, employees, and other Subcontractors and their employees.
 - a. This Site Manager shall have a minimum of 5-years' experience as a Site Manager directly supervising PBB installations.
 - b. This Site Manager shall be an employee of the PBB manufacturer or the approved PBB Installation Subcontractor.
 11. The Contractor's Site Manager shall conduct a weekly status meeting with the Owner and any representative of any affected airlines. Minutes of these meetings shall be distributed by the Site Manager to all attendees by the end of the shift.
 12. The Contractor's Site Manager shall also function as the Contractor's Site Safety Manager and coordinate all safety related issues and activities with the Owner's and airline's Safety Managers.
 13. The Owner SHALL approve the Site Manager proposed by the Contractor and /or Subcontractor.
 14. In addition to the Site Manager, the PBB manufacturer and PCAir or GPU manufacturer if different than the PBB manufacturer, shall provide qualified manufacturer's technical representative / service personnel during the PBB, PCAir and GPU installation, testing and commissioning process **AT EACH GATE** to assure a proper installation, and to provide adequate and reliable field service support to correct any and all equipment failures that may occur during the commissioning and testing and during the initial operating period.
 - a. The PBB manufacturer's technical representative / service personnel shall be available at PHL for the first 60 days after the first PBB is installed and accepted by the Owner.
 - b. The manufacturer's technical representative / service personnel shall monitor and ensure that the approved PBB Installation Subcontractor follows:
 - (1) The PBB, PCAir and GPU manufacturer's field installation manual.
 - (2) Compliance with all safety requirements.
 - (3) Accurate and complete reports and records maintenance.
 - (4) Applicable requirements of the Project Specifications and Drawings
 - c. The PBB manufacturer's technical representative / service individual could also function as the designated Site Manager, if qualified.
 15. The Contractor and/or approved PBB Installation Subcontractor shall utilize, to the extent feasible, local DBE Certified or WMBE firms to provide labor and services if qualified firms are available.

16. The Contractor's Site Manager and other representatives from the Contractor and/or Subcontractor shall be required to obtain badging at PHL. **THE OWNER WILL PROVIDE NO ESCORTS.**
17. PHL is a smoke free facility. The Contractor is required to ensure that all of its personnel and subcontractors adhere to and abide with the smoking policy at PHL.
18. The PBB, PCAir and GPU manufacturer and the PBB Installation Subcontractor shall provide all tools, equipment, vehicles, consumables, supplies, test fixtures, etc. required to complete the PBB, PCAir and GPU removal and scrap (or storage); and the new PBB, Fixed Walkway, PCAir and GPU installation, testing and commissioning Scope of Work.
19. Refer to SECTION 263543 - 400Hz GROUND POWER UNIT AND ACCESSORIES for additional installation information, requirements and specifications for the GPU's and their accessories.

B. Applicable Codes And Standards

1. PHL Security, Badging, AOA Access, Safety and Construction Policies and Procedures
2. DOT 49 CFR Part 1500 Series – Civil Aviation Security
3. DOT 14 CFR Part 157 - Notice of Construction, Alteration, Activation and Deactivation of Airports
4. OSHA Regulations
5. NEC (National Electric Code), NFPA 70 and NFPA 79
6. NEMA (National Electrical Manufacturers Association)
7. Local, County and State Building and Electrical Codes

C. Other Installation Requirements

1. The requirements listed herein are in addition to other Contractor or Site Installation Requirements that may be included in other applicable Specifications or Owner Contractor requirements. If there is any conflict between those requirements and the requirements listed below, the other applicable Specifications and Owner Contractor requirements shall take precedence.
2. For gates with no walkways, the Contractor shall be responsible to complete all electrical, communications and other function connections from the new PBB's disconnect cabinet or the individual equipment disconnects or junction boxes at the PBB ronduda to the junction boxes located on the terminal building face.
 - a. Electrical, communications and other function wiring for these connections shall be enclosed in rigid conduit with one flexible conduit section and shall be in compliance with NEC, NEMA and state, county and local construction and electrical codes.

- b. Flexible conduit is required to allow for movement of the PBB rotunda.
 - c. Flexible conduit sections shall NOT exceed three (3) feet.
3. For gates with new walkways, the Contractor shall be responsible to complete all electrical, communications and other function connections from the new PBB's disconnect cabinet or the individual equipment disconnects or junction boxes at the PBB rotunda,
- a. through conduit and one flexible conduit section to the walkway
 - b. through new conduit supplied with the new walkways, through conduit and one flexible conduit section
 - c. to the junction boxes located on the terminal building face.
 - d. Electrical, communications and other function wiring for these connections shall be enclosed in rigid conduit and flexible conduit and shall be in compliance with NEC, NEMA and state, county and local construction and electrical codes.
 - e. Flexible conduit is required to allow for movement of the PBB rotunda and Walkway. Flexible conduit sections shall not exceed three (3) feet.
 - f. Wire ways, cable trays, etc. shall NOT be allowed under the Walkway.
4. Contractor shall also install a ground wire from the power grounding lug in the disconnect cabinet or individual disconnects to the grounding lug on the PBB rotunda base plate.
- a. Ground wire shall be secured to the rotunda column.
5. Contractor shall use materials (wire, conduit, fittings, etc.) that fully comply with NEC and ALL Local, County and State electrical code requirements and Owner requirements.
6. Conduit shall be galvanized steel, either Intermediate Metallic Conduit (IMC) or Rigid Galvanized Steel Conduit (RGSC).
- a. All exterior conduit installed that is exposed to weather must drain to a common conduit system low point per NEC.
7. Bird barrier strips shall be installed atop all conduit, PVC, Unistrut, or any fixed material that runs from building face to rotunda disconnects. See minimum requirements listed below:
- a. General: Modular spike barrier strips.
 - b. Material: Stainless Steel.
 - c. Spikes: 4 inches long.
 - d. Minimum 120 spikes per linear foot of base strip.
 - e. Minimum 90-degree coverage.
 - f. Mounting Hardware: Cable ties plus manufacturer's standard adhesive and glue clips.
8. The PBB Installation Subcontractor shall test the power feeds in the junction boxes at the terminal face and make sure they are correctly labeled with the Brown (L1), Orange (L2) and Yellow (L3) markings.
- a. If they are incorrectly labeled, the PBB Installation Subcontractor shall coordinate with the Contractor to have the power feeds correctly labeled.
9. The PBB Installation Subcontractor shall also ensure that the PBB, PCAir and GPU power cables coming to the equipment disconnects are correctly labeled as to phase.

10. In addition, the following shall apply to electrical materials supplied and electrical installation work performed for the PBB Installation scope of work.

a. Enclosures and Junction Boxes

- (1) All exterior enclosure and junction boxes shall be labeled with engraved placards.
 - i) Placards shall contain the nomenclature used on the drawings or schematics of the enclosure or junction box.
- (2) All exterior electrical components, including terminal blocks / terminal strips, shall be housed in weather tight, stainless steel (SST) enclosures.
- (3) All exterior enclosures and junction boxes, including pass through junction boxes shall:
 - i) be weather tight, stainless steel (SST) enclosures of NEMA 3R or 4 rating.
 - ii) Shall have a hinged, SST cover, which shall be retained by SST latch(s) or SST self-retaining screws.
 - iii) Shall have a weather gasket for the cover
 - iv) Shall have drain device for condensate.
- (4) All exterior electrical devices, including, but not limited to, lights, beacons, sensors, temperature probes and switches shall be a weatherproof design with a NEMA 3R or 4 rating.
 - i) All mounting boxes for electrical devices shall be SST and be a weatherproof design with a NEMA 3R or 4 rating.
 - ii) The enclosure cover shall be hinged, SST and be retained by SST latch(s) or SST self-retaining screws.
 - iii) The enclosure covers shall also have a weather gasket.
 - iv) The enclosure shall have a drain device for condensate.
 - v) The device should be mounted to the hinged cover.
- (5) All enclosures and junction boxes containing power circuits shall have applicable warning or symbol stickers required by Code.
- (6) All components mounted in enclosures and junction boxes shall be mounted to a backing plate supplied by the enclosure manufacturer.
 - i) Components shall be intended for use in the enclosure or junction box.
 - ii) Mounting directly to the enclosure or junction box wall shall NOT be allowed.
- (7) Conduits and wiring routed into enclosures, junction boxes or panels shall have clamping fittings, and the fitting threads shall have bushings installed.

b. Wiring and Terminal Blocks

- (1) All wiring shall be brought to mounted terminal blocks.
 - i) Wire splices of any type shall **NOT** be used.
 - ii) Terminal blocks shall **NOT** be allowed to hang free in air.
 - iii) In junction boxes where space does not allow for the use of terminal blocks, mounted Wago type connectors are acceptable.
- (2) Wiring in all enclosures and junction boxes shall comply with the NEC requirement in Table 314.16 for wiring fill capacity of the enclosure or junction box.
- (3) Wiring shall be formed and restrained to give a neat appearance.
- (4) All wires, including spares, within junction boxes, control cabinets, disconnects, other electrical enclosures shall be neatly secured and routed.
 - i) Wire routing trays shall be used when interior space permits.

- (5) Grommets and suitable anti-chafe material shall be used where wires are required to pass through structure or similar relief opening which exposes the wire to possible chafing.
 - (6) All wiring shall be identified using stamped labels or other Owner approved wire labels.
 - i) Labels shall be visible and located within 1 in. of their termination point.
 - ii) Wires are to be numbered in a logical sequence and all wire numbers are to be indicated on electrical wiring diagrams.
 - (7) Spare wires shall be numbered and labeled as "SPARE".
 - (8) Spare wires shall be indicated on the electrical diagrams.
 - (9) Wires must meet the bend radius requirements of NEC.
 - i) Ninety-degree bends shall not be allowed.
 - (10) Ferrules or insulated ring terminals shall be used on any fine stranded wire, depending on the terminal block connection.
 - i) Fork or Spade terminals shall ONLY be allowed to make connections to purchased components that have ring terminals and are assembled into the PBB. No other use of fork or spade terminals shall be allowed.
 - ii) Direct connection of fine stranded wire to a terminal block shall NOT be allowed.
 - (11) Terminal blocks shall be either:
 - i) Finger proof or tamper proof design
 - ii) Stud or open style design with a protective cover supplied by the terminal block manufacturer.
 - iii) Other terminal block designs shall not be accepted.
 - (12) Terminal blocks must meet the applicable requirements of SAE J561, J858 and J928.
 - (13) Wire ties SHALL NOT be used to support any wiring.
 - (14) NEC / UL approved clamps and methods must be used to secure and support wiring.
 - i) Clamps used shall be specifically designed for the wiring being clamped (e.g. clamps for flat pack cable are not the same as clamps for SO cable).
 - (15) Wire ties shall only be used to keep wires together for appearance and routing to various components.
11. The existing communication circuit may not be in a junction box at building face. If this is the case, the PBB installation subcontractor shall cut the communication cable when the old PBB is removed, leaving enough cable so that a new junction box, with terminal strip can be installed by the PBB installation subcontractor at the terminal face.
12. Contractor shall be responsible to connect the communication cable from the new PBB to the new or existing communication junction box on the terminal building. Use of conduit and flexible conduit shall be the same as items 2 and 3 above.
13. See P-Series Contract Drawings and SECTION 347722 in PHL Bid No. 6648 for requirements.
14. Contractor shall be responsible to determine what Mechanical or Electrical Permits are required to complete ALL of the equipment installation activities. Contractor shall then be responsible to obtain the required permits from the City of Philadelphia – Licenses and Inspections or Tinicum Township.

15. Contractor shall be responsible to collect and dispose of any waste materials, including any hazardous wastes associated with paint touch up, lubricants, etc.
16. Contractor shall maintain the apron area in a clean and orderly manner during installation activities. At the close of each shift, all tools and equipment shall be appropriately stored. All waste materials shall be collected and disposed of. All parts shall be collected and organized in an orderly fashion near the terminal building.
17. A spreader beam MUST be used when installing the PBB Rotunda on to the PBB foundation.
18. If the existing anchor bolt extension does not allow for the use of 2 new anchor bolt jam nuts, the Contractor shall either use two (2) new anchor bolt ½ nuts OR shall tack weld the anchor bolt nuts to the flat washer and the flat washer to the PBB rotunda base plate.

D. Substantial Completion, Punch Lists, Final Acceptance

1. Upon completion of Installation Scope of Work, including any required testing, the Owner will accept the equipment as Substantially Complete.
2. In order to be Substantially Complete, the Equipment must be fully installed and operational and be able to use by the Owner and airlines as intended.
3. The Owner's representative and the Contractor's Site Manager shall jointly develop a Punch List of any outstanding work, defects or non-compliances. At this time a Completion Date for the Punch List works shall be agreed to by the Owner's representative and Contractor's Site Manager.
4. The Contractor shall complete this Punch List work within the agreed upon completion date. If the Punch List work is not complete by the agreed Completion Date, the Owner may impose penalties as called for in the Contract Documents.
5. Upon the completion and Owner's acceptance of the Punch List work, the Owner will issue a Final Acceptance as called for in the Contract documents.

3.3 DEMOLITION AND SCRAP OF EXISTING EQUIPMENT

A. Removal and Scrap of PBB, PCAir and GPU

1. Prior to installing the new PBB, PCAir and GPU, the Contractor shall remove and scrap the existing PBB and GPU units (where applicable).
2. The PCAir units and their Pushbuttons, temperature probes, PBB interlock connection, PCAir hose, coupler, and hose basket and other PBB connections at all gates (D2, D4, D6, D8, D10, D11, and E2) shall be removed, stored and reinstalled on the new PBB's. The PCAir hose, coupler and hose basket for these gates will be scrapped.

3. The Owner shall allow its PBB Maintenance contractor to salvage certain parts from the PBB and GPU prior to the Contractor removing and scrapping them.
 - a. The Owner's PBB maintenance contractor shall have 24 hours from when the gate is taken out of service to remove such salvage spare parts.
 - b. The Contractor shall coordinate directly with the Owner's maintenance contractor to schedule the salvage part removal.
4. Once the Owner's PBB maintenance contractor has completed the removal of any spare parts, the Contractor may proceed with removal and scrap of the PBB and GPU.
 - a. The Contractor shall record and provide to the Owner the model and serial numbers for each PBB and GPU that is scrapped.
 - b. The Contractor shall obtain and provide to the Owner, Certificates of Scrap for each PBB and GPU.
 - i) The Certificates of scrap shall list the Serial Number and Description of the piece of equipment scraped and shall be endorsed by the scrap yard and the Contractor.
 - c. Any proceeds from the scrap of the PBB and GPU may be retained by the Contractor.

B. Protection of Existing Rotunda Anchor Bolts

1. The Contractor shall take care NOT to damage the existing PBB anchor bolts when removing the PBB rotunda. The new PBB's will be installed on the existing foundations using the existing anchor bolts.
2. Contractor shall remove existing grout down to foundation pier cap, taking care not to damage the foundation anchor bolts.
3. **Contractor must refer to the contract drawings for any additional foundation modifications/reconstruction.**
4. Contractor SHALL remove ALL old anchor bolt nuts and flat washers. No existing anchor bolt nuts or flat washers shall be reused.
5. Contractor shall clean, chase and protect with oil all anchor bolts.
6. If the existing anchor bolts do not have threads all the way down to the foundation pier cap and additional threads are required to correctly install the new PBB rotunda on the leveling nuts, the Contractor shall use a die to cut new threads, to match existing threads, down to the foundation pier cap.
7. Contractor shall supply three (3) new anchor bolt nuts per anchor bolt and 2 flat washers per anchor bolt and install these on the anchor bolts as soon as the anchor bolts are cleaned and oiled.
8. The Contractor shall install a temporary protection, consisting of a section of PVC pipe over each anchor bolt / nuts to protect the anchor bolts from the time the old PBB is removed and the new PBB is installed. Top anchor nut shall be flush with the top of the PVC pipe.

- A. Contractor shall provide Operations and Maintenance classes for the PBB's supplied on this Project.
1. The training shall be specific to the PBB's supplied to PHL. A "standard" training class is not acceptable.
 2. Training shall utilize prepared texts, power point presentations and other instructional aids as appropriate. Contractor shall supply whatever equipment is required to present training materials.
 3. The Contractor shall conduct multiple Operations Training Classes to facilitate the scheduling of Owner and Tenant Airline personnel.
 - a. Operations training classes shall be a minimum of 4 hours and shall consist of both classroom and hands on training.
 - b. Operator training shall include, at a minimum, the proper demonstration as well as actual use of correct PBB operations to avoid damaging the equipment or aircraft or personal injury, by improper use of the PBB and its controls.
 - c. The Contractor shall provide classes, one for each of the tenant airlines.
 - i. These Operator training classes shall be conducted at substantial completion of the first gate of each airline.
 - d. The anticipated Operator training class size shall be 10.
 4. The Contractor shall conduct multiple Maintenance Training Classes to facilitate the scheduling of Owner and Owner maintenance contractor personnel.
 - a. Maintenance training classes shall be a minimum of 8 hours and shall consist of both classroom and hands on training.
 - b. Maintenance training shall include, at a minimum:
 - (1) proper demonstration of cut-away models of critical parts, full instruction of proper maintenance and troubleshooting, and instructions on proper use of manuals.
 - (2) Instruction in proper use, operation, and daily maintenance of the PBB.
 - (3) Emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies.
 - (4) Normal procedures to be followed in checking for sources of operational failures or malfunctions.
 - (5) Use of the hardware / software tools required to upload and download control programs, trouble shoot the PBB control software, perform equipment diagnostics and review data flow.
 - (6) Requirements for a complete PBB PM maintenance program, including monthly, quarterly, semiannual and annual checks.
 - (7) Warranty, technical support and parts ordering procedures.
 - c. The Contractor shall provide two (2) Maintenance training classes, one on first shift and one on second shift, at substantial completion of the first gate.
 - d. The anticipated class size shall be 5.
 5. The Contractor shall video tape one complete Operations training session and one complete Maintenance training session and provide these recordings to the Owner.
 6. Training dates and times shall be coordinated with the Owner PM.

7. The Owner, Owner's Maintenance Contractor and tenant Airline shall assign their respective employees to be trained.
8. Contractor shall submit a Training Syllabus for all training classes to be conducted at PHL within sixty (60) days of the Notice to Proceed. Format and content of Contractor's proposed Training classes shall be subject to approval of the Owner.
9. The Contractor's PBB operator and maintenance training classes shall be conducted concurrent with the GPU and PCAir training classes.
10. The Contractor's PBB training program must meet the requirements of this Specification and be done within the allowance for the GPU, PCAir and PBB operator and maintenance training classes, as stated in the Project Bid Documents.

Specification Continued on Next Page

PART 4 - CONTRACTOR QUALITY CONTROL REQUIREMENTS

4.1 QUALITY ASSURANCE

- A. For additional Quality Control requirements refer to Owner DOCUMENTS – SECTION C AND 7
- B. The following describes the minimum inspection and testing required in the Contractor's quality Control Program for the work of this section. THE IMPLEMENTATION OF A CONTRACTOR QUALITY CONTROL PROGRAM DOES NOT RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY TO PROVIDE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, APPLICABLE CODES, REGULATIONS, AND GOVERNING AUTHORITIES. The Contractor Quality Control Program shall include, but not be limited to, the elements included herein. These elements are provided only as a minimum starting point for the Contractor to use to generate the complete Contractor's Quality Control Program.

4.2 GENERAL REQUIREMENTS

- A. The quality assurance requirements for this project shall focus on ensuring Contractor designs, manufactures, delivers and installs the required equipment that fully complies with the requirements of this Specification.
- B. The quality assurance requirements shall consist of:
 - 1. The Contractor's and Manufacturer's Quality System – Consisting of the Contractor's Quality Manual and Quality Procedures
 - 2. The Contractor's Quality Plan – The Quality Plan developed by the Contractor to ensure all requirements of this Specification are met.
 - 3. Contract Review and Design Approval – One of the main components of the Owner's review and approval of the Contractor's equipment design and compliance with the Contract, Specification and Drawing is through the Submittal review and approval process.
 - a. The Owner's factory inspections, witness of factory testing, site inspections and witness of site testing and commission are also part of Contract Review and Design Approval.
 - 4. Certificate of Compliance - Prior to the Owner and their designated representatives scheduling the first Factory Inspection visit, the PBB, PCAir and GPU manufacture shall submit a Certificate of Compliance that the equipment supplied under this contract fully complies with the Contract Specifications and Drawings.
 - a. This Certificate of Compliance shall be signed by the PBB manufacturer's Engineering Manager, Quality Assurance Manager and General Manager.
 - 5. PBB Manufacturer's Material Receipt, In-Process Manufacturing and Final Inspections – All receiving, in-process and final inspection documents and reports shall be submitted for review and approval of the Owner.

6. Manufacturer's Factory Acceptance Testing – The PBB Manufacturer shall conduct their own functional testing on the PBB and its components, prior to the Owner's Factory Inspection, to ensure all equipment meets the requirements of this Specification.
 - a. The Contractor shall submit reports of such functional testing for review and approval of the Owner.
7. Owner Factory Inspection to Shipment – The Owner reserves the right to perform an in-factory inspection and witness of functional testing of all equipment PRIOR to shipment.
 - a. The PBB, fixed walkway and all of their components and accessories shall be made available for inspection.
 - b. To the extent possible, the PBB and its components shall be assembled to demonstrate a functioning unit.
 - c. This inspection shall review the PBB, fixed walkway and all of their components and accessories against the Specification requirements, as modified by any Owner approved substitutions or deviations.
 - d. This inspection shall also witness the functional testing of the PBB and its components to ensure that the PBB functions and meets the performance requirements per the Specification.
8. Contractor's Installation In-Process and Punch List Completion Inspection – All Installation In-Process and Punch List Completion inspection documents and reports shall be submitted for review and approval of the Owner.
9. Owner In Process Installation Inspection – The Owner's representative will perform an in process inspection during the Installation process.
10. Manufacturer's Functional Testing & Commissioning – As part of the installation process, the Contractor shall conduct the Functional Testing and Commissioning as required by the Specifications and to verify the equipment meets the functional and performance requirements of the Specification.
 - a. All test reports from such Functional Testing shall be submitted to the Owner for review and approval.
11. Owner Substantial Completion Inspection – The Owner's representative will perform Substantial Completion Inspection after the Contractor notifies the Owner that Substantial Completion is achieved on all equipment.
 - a. This inspection shall also include the Owner's witness of the site testing and commissioning, as required by the Specifications.
 - b. At this time, a Punch List will be generated, identifying all non-conformances to the Contract, Specifications and drawings and the agreed upon date between the Owner and the Contractor for the Contractor to remedy all non-conformances.
12. Between Substantial Completion and Final Acceptance of each gate, there shall be a one (1) week tenant Airline "familiarization period" for Airline employees to become familiar with the equipment at the gate. This familiarization process will utilize aircraft to "test" all equipment. Additional punch list items may be identified during this period.
13. Owner's Final Inspection - Once all items on the Punch List are complete, the Owner's representative will perform a Final Inspection to determine if Final Acceptance

has been achieved.

4.3 CONTRACTOR'S QUALITY PLAN

- A. The Contractor shall develop a Quality Plan that identifies the relevant inspection points and acceptance criteria that will be utilized by the Contractor to ensure all of the requirements of the Specification are met.
- B. The Quality Plan shall identify the inspection and review points during the contract review, design, manufacturing and installation where the Contractor will perform inspections or tests to ensure compliance to the Specifications.
- C. The Quality Plan shall identify the scope of the inspections and tests and the specific acceptance criteria that will be utilized by the Contractor for each inspection and test.
- D. The Quality Plan shall also identify the test plan, procedures, methods, techniques, etc. that will be utilized by the Contractor to conduct the required factory acceptance testing and on-site functional testing and commissioning
- E. The Contractor's Quality Plan shall be specific to the requirements of the Contract, Specifications and Drawings.
- F. The Contractor shall submit their Quality Plan to the Owner for approval within sixty (60) days of the issuance of the Notice to Proceed.

4.4 NON-CONFORMING GOODS

- A. Goods shall be defined as any equipment supplied and the on-site installation, testing and commissioning activities. In other words, the equipment and work covered by the Contract, Specifications and Drawings.
- B. The Owner has the right to disapprove or reject any Goods that the Owner believes to be non-conforming.
- C. If the Owner elects to reject the Goods in whole or in part, Owner's notice to Contractor will describe in sufficient detail the non-conforming aspect of the Goods. If Goods have been delivered to Owner, Contractor shall promptly, and within the Contract Times, remove and replace or modify the rejected Goods.
- D. Contractor shall bear all costs, losses and damages attributable to the removal and replacement or modification of the non-conforming Goods.
- E. Upon rejection of the Goods, Owner retains a security interest in the Goods or to the extent of any payments made and expenses incurred in their testing and inspection.
- F. If the Owner elects to permit the Contractor to modify the Goods to remove the non-conformance, Contractor shall promptly provide a schedule for such modifications and shall make the Goods conforming within a reasonable time.

- G. Instead of requiring modification or removal and replacement of non-conforming Goods discovered either before or after final payment, Owner may accept the non-conforming Goods. Contractor shall bear all costs, losses, and damages attributable to Owner's evaluation of and determination to accept such non-conforming Goods.
- H. Contractor shall pay all claims, costs, losses, and damages, including but not limited to all fees and charges for re-inspection, retesting and for any engineers, architects, attorneys and other professionals, and all court or arbitration or other dispute resolution costs arising out of or relating to the non-conforming Goods, including the modification or removal and replacement of the non-conforming Goods and the replacement of property of Owner and others destroyed by the modification or removal and replacement of the non-conforming Goods, or the obtaining of conforming Goods from others.
- I. Contractor's responsibility for correcting all non-conformities in the Goods will extend for the Warranty Period as specified in the Contract Documents after the date of Final Acceptance of the Goods, or for such longer period of time as may be prescribed by Laws or Regulations or by the terms of any specific provisions of the Contract Documents.
- J. Neither payments made by Owner to Contractor prior to any tests or inspections, nor any tests or inspections shall constitute acceptance of non-conforming Goods, or prejudice Owner's rights under the Contract.

4.5 INSPECTIONS

A. Factory Inspections

- 1. The Owner shall conduct two (2) Factory Inspections at the equipment manufacturer's facility and perform an inspection of the equipment and witness the equipment testing as set forth in the Project Specifications and in the Contractor's approved Factory Test plan for each equipment type.
- 2. These Factory Inspections shall consist of in-process fabrication inspection, inspections at final assembly and witness of equipment testing. The Owner recognizes that the equipment will be produced in the manufacturer's normal production process and at any one time, there will be multiple pieces of equipment in various stages of completion.
- 3. Owner may send up to four (4) representatives to conduct these Factory Inspections.
- 4. The Contractor shall supply the Owner's inspection representatives with instruments, tools and equipment and all such assistance as they may find necessary to conduct inspections of the equipment.
- 5. Contractor shall provide Owner with a detailed manufacturing schedule within 30 days of the NTP so that the Owner can establish a plan for the required inspections.
- 6. The Contractor shall supply 30 days' written notice, prior to start of fabrication for the first PBB, PCAir and GPU and 15 days' written notice prior to the completion of assembly and readiness for factory testing of the first PBB, PCAir and GPU.
- 7. The Contractor shall supply 15 days' written notice prior to the completion of assem-

- bly and readiness for factory testing of any subsequent PBB, PCAir and GPU.
8. The basis for the Factory inspections and testing shall be the project equipment Specifications and drawings. The inspections and testing document utilized by the Owner or Owner's representative WILL BE the Specification and drawing documents.
 9. If, on the basis of the Factory inspections and testing, the equipment appears to be conforming, Owner will give Contractor prompt notice thereof.
 - a. Such notice will be the Contractor's authorization to ship the equipment.
 10. If on the basis of the Factory inspection and testing, the equipment is non-conforming per the requirements of the Specifications and Drawings, as determined by the Owner,
 - a. Owner will give Contractor prompt notice thereof and will advise Contractor of the required remedies and,
 - b. if such remedies must be accomplished prior to shipment and,
 - c. if a subsequent re-inspection by the Owner's representatives will be required prior to shipment.
 11. If subsequent factory inspections are required by the Owner due the non-conformance of any equipment, as determined by the Owner,
 - a. the Contractor shall arrange and pay for all travel, lodging, local transportation and local meals for the Owner representatives (up to two (2)) to attend any factory re-inspections and re-testing that may be required.
 - b. The Contractor shall also pay, via a back charge, all labor costs for the Owner's representatives to conduct such factory re-inspections, including time for inspections at the factory and time for preparation of inspection reports.
 - c. Prior to the Owner scheduling travel for the factory re-inspections, the Contractor shall provide the Owner with documented evidence that the non-conformances have been remedied.
 12. If on the basis of any Factory re-inspection and testing, the equipment is still non-conforming per the requirements of the Specifications and Drawings, as determined by the Owner,
 - a. Owner will give Contractor prompt notice thereof and will advise Contractor of the required remedies and,
 - b. if such remedies must be accomplished prior to shipment and,
 - c. if a subsequent additional re-inspection by the Owner's representatives will be required prior to shipment.
 13. The equipment shall NOT be shipped until approval from the Owner has been received. If the Contractor ships the equipment without the Owner's approval, the Contractor shall bear ALL costs associated with any storage, delays, or required remedies performed at site to correct non-compliances to the Specifications and Drawings.

B. Inspection Upon Delivery

1. Contractor shall inspect the PBB's upon delivery at PHL solely for purposes of identifying the PBB's and general verification of quantities and observation of apparent

condition in order to ensure PBB's are acceptable and suitable for installation at PHL. Such inspection will not be construed as final or as receipt of any PBB's that, as a result of subsequent inspections and tests, are determined to be non-conforming.

2. Within three (3) days of such receiving inspections, Contractor shall provide Owner with written notice of Contractor's determination regarding conformity of the PBB's. In the event Contractor does not provide such notice, it will be presumed that the PBB's are suitable for Installation.

C. Inspection During Installation Process

1. The Owner's representative will conduct one or more inspections during the Installation process to review the Contractor's compliance with the Specifications and the completion of any previously identified non-conformities or punch list items. The Contractor shall supply the Owner's inspection representative with instruments and all such assistance as they may find necessary.
2. The Owner reserves the right to conduct these Installation inspections, unannounced and at any time during the Installation process.
3. If, on the basis of any inspections or testing, the PBB's, GPU's or PCAir's appear to be non-conforming, the Owner will give Contractor prompt notice thereof will advise Contractor of the required remedies and the required completion date of such remedies.

D. Inspection At Substantial Completion

1. The Contractor shall provide seven (7) days written notice to the Owner of the proposed date of Substantial Completion and on-site functional testing for each gate.
2. The Owner's representative will conduct a Substantial Completion inspection when the Contractor has completed the installation of the PBB, PCAir and GPU.
 - a. This Substantial Completion inspection will be on a Gate by Gate basis.
 - b. The Owner's representative shall review all of the equipment to ensure they are installed properly, that the installation has been completely carried out and that all previously identified non-conformities have been remedied.
 - c. During this Substantial Completion inspection, the Contractor shall conduct, with the Owner's representative as a witness, the specified on-site functional testing of the PBB, PCAir and GPU.
 - d. The Owner's representative will identify any Punch List items that must be remedied by the Contractor during the Substantial Completion Inspection.
3. If the PBB, PCAir and GPU are considered by the Owner to be Substantially Complete and useable for the intended purpose, the Owner shall issue notification to the Contractor that Substantial Completion has been achieved for the specific gate.
 - a. The Owner's notification shall include the Punch List items that must be corrected prior to Final Acceptance by the Owner.
 - b. The Contractor shall complete the punch list and be ready for a Final Acceptance inspection by the time the Substantial Completion inspection is scheduled for the next gate to be completed.

4. If, after the Substantial Completion inspection and equipment testing and commissioning or any Substantial Completion re-inspection, the PBB, PCAir and GPU are NOT substantially complete, as determined by the Owner, the Owner will issue notification to the Contractor that Substantial Completion has not been achieved at the specific gate.
 - a. The Owner's notification shall include the Punch List items that must be corrected prior to Substantial Completion and those items that must be corrected for Final Acceptance.
 - b. The Owner's notification shall also include the requirement, if necessary, for an additional Substantial Completion inspection.
 - c. the Contractor shall be responsible for all travel, lodging, local transportation and local meals for the Owner representatives to conduct any additional Substantial Completion re-inspections and Equipment Testing and Commissioning.
 - d. The Contractor shall also be responsible for all labor costs for the Owner's representatives to conduct such Substantial Completion re-inspections, including time for inspections at the installation site and time for preparation of inspection reports.
 - e. Prior to the Owner scheduling travel for any Substantial Completion re-inspections, the Contractor shall provide the Owner with documented evidence that the punch list items required for Substantial Completion have been completed.
5. If the Contractor does not achieve Substantial Completion, as determined by the Owner, by the required date, as specified in the Contract Documents, the Owner may exercise delay penalties as called out in the Contract Documents.

E. Inspection at Final Acceptance

1. The Owner's representative shall conduct a Final Acceptance inspection at each gate concurrent with the Substantial Completion inspection that is done for the next gate to be completed.
 - a. In other words, if the project schedule calls for the gates to be completed in the order of D2, D4, D6, D8, etc., the Final Acceptance inspection for D2 will be done concurrent with the Substantial Completion inspection of Gate D4 and the Final Acceptance inspection for D4 will be done concurrent with the Substantial Completion inspection of D6.....etc.
2. If, after the Final Acceptance inspection or any Final Acceptance re-inspections, there are still outstanding Punch List items, as determined by the Owner, as determined by the Owner, the Owner will issue notification to the Contractor that Final Acceptance has not been achieved at the specific gate.
 - a. The Owner's notification shall include the Punch List items that must be corrected completed for Final Acceptance.
 - b. The Owner's notification shall also include the requirement, if necessary, for an additional Final Acceptance inspection.
 - c. the Contractor shall be responsible for all travel, lodging, local transportation and local meals for the Owner representatives to conduct any additional Final Acceptance re-inspections.
 - d. The Contractor shall also be responsible for all labor costs for the Owner's representatives to conduct any additional Final Acceptance re-inspections, including time for inspections at the installation site and time for preparation of inspection

- reports.
- a. Prior to the Owner scheduling travel for the Final Acceptance re-inspections, the Contractor shall provide the Owner with documented evidence that the remaining Punch List items have been completed.
3. If the Contractor does not achieve Final Acceptance during the planned **FIRST** Final Acceptance inspection, the Owner may exercise delay penalties as called out in the Contract Documents.
 4. Once Final Acceptance is achieved, the Owner shall notify the Contractor of the date of Final Acceptance.
 - a. Within one (1) week of the receipt of the Owner's notification of final acceptance, the Contractor shall provide to the Owner, the Warranty Documentation for the PBB, PCAir and GPU, as required by the project Specifications and Contract documents.
 - b. Warranty Documentation shall indicate the model and serial number of the equipment and the date the equipment has been accepted by the Owner.
 - c. This date will also be the start date of the Contractor's Warranty Period for the equipment.

4.6 FACTORY ACCEPTANCE TESTING

A. Contractor's Factory Testing Plan

1. The Contractor shall develop a Factory Testing Plan, as part of its overall Quality Plan, which identifies the specific testing to be done at the Contractor's factory.
 - a. The Factory Tests must confirm, to the extent possible in Contractor's factory that all features, functions and capabilities of the PBB, as defined in the Specification and Contract Documents, are performing as intended.
 - b. The Factory Test Plan shall be submitted with the Contractor's Quality Plan and approved by the Owner thirty (30) days prior to any Factory Tests being conducted.
2. It is the intent of the Owner that the Contractor shall develop a comprehensive Factory Test Plan, identifying the specifics of the tests to be carried out, and the acceptance criteria of such test, to ensure the PBB complies with the requirements of the Specification and Contract Documents.
3. The Factory Test Plan, shall at a minimum, address the requirements in Paragraphs B below, which shall constitute the Factory Tests to be witnessed by the Owner's representative(s).

B. Passenger Boarding Bridge

1. Tunnel Extend / Retract
2. All Cab operations
3. PLC and Control Systems
4. HMI Functions and displays

5. Auto-level over travel alarm
6. Activation of other alarms and beacons
7. Interior / Exterior Lights and Outlets

4.7. ON-SITE FUNCTIONAL TESTING AND COMMISSIONING

A. Contractor's On-Site Testing and Commissioning Plan

1. The Contractor shall develop an On-Site Testing and Commission Plan, as part of its overall Quality Plan, which identifies the specific testing to be done by the Contractor after the PBB, PCAir and GPU are installed at PHL.
 - a. The On-Site Testing and Commissioning must confirm that all of the equipment function as intended, alone and in conjunction with each other and provide the required features, functions and capabilities as defined in the Specification and Contract Documents.
 - b. The On-Site Testing and Commission Plan shall be submitted with the Contractor's Quality Plan and approved by the Owner sixty (60) days from NTP.
2. It is the intent of the Owner that the Contractor shall develop a comprehensive On-Site Testing and Commissioning Plan, identifying the specifics of the tests and procedures to be carried out, and the acceptance criteria of such test or procedure, to ensure the PBB, PCAir and GPU comply with the requirements of the Specification and Contract Documents.
3. The items listed in Paragraphs B, C, D below shall be considered as a minimum required field tests and commissioning activities. The Contractor has the responsibility to identify any additional tests and commissioning activities and develop the On-Site Test and Commissioning Plan to ensure the PBB, PCAir and GPU comply with the requirements of the Specification and Contract Documents. The Owner reserves the right to witness any or all On-Site Tests and Commissioning activities.
4. The results of the On-Site functional testing shall be provided to the Owner with the Final Acceptance Certificate and Final Payment Application.

B. Passenger Boarding Bridge

1. Contractor shall arrange and pay for a PCAir factory-authorized on-site representative for the time required to assist and/or supervise the installation, start-up and testing of all new PCAir gate equipment in accordance with the manufacturer's written instructions.
 - a. The on-site representative shall be the point of contract for interface with the manufacturer's home office engineering, manufacturing and other support staff as needed, and serve as liaison with the Contractor, if applicable.
2. The PBB onsite functional testing and commissioning shall include, at a minimum:
 - a. PBB movements to the maximum limits – tunnel extension, left / right swing, vertical

- b. HMI Functions and displays
- c. HMI messages for all limits and error conditions and associated audible alarms.
- d. Full Cab Rotation
- e. PBB will reach all parking positions and doorsill height at park positions. Must meet Owner's Gate Layout.
- f. Auto level over travel message and audible alarm
- g. All other audible alarms and flashing beacons
- h. Lift Column fault does not allow PBB to operate
- i. All interior and exterior lights and outlets
- j. All functions on the Operator's Control Console
- k. GPU, Cable Hoist, PCAir, PCAir Precool and Canopy Interlocks function correctly
- l. Camera System Function and View from All 4 Cameras.
- m. Perform a "canned smoke" test of the PBB smoke detector to verify:
 - (1) Ventilator and PCAir Pre-cool / heat are disabled.
 - (2) Warning message and Smoke Detector Reset are displayed on PBB HMI
 - (3) Alarm sounds at PBB console
 - (4) Smoke Detector Reset button on HMI resets smoke detector, removes warning message and ventilator and PCAir Pre-cool / heat are functional.
- n. Walkway, Tunnel and Transition Ramp Slope

C. PCAir

1. Contractor shall arrange and pay for a PCAir factory-authorized on-site representative for the time required to assist and/or supervise the installation, start-up and testing of all new PCAir gate equipment in accordance with the manufacturer's written instructions.
 - a. The on-site representative shall be the point of contact for interface with the manufacturer's home office engineering, manufacturing and other support staff as needed, and serve as liaison with the Contractor, if applicable.
2. Before operating the system, perform these steps:
 - a. Check filters for cleanliness.
 - b. Prepare report test sheets for each PCAir unit. Obtain manufacturer's recommended procedures for testing.
 - c. Check fan rotation.
 - d. Connect air handling unit (via flexible ductwork) to Contractor-provided "test section."
3. Start-up and Testing
 - a. Each PCAir unit shall be tested for a minimum of two hours in each mode of operation. All tests shall be witnessed by the Owner or their designee.
 - b. Contractor shall provide an adjustable "test section" to simulate the pressure and flow restrictions of different aircraft and to allow for the use of the required meters and test devices to measure air flow volume, temperature and pressure.
 - c. Test section shall be installed at the end of the aircraft hose to simulate air flow conditions entering the aircraft.
 - d. The maximum number of hose sections required for the specified aircraft mix shall be used for testing.
 - e. The "test section" must be able to be attached to the 14-inch flexible PCAir duct via an aircraft adapter nozzle.
 - f. The "test section" shall be mounted on feet for stability, and a volume damper shall be located at the far end of the "test section" to adjust static pressure and

- airflow.
 - g. Also provide a port at the midpoint of the "test section" large enough to insert a pitot tube.
 - h. All PCAir units shall be tested during start-up with this test section for airflow volumes, gauge pressure and supply air temperature.
 - i. For Aircraft Cooling Operation:
 - (1) Measure and record the supply air temperature, flow rate, and gauge pressure at the outlet of the aircraft connector.
 - (2) For gates servicing multiple sizes of aircraft, supply air recordings shall be made for all Selector switch options.
 - j. For Aircraft Heating Operation:
 - (1) Measure and record the supply air temperature, flow rate, and gauge pressure at the outlet of the aircraft connector.
 - (2) For gates servicing multiple sizes of aircraft, supply air recordings shall be made for all selector switch options.
 - (3) Verify electric strip heat stage control.
 - k. For Bridge Precool and Preheat Operation:
 - (1) Measure supply airflow rate and temperature at the supply air grille.
 - (2) Verify correct damper position.
 - (3) Verify aircraft hose does not inflate when PCAir unit in Bridge Pre-cool/Preheat operation even if not properly stored in basket.
 - l. For Safety Device:
 - (1) Perform a "canned smoke" test of the PCAir unit smoke detector to verify proper unit shut down and visual and audible alarm indication.
 - (2) Verify unit restarts after manual reset energized.
 - (3) Perform a test of the PCAir unit CO2 detector to verify proper unit shut down and visual and audible alarm indication.
 - (4) Verify unit restarts after manual reset energized.
 - m. Record and Report Data:
 - (1) Record all data obtained during start-up and testing procedures as approved on the sample report forms.
 - (2) Provide back-up calculations that verify the recorded values match expected unit operation at the outdoor conditions the tests were run at.
 - (3) Provide recommendations for correcting unsatisfactory mechanical performances when system does not meet specified design criteria.
 - n. Correct all deficiencies resulting from tests.
 - o. In the event that equipment defects necessitate the rejection of the PCAir equipment, the Owner's Project Representative shall have the right to operate the equipment without additional cost until such time as new equipment is provided to replace the rejected equipment. Replacement of the equipment shall be coordinated and scheduled with the Owner.
4. Confirm that the PBB does not operate when PCAir is running in aircraft cool or heat mode and that a warning message is displayed on the HMI and an audible alarm on the console faceplate is activated.
5. Confirm that the PBB does or does not operate, as determined by the HMI setting, when the PCAir is running in aircraft pre-cool or pre-heat mode and that a warning message is displayed on the HMI and an audible alarm on the console faceplate is activated if required.

6. Perform a "canned smoke" test of the PCAir smoke detector to verify:
 - a. PCAir unit shuts down.
 - b. Warning message is displayed on PBB HMI
 - c. Light and audible alarm are activated on the front of the PCAir unit.
 - d. Smoke Detector is able to be reset, light and alarm are reset and message on PBB HMI is removed.
7. Perform a test of the PCAir CO2 detector to verify:
 - a. PCAir unit shuts down.
 - b. Warning message is displayed on PBB HMI
 - c. Light and audible alarm are activated on the front of the PCAir unit.
 - d. CO2 Detector is able to be reset, light and alarm are reset and message on PBB HMI is removed.

D. GPU

1. Contractor shall arrange and pay for a GPU factory-authorized on-site representative for the time required to assist and/or supervise the installation, start-up and testing of all new GPU gate equipment in accordance with the manufacturer's written instructions.
 - a. The on-site representative shall be the point of contract for interface with the manufacturer's home office engineering, manufacturing and other support staff as needed, and serve as liaison with the Contractor, if applicable.
2. Confirm the GPU functions properly when operated with Pushbutton and 400Hz Vac output
3. Confirm Cable hoists operate properly with Pushbutton
4. Confirm that output cables reach connection points for all specified aircraft
5. Confirm that the PBB does not operate when GPU is running or hoist is deployed and that a warning message is displayed on the HMI and an audible alarm on the console faceplate is activated.
6. In addition to the tests listed above, the Contractor shall conduct both resistive AND reactive load bank testing the GPU outputs, simultaneously.
 - a. These load tests shall be carried out at various load levels, beginning at minimum loads and increasing in several steps to maximum load.

APPENDIX I – SUBMITTAL SCHEDULE

Shop Drawings and Samples

Description	Due Date
Index of Shop Drawings, Samples and Required Documentation that will be submitted by Contractor	Per Contractor's Submittal Schedule
Certification by Third Party agency or NRTL of actual fire test reports which indicated compliance to NFPA 415 2022, Chapter 6, Sections 6.4.5, 6.4.6, 6.4.7, 6.4.8, 6.4.9, 6.4.10	With Contractor Proposal or prior to Contract Award.
Certification by Third Party Agency or NRTL that the PBB design complies with NFPA 415 2022, Chapter 6, Sections 6.1 and 6.2.	With Contractor Proposal or prior to Contract Award.
Certification by Third Party Agency or NRTL that materials used in the construction of the PBB comply with NFPA 415 2022, Chapter 6, Sections 6.3	With Contractor Proposal or prior to Contract Award.
Certification by a Third Party Agency or NRTL that PBB design complies with the applicable UL codes.	With Contractor Proposal or prior to Contract Award.
Calculations, data and information that certify the PBB Design will comply with all load requirements as specified in Section 2.6	Per Contractor's Submittal Schedule
Product Data / Cut Sheets	Per Contractor's Submittal Schedule
Interior Finishes	Per Contractor's Submittal Schedule
Exterior and Exterior Finishes	Per Contractor's Submittal Schedule
Cab	Per Contractor's Submittal Schedule
Safety / Signage	Per Contractor's Submittal Schedule
Electrical, Mechanical, Structural	Per Contractor's Submittal Schedule
Electrical load and requirements for PBB, PCAir and GPU	Per Contractor's Submittal Schedule
Foundation Load Reactions for PBB and Fixed Walkway	Per Contractor's Submittal Schedule
Rotunda Spool Piece design for those gates that require it.	Per Contractor's Submittal Schedule
Installation Drawings	Per Contractor's Submittal Schedule
As Built Drawings –Signed and Sealed	30 Days from Final Acceptance of first Gate
Software and Laptop, as required by Specifications	Substantial Completion of First Gate

Required Documentation

Description	Due Date
Certificate of Compliance – Signed by QA, Engineering and General Managers	Prior to First Factory Inspection
Recommended Spare Parts List w/ Pricing	With Shop Drawing Submittal
Project Progress Schedule	30 Days from NTP
Written notification of Start of Fabrication for 1 st unit	30 Days prior to start of Fabrication
Written Notification of completion of assembly and readiness for factory inspection and testing – each unit.	15 Days prior to completion of assembly.
Training plan and class syllabus for all training	60 Days from NTP
Proposed content and format of O&M Manuals	60 Days from NTP
Final O&M Manuals	With shipment of Equipment for 1 st Gate

QUALITY ASSURANCE / TESTING

Description	Due Date
Quality Plan, specific to the Project and including at a minimum, the following - Review, Inspection, Hold and Witness points, with acceptance criteria, that will be performed during the contract review, design, manufacturing, factory testing, installation and field testing / commission. - Scope of inspections and tests to be performed, with acceptance criteria - Test plans, procedures, methods, techniques for Factory Acceptance Testing. - Test plans, procedures, methods, techniques for Onsite Functional Testing and Commissioning	60 Days from NTP
Contractor's Factory Test results and records – Each piece of equipment	Prior to Shipment of each piece of equipment
Contractor's On-Site Functional Test Results and Records – Gate by Gate	With Final Acceptance of a Gate

INSTALLATION

Description	Due Date
Installation Methods Statement per requirements of 3.2.A.1 • Method to insure compliance to Code, Specification and Drawing requirements • Gate by Gate Installation and Phasing Plan and Schedule • Proposed site survey process and forms • Equipment Delivery and Off Loading Procedures • Description of equipment removal and scrap process. • Description of process and procedures to remove, store and reinstall existing PCAir units that are to be reused. • New Equipment installation procedures / process. • Existing Fixed Walkway refurbishment process. • Process to ensure compliance to equipment manufacturer's installation manual, drawings and field package. • Description of how on site testing and commissioning will be accomplished. • Description of how punch list items will be identified, tracked and completed. • Use of barriers to segregate work at the site. • Resume or CV of Proposed Installation Site Manager • Resume or CV of Proposed Manufacturer's Technical Representative, if different than Site Manager.	90 days from NTP
Minutes from Weekly Site Status Review meetings	Weekly once installation begins
Certificate of Scrap – Each gate	10 days from removal of equipment from gate
Completed Permits / Certificates from City of Philadelphia and Tini-cum- Gate by Gate	At Final Acceptance for each Gate
Site Survey Report, with all dimensions and information about terminal building, electrical service and walkway and rotunda foundation. For all gates.	60 days from NTP,
Written Notice of Proposed Date of Substantial Completion on On-Site Testing. Gate by Gate Basis	7 Days Prior to Proposed Date of Substantial Completion
Written Notice of readiness for Final Acceptance Inspection. Gate by Gate Basis.	7 Days Prior to Readiness for Final Acceptance Inspection.
Final Acceptance Certificate	Upon completion of Final Acceptance Inspection and no remaining Punch List Items

APPENDIX II – AUDIBLE ALARM AND MESSAGE SUMMARY

Function	Audible Sonic	Warning message Script Type	Icon /Button- is illuminated	Larger Message Pop-up on HMI
a.) Slope Limit – UP	☐	☐	☐ Flashing .....	.....
b.) Slope Limit – Down	☐	☐	☐ Flashing .....	.....
c.) Swing Limit - LEFT	☐	☐	☐ Flashing .....	.....
d.) Swing Limit - RIGHT	☐	☐	☐ Flashing .....	.....
e.) Swing Left - mechanical...	☐	☐	.....	☐ Flashing.....
f.) Swing Right - mechanical ...	☐	☐	.....	☐ Flashing ...
g.) Lift Column – UP	☐	☐	☐ Flashing .....	.....
h.) Lift Column – DOWN	☐	☐	☐ Flashing .....	.....
i.) Lift Column – UP mech. ....	.....	☐	.....	☐ Flashing.....
j.) Lift Column – DOWN mech. ....	.....	☐	.....	☐ Flashing.....
k.) Tunnel Limit – EXTEND	☐	☐	☐ Flashing .....	.....
l.) Tunnel Limit – RETRACT	☐	☐	☐ Flashing .....	.....
m.) Tunnel extend mechanical.....	.....	☐	.....	☐ Flashing
n.) Tunnel retract mechanical.....	.....	☐	.....	☐ Flashing
o.) Canopy – DEPLOYED .....	☐	.....	☐ Flashing .....	.....
p.) Cab Rotate – LEFT	☐	☐	☐ Flashing .....	.....
q.) Cab Rotate – RIGHT	☐	☐	☐ Flashing .....	.....
r.) Spacer – SLOW DOWN.....	.....	☐	☐ Flashing .....	.....
s.) Spacer – STOP .....	.....	☐	☐ - Steady.....	.....
t.) Power – Phase loss .....	.....	☐	.....	☐ Flashing
u.) GPU Hoist – DOWN	☐	☐	☐ Flashing .....	.....
v.) GPU – OPERATING	☐	☐	☐ Flashing .....	.....
w.) PCAir – OPERATING	☐	☐	☐ Flashing .....	.....
x.) PCAir – BRIDGE COOL .....	.....	.....	☐ Steady .....	.....
y.) Auto Level – OPERATING .....	.....	☐	☐ Steady .....	.....
z.) Auto Level – FAILURE	☐ ALARMS .....	.....	☐ Steady	☐ Flashing.....
aa.) Lift Column – RACK .....	☐	.....	☐ Flashing.....	☐ -Flashing.....
bb.) E-Stop – CONSOLE .....	☐	.....	.....	☐ - Flashing.....
cc.) E-Stop – LEFT SIDE – Colm .....	☐	.....	.....	☐ - Flashing.....
dd.) E-Stop – RIGHT SIDE – Str. ....	☐	.....	.....	☐ - Flashing.....
ee.) Horz. Drive won't engaged .....	.....	☐	.....	☐ - Flashing...
ff.) RJ – Floor operating.....	.....	.....	☐ - Steady.....	.....
gg.) RJ – Floor contact	☐	☐	☐ -Flashing.....	☐ -Flashing.....
hh.) Safety Shoe operating.....	.....	☐	☐ - Steady.....	.....
ii.) Safety Shoe failure.....	☐ ALARM .....	☐	.....	☐ - Flashing ...
jj.) Baggage conveyor operating.....	.....	☐	☐ -Flashing .....	.....
kk.) Wheel Guard .....	☐	☐	.....	☐ - Steady.....

END OF SECTION 347713

SECTION 347722 – POTABLE WATER CABINETS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Potable Water Cabinets for airports.
 - 2. Above ground water supply pipe and fittings.
 - 3. Insulation and heat tracing for freeze protection on water supply pipe.
- B. Requirements of Division 1 sections apply to work of this section.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of potable water cabinet indicated.
- B. Shop Drawings: For electric heating cable & controls.

1.3 CLOSEOUT SUBMITTALS

- A. System purging and disinfecting activities report.
- B. Operation and maintenance data.
- C. Field installation quality-control reports.
- D. Warranty: Executed warranty documents.

1.4 QUALITY ASSURANCE

- A. Cabinet shall be NRTL listed and labeled.
- B. Cabinet and installation shall comply with 21 CFR 1240 and 1250.
- C. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

- D. Inspections and Testing: Coordinate required field inspections by FDA, and State and local agencies having jurisdiction with DOA Engineering.

PART 2 - PRODUCTS

2.1 POTABLE WATER CABINETS

A. Product Description:

- 1. Factory assembled and tested cabinet complete with piping, hose reel, hose, nozzles, valves, heating and controls, to supply potable water to aircraft in accordance with US Food and Drug Administration (FDA) regulations.

B. Capacity and Dimensions:

- 1. Nominal Overall Dimensions – cabinet only without stand: 48" W x 31" D x 45" H
- 2. Nominal Door Dimensions: two each at 20.5" W x 40" H.
- 3. Hose:
 - a. Length: 300 Feet
 - b. Inside Diameter: ¾"
- 4. Weight: 630 Lbs.

C. Features and Construction:

- 1. Cabinet: Welded type 304, or 316, stainless steel with ground and polished joints; 16 gauge double wall insulated top, bottom, sides and door.
 - a. Finish: #4 polish inside and outside.
 - b. Stainless steel hardware.
 - c. Smooth, unobstructed, bottom inside to facilitate drainage and cleaning.
 - d. Sloped top for drainage.
 - e. Removable doors.
 - f. Automotive grade weather stripping on doors.
- 2. Piping and valves:
 - a. Bronze or stainless steel piping.
 - b. Lead free fittings and valves.
 - c. Full port valves.
 - d. Adjustable pressure regulator, 20 – 70 psi, with pressure gauge.
 - e. Shut-off valve, 1".
- 3. Freeze Protection tested to 40°F below Zero, with laboratory test reports available on request.
- 4. Electrical:
 - a. Electrical components UL listed.
 - b. Electrical components weather resistant or NEMA 4 rated.

- c. Heater, 2400w, 120V
- d. Light fixture, water resistant, 100w.
- e. Rewind motor, ½ hp, 120V
- f. GFCI, 120V
- g. Service outlet, 120V, 15A.

D. Accessories:

- 1. Fused Disconnect
- 2. Hose reel drive gear reducer
- 3. 4-Way hose roller guide
- 4. Stainless steel hose reel frame
- 5. Stainless steel reel chain guard
- 6. Water filter
- 7. Reduced pressure backflow preventer
- 8. Alarm beacon light
- 9. Stainless steel stand

E. Utilities:

- 1. Water: 1"
- 2. Electric:
 - a. (1) 15A, 120VAC
 - b. (1) 25A, 120VAC

F. Manufacturers:

- 1. Basis of Design: Specifications are based on equipment identified herein by manufacturer's name and model to establish acceptable standards of quality, performance, features, and construction.
 - a. Semler Industries, Inc., Franklin Park, IL, Model SIIF-2400 with accessories.
- 2. Other manufacturers: Contingent upon compliance with these specifications and documentation requirements set forth in SUBMITTALS, and approval by DOA, equipment produced by other manufacturers, including the following, may be considered as equal.
 - a. GNY Equipment, Bay Shore, NY

2.2 PIPING MATERIALS

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61 Annex G. Plastic piping components shall be marked with "NSF-pw."

2.3 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L (ASTM B 88M, Type B) water tube, drawn temper.
- B. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- C. Copper Unions:
 - 1. MSS SP-123.
 - 2. Cast-copper-alloy, hexagonal-stock body.
 - 3. Ball-and-socket, metal-to-metal seating surfaces.
 - 4. Solder-joint or threaded ends.

2.4 DIELECTRIC FITTINGS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Nipples:
 - 1. Standard: IAPMO PS 66.
 - 2. Electroplated steel nipple complying with ASTM F 1545.
 - 3. Pressure Rating and Temperature: 300 psig (2070 kPa) at 225 deg F (107 deg C).
 - 4. End Connections: Male threaded or grooved.
 - 5. Lining: Inert and noncorrosive, propylene.

2.5 SELF-REGULATING, PARALLEL-RESISTANCE HEATING CABLES

- A. Comply with IEEE 515.1.
- B. Heating Element: Pair of parallel No. 16 AWG, nickel-coated, stranded copper bus wires embedded in crosslinked conductive polymer core, which varies heat output in response to temperature along its length. Terminate with waterproof, factory-assembled, nonheating leads with connectors at one end, and seal the opposite end watertight. Cable shall be capable of crossing over itself once without overheating.
- C. Electrical Insulating Jacket: Flame-retardant polyolefin.
- D. Cable Cover: Tinned-copper braid and polyolefin outer jacket with ultraviolet inhibitor.
- E. Maximum Operating Temperature (Power On): 150 deg F (65 deg C) .
- F. Maximum Exposure Temperature (Power Off): 150 deg F (65 deg C).
- G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

- H. Capacities and Characteristics:
 - 1. Maximum Heat Output: 5 W/ft. (16.4 W/m).
 - 2. Piping Diameter: NPS 1 (DN 25).
 - 3. Number of Parallel Cables: One.
 - 4. Electrical Characteristics for Single-Circuit Connection:
 - a. 120 V / 1 Φ / 60 Hz
 - b. Minimum Circuit Ampacity: 15A.
 - c. Maximum Overcurrent Protection: 15A.
- I. Heating Cable Controls
 - 1. Pipe-Mounted Thermostats for Freeze Protection:
 - a. Remote bulb unit with adjustable temperature range from 30 to 50 deg F (minus 1 to plus 10 deg C).
 - b. Snap action; open-on-rise, single-pole switch with minimum current rating adequate for connected cable.
 - c. Remote bulb on capillary, resistance temperature device, or thermistor for directly sensing pipe-wall temperature.
 - d. Corrosion-resistant, waterproof control enclosure.
 - 2. Monitoring: Provide local monitoring, audible/visual alarm with silencing switch, and four additional dry contacts for future interface with a computerized facility automation system.
 - 3. Cable Installation Accessories: Fiberglass tape, heat-conductive putty, cable ties, silicone end seals and splice kits, and installation clips all furnished by manufacturer, or as recommended in writing by manufacturer.
 - 4. Warning Labels:
 - a. Provide warning labels on outside of insulation jacket indicating the presence of electrical heat tracing on pipe.
 - b. Provide labels on outside of insulation jacket indicating location of heat trace control elements.

2.6 INSULATION MATERIALS

- A. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- B. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

2.7 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
- C. PVC Jacket Adhesive: Compatible with PVC jacket.

2.8 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Color: White.
 - 2. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.

2.9 TAPES

- A. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
 - 1. Width: 2 inches (50 mm).
 - 2. Thickness: 6 mils (0.15 mm).
 - 3. Adhesion: 64 ounces force/inch (0.7 N/mm) in width.
 - 4. Elongation: 500 percent.
 - 5. Tensile Strength: 18 lbf/inch (3.3 N/mm) in width.

2.10 SECUREMENTS

- A. Nylon cable ties: UV resistant, nylon 6/6 cable ties, 50 lb tensile strength, -40F to 185F temperature rating, UL 94 V-2 Flammability rating.

2.11 BIRD BARRIER STRIPS

- A. General: Modular spike barrier strips.
 - 1. Material: Stainless Steel.
 - 2. Spikes: 4 inches long.
 - a. Minimum 120 spikes per linear foot of base strip.
 - 3. Minimum 90-degree coverage.
 - 4. Mounting Hardware: Cable ties plus manufacturer's standard adhesive and glue clips.

PART 3 - EXECUTION

3.1 POTABLE WATER CABINET INSTALLATION

- A. New Potable Water Cabinets (Gates D2, D4, D6, D8, D10, D11)
 - 1. Furnish and install new water cabinets in accordance with contract drawings and specifications.
 - 2. Install new water cabinets in accordance with the manufacturer's installation instructions.

3. Install new potable water cabinets in the same location where existing cabinets were removed at each respective gate. Secure each cabinet to the concrete base with appropriate expansion anchors. Patch existing concrete, and drill new anchor holes if required.
 4. Connect existing utilities to new cabinets in accordance with contract drawings and specifications.
- B. Temporarily Relocated Potable Water Cabinets and Repair (Gate E2)
1. Photograph cabinet, and all accessories to be reinstalled, to document existing condition, and submit to Engineer for record before beginning any work on cabinets.
 2. Disconnect utilities from the cabinet (and local disconnect switch), remove cabinet from its existing mounting, pack cabinet and any accessories for storage, and store cabinet and accessories in a secure, protected, location.
 3. Following installation of the new passenger boarding bridge, reinstall the cabinet per the contract drawings. Secure each cabinet to the concrete base with appropriate expansion anchors. Patch existing concrete, and drill new anchor holes if required.
 4. Reinstall the water cabinet in accordance with the manufacturer, Semler Industries, installation instructions.
 5. Repair existing defects. Repairs may include, but are not limited to, hinge repair, closer repair, signage repair, handle repair, light replacement, and power washing. The PWC shall be restored back to full working condition.
 6. Connect existing utilities to the reinstalled cabinet in accordance with contract drawings and specifications.
- C. Potable Water Cabinet Mounting: Install new potable water cabinets on concrete base.
1. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Install potable water cabinets level and plumb, according to layout drawings, and original design.
1. Install shutoff valves and unions on domestic-water-supply piping to potable water cabinets.
- E. CONNECTIONS
1. Drawings indicate general arrangement of piping, fittings, and specialties.
 2. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
 3. Use transition fitting to join dissimilar piping materials.
 4. Provide piping from auto-flush to grade with discharge elbow.

3.2 PIPING INSTALLATION

- A. Drawing plans, indicate general location and arrangement of domestic water piping. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install shutoff valve immediately upstream of each dielectric fitting.
- C. Install domestic water piping with 0.25 percent slope downward toward drain and plumb.
- D. Install seismic restraints devices on piping using methods approved by an agency acceptable to the AHJ that provides required submittals for component. Piping restraints shall comply with requirements in MSS SP-127.
- E. Install piping indicated to be exposed and piping in service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- F. Install piping to permit valve servicing.
- G. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- C. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- D. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

3.4 HANGER AND SUPPORT INSTALLATION

- A. Comply with MSS SP-69 and MS SP-89. Install hangers, supports, clamps and attachments as required to properly support piping.
 - 1. Vertical Piping: MSS Type 8 or 42, clamps.

2. Individual, Straight, Horizontal Piping Runs:
 - a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
- B. Support vertical piping and tubing at base and at top of riser.
- C. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 1. NPS 1 (DN 25): 72 inches (1800 mm) with 3/8-inch (10-mm) rod.
- D. Install supports for vertical copper tubing every 10 feet (3 m).

3.5 HEATING CABLE INSTALLATION

- A. Install Self-regulating, parallel-resistance electric heating cable for freeze protection on water supply piping.
- B. Install electric heating cable across expansion, construction, and control joints according to manufacturer's written instructions; use cable-protection conduit and slack cable to allow movement without damage to cable.
- C. Electric Heating-Cable Installation for Freeze Protection for Piping:
 1. Install electric heating cables after piping has been tested and before insulation is installed.
 2. Install electric heating cables and controls according to IEEE 515.1, and the manufacturer's installation instructions.
 3. Coordinate heat tracing installation with the trade installing insulation. Comply with requirements for heat tracing that apply to insulation.
 4. Install warning labels on piping insulation where piping is equipped with electric heating cables.
- D. Ground equipment according to manufacturer's instructions

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. General:
 1. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
 2. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
 3. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
 4. Install insulation with longitudinal seams at top and bottom of horizontal runs.
 5. Keep insulation materials dry during application and finishing.
 6. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
 7. Install insulation with least number of joints practical.

8. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 9. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
 10. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- B. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed valve covers manufactured of same material as pipe insulation when available.
 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
 3. Install insulation to flanges as specified for flange insulation application.
 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.

3.8 PIPING SCHEDULE

- A. Aboveground domestic water piping, NPS 2 (DN 50) and smaller, shall be the following:
1. Hard copper tube, ASTM B 88, Type L (ASTM B 88M, Type B); wrought-copper, solder-joint fittings; and brazed joints.

3.9 OUTDOOR, ABOVEGROUND PIPING INSULATION & JACKET SCHEDULE

- A. Domestic Water Piping: Insulation shall be the following:
1. Flexible Elastomeric: 1 inch (25 mm) thick.
- B. Drain piping from auto-flush: Insulation shall be the following:

1. Flexible Elastomeric: 1 inch (25 mm) thick.
- C. Install field-applied jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
 1. Piping, Exposed:
 - a. PVC: 30 mils (0.8 mm) thick.

3.10 IDENTIFICATION

- A. Label piping and equipment in accordance with airport guidelines.
- B. Label water piping to potable water cabinets as "POTABLE WATER".

3.11 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections.
 1. Equipment Tests
 - a. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
 - b. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
 - c. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
 - d. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 2. Piping Tests:
 - a. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved.
 - b. Cap and subject piping to static water pressure of 50 psig (345 kPa) above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
 - c. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
 3. Heating Cable Tests:
 - a. Perform tests after cable installation but before application of coverings such as insulation, wall or ceiling construction, or concrete.
 - b. Test cables for electrical continuity and insulation integrity before energizing.
 - c. Test cables to verify rating and power input. Energize and measure voltage and current simultaneously.
 - d. Repeat tests for continuity, insulation resistance, and input power after applying thermal insulation on pipe-mounted cables.
 - e. Remove and replace damaged heat-tracing cables.
 4. Backflow Preventer Test:

- a. Test and certify backflow preventers in accordance with EPA, FDA and local requirements.
 - b. Testing shall be by personnel certified to perform backflow preventer tests.
 - c. Submit to the DOA documentation of individual or company certification for testing.
5. Water Quality Tests:
 - a. Test water quality from potable water cabinet for free and total chlorine and microbiological contaminants.
 - b. Perform tests in accordance with the Potable Water Cabinet and Sanitary Waste Disposal System Operation Protocol for Philadelphia International Airport.
 - c. Repeat cleaning procedures if biological examination shows contamination.
 - d. Prepare and submit test reports and water samples in accordance with DOA Engineering and US Food and Drug Administration (FDA) requirements.

- B. Prepare test and inspection reports.
 1. Prepare reports for tests and for corrective action required.

3.12 CLEANING

- A. Clean and disinfect piping, and new and reinstalled domestic water cabinets, as follows:
 1. Purge new piping and components, and parts of existing piping components, within potable water cabinets.
 2. Use purging and disinfecting procedures prescribed by the FDA; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652, the manufacturer's recommendations, or follow procedures described below:
 - a. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
 - b. Flush piping system with clean, potable water until dirty water does not appear at outlets.
 - c. Fill and isolate system according to either of the following:
 - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
 - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
 - d. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

- B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

END OF SECTION 347722

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SECTION 260100 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. General Conditions.
2. Sleeves and Box-outs.
3. Painting.
4. Plywood backboards.

1.2 RELATED SECTIONS

A. Electrical requirements described in this Section apply to all Sections of Division 26. Division 26 specification sections are interrelated and what is called for by one section shall be deemed as required by the other sections. An individual specification section that lists other specific sections in RELATED SECTIONS is done for the convenience of the reader and is not to be construed as the only related sections.

A. Drawings and general provisions of Contract, including Section C - Special Provisions apply to all sections of Division 26.

B. Division 03 – Concrete

C. Division 05 – Metals

D. Division 23 – Equipment

E. X-103 – Security Requirements During Construction

1.3 DEFINITIONS

A. The following definitions are applicable to this Division.

1. Provide: Furnish, install, connect and test.
2. Wiring: Wire or cable installed in conduit with all required boxes, fittings, connectors, etc.
3. Work: Materials completely installed, including the labor involved.
4. Conduit: Rigid galvanized steel conduit (RGSC), electrical metallic tubing (EMT), intermediate metal conduit (IMC), rigid non-metal conduit (RNC), or flexible metal conduit (FMC).
5. Branch Circuit: The circuit conductors between the final overcurrent device protecting the circuit and the loads or outlets.

6. Feeder: All circuit conductors between the service equipment, the source of a separately derived system, or other power supply source and the final branch circuit overcurrent devices.
7. Where shown or where indicated: Reference to Drawings, item or items.
8. Or equal: Shall mean equivalent as approved by the Engineer

1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70 (NEC).
- C. Comply with NFPA-70E Standard for Electrical Safety in the Workplace
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. comply with IEEE-C2 National Electric Safety Code (NESC)

1.5 SYSTEM DESCRIPTION

- A. The extent of Division 26 work shall be as shown on the Electrical Drawings. This Division includes all the electrical work except that work specifically designated as being specified or required by other Divisions. Work is to include all labor and material necessary for the complete electrical installation and proper operation of all electrical systems including but not limited to equipment associated with the HVAC, Fire Protection, Fire Alarm and Plumbing Systems.
- B. Drawings: The Electrical Drawings are diagrammatic in nature except where specific dimensions, or specific details, are shown. Refer to other project drawings for exact locations of equipment, building dimensions, Architectural details and conditions affecting the electrical work.

1.6 SUBMITTALS

- A. General: Unless otherwise indicated, all submittals shall be made in accordance with requirements as specified herein and in the project General Conditions.
- B. All material lists and shop drawing submittals shall include a stamped indication signifying that the submittals have been previously reviewed for compliance with the Contract Documents, that all coordination required prior to field installation has occurred and that the material being submitted is approved for installation. The stamped indication shall include the name of the Contracting Firm, the date of the review and the signature of the Contractor. The Engineer will not review the shop drawing submittals without the Contractors stamped approval on the shop drawings. The responsibility of complying with the Contract Documents shall not be relieved by the Engineer's review and comments. The Engineer's review requires not less than two (2) weeks from date the shop drawings are received by the Engineer. Submittals

for equipment specified in each Section, with the exception of samples, shall be loose-leaf pages, bound into a 3-ring binder and submitted as a complete package. The submittal may be included in more than one volume. However, the submittal shall be separated into groups of types of equipment as follows:

1. Group I – Conduit, Boxes and Devices:
 - a. Conduit and Fittings
 - b. Pullboxes
 - c. Junction Boxes
 - d. Outlet Boxes
 - e. Wall Switches
 - f. Wall Dimmer Switches
 - g. Receptacles
 - h. Coverplates
2. Group II - Switchgear:
 - a. Disconnect Switches
 - b. Circuit Breakers
 - c. Fuses
3. Group IV - Systems:
 - a. Grounding System
4. Group V - Wire:
 - a. Conductors, 0-600 Volts
- C. Product Data: Manufacturers technical product literature, including specifications and installation instructions for each component and system as listed in Products, Part 2, of each section.
- D. Shop Drawings: Dimensioned drawings and layouts showing location of system components, accessories and secondary systems. Include wiring diagrams, connections and special installation details.
- E. Coordination Drawings: Detailed layout drawings showing primary elements, components and systems of electrical equipment and materials in relationship with other building components.
 1. Indicate clearances for servicing and maintaining equipment.
 2. Indicate locations where space is limited and sequencing and coordination will affect efficient installation of the Work.
- F. Quality Control Submittals: Provide the following for record:
 1. Test Reports.
 2. Certificates.
 3. Manufacturers Instructions.

4. Manufacturers Field Reports.

- G. Contract Close-out Submittals: Provide tab pages with metal or plastic reinforced holes to separate each major item or closely related group of items with typed item names on the tabs. Supply a table of contents at the beginning of each volume listing all items, the manufacturers and the name, address and phone number of the nearest authorized service representative. In addition to operation, maintenance and lubrication instructions, the manuals shall include the following:
1. Parts lists.
 2. Power and control wiring diagrams.
 3. Elementary or schematic wiring diagrams.
 4. Manufacturers recommended tightening torque for connections where applicable.
- H. Project Record Documents: Furnish project record documents in accordance with General Conditions and Division 1. Include marked up as-built drawings indicating proper circuit numbers, conduit homeruns, branch conduit runs, and other such pertinent data. Mark the actual installed depths of all buried electrical conduit or cable and show the measured horizontal distance from permanent construction, such as building walls. Especially mark where any riser conduit occurs. Include the following:
1. "As-built" conduit layout diagrams, including wire color code and/or tag number.
 2. Complete "as-built" wiring diagrams.
 3. Detailed catalog data on all installed system components.
 4. Copy of the test reports described elsewhere.
- I. Operation and maintenance data warranty: Provide three copies at time of Final Completion in accordance with the General Conditions and Division 01. Use multiple binders if a single binder would exceed 2-1/2" in thickness. Arrange the data in the same sequence as the specification Section. Delete or mark through extraneous data. Before final acceptance of work, the Contractor shall deliver the composite "Operating and Shop Maintenance Manual." Each manual shall contain, but not be limited to:
1. A statement of guarantee, including date of termination and name and phone number of the person to be called in event of equipment failure.
 2. Individual factory-issued manuals containing all technical information on each piece of equipment installed. In the event such manuals are not obtainable from the factory, it shall be the responsibility of the Contractor to compile and include them. Advertising brochures or operational instructions shall not be used in lieu of the required technical manuals.

1.7 SUBSTITUTIONS

- A. Throughout the Specifications, types of material may be specified by manufacturer's name and catalog number in order to establish standards of quality and performance. Where one or more manufacturers are listed for a product, without the words "or equal", provide the equipment of one of the manufacturers listed. Where one or more manufacturers are listed followed by the words "or equal", provide the product of one of the manufacturers listed, or request a substitution of a product of equal quality, performance and function as specified in Division 01. However, the burden is upon the

requester to prove such equivalence. He must request the Engineer's approval (in writing) to substitute such item for the specified item, with supporting data (and samples, if required) to permit a fair evaluation of the proposed substitute with respect to quality, serviceability, warranty and cost.

- B. When a substitute item is proposed, submittal for review shall be stamped "substitution".
- C. When a substitute item is proposed, all costs associated with changes to incorporate the substituted item shall be borne by the Contractor without incurring additions to the Contract.
- D. Where the contractor proposes a substitution and/or approved equal the contractor shall note this exception taken during shop drawing submission.

1.8 QUALITY ASSURANCE

- A. Qualifications: Manufacturers shall have minimum 5 years experience in the manufacture of the indicated products.
- B. Regulatory Requirements: All products (including equipment) furnished for the electrical installation shall bear the Listing Mark or Classification Marking (label) of UL where such marking is available or other approved testing agency. Products which are not listed will not be acceptable.
- C. The work under Divisions 26 shall comply with relevant portions of the following. The most stringent shall apply where a code conflict occurs.
 - 1. Federal Occupational Safety and Health Act.
 - 2. Americans with Disabilities Act (ADA).
 - 3. International Building Code with Pennsylvania Amendments.
 - 4. International Fire Code.
 - 5. NFPA-70 National Electrical Code (NEC), 2011.
 - 6. NFPA-70E Standard for Electrical Safety in the Workplace, 2009.
 - 7. NFPA-72 National Fire Alarm Code.
 - 8. NFPA-90A Installation of Air Conditioning and Ventilation Systems
 - 9. NFPA-101 Life Safety Code.
 - 10. International Energy Conservation Code (IECC), 2009 Edition with reference to ASHRAE Standard 90.1 - 2007.
 - 11. ANSI/NETA ATS InterNational Electrical Testing Association, Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems.
- D. Where different sections of any of the aforementioned codes and regulations, or the Contract Documents, require different materials, methods of construction or other requirements, the most restrictive shall govern. In any conflict between a general provision and a special provision, the special provision shall govern. In case of differences between the drawings and the specifications, or where the drawings and specifications are not clear, the higher cost alternative shall be included in the contract and the subject shall be referred to the Engineer for clarification and instructions.

1.9 DELIVERY STORAGE AND HANDLING

- A. Packing and Shipping: All materials shall be packed to prevent damage during shipping. Packing shall include plastic rap and crating. Coordinate shipping of items to the jobsite to prevent exposure to weather. Equipment will not be permitted to be stored outside.
- B. Acceptance at Site: All equipment/material delivered on-site shall be inspected immediately. All damage must be digitally photographed and documented. Safeguarding the equipment/materials delivered on-site is the responsibility of the contractor, including theft protection.
- C. Storage and Protection: Receive delivery of electrical equipment and protect from the weather at all times during storage and construction. Provide offsite storage of equipment if building is not totally enclosed and ready to accept equipment. Manufacturer's recommendations with regard to storage and protection shall be followed. Should any apparatus be subjected to possible damage by water, it shall be replaced with new apparatus, or at the direction of the Engineer, thoroughly dried and put through a dielectric test to ascertain the suitability of the apparatus, or it shall be replaced, in either case without incurring additions to the Contract.

1.10 PROJECT / SITE CONDITIONS

- A. Before ordering any equipment, the physical size of all equipment shall be checked to properly fit the allotted spaces shown, and to satisfy all NEC required clearances.
- B. Environmental Requirements: Comply with manufacturer's requirements for environmental conditions during shipping, storage, installation, testing and operation. Maintain manufacturers recommended ambient conditions such as temperature, humidity, altitude, ventilation, etc.
- C. Existing Conditions: Attention is called to the fact that this work is a renovation within an existing facility. Care must be taken not to interrupt the operation of the existing facility, nor any existing systems, except as directed by the Contract Documents and in coordination with the Owner. Included in this work is the requirement to visit the site, to review the existing conditions, and to become specifically familiar with the modifications and demolition work necessary. Failure to conduct the survey and any lack of familiarization with the existing conditions will not constitute grounds for consideration of additions to the Contract after award nor during construction. It must be understood that this work includes demolition and removal from the site of any materials and equipment rendered useless by this renovation. Any existing material or equipment specified to be salvaged shall be turned over to the Owner. When this work is completed, all existing systems shall operate and function in the same manner as prior to the renovation, completely integrated with any additions to the systems as indicated and as specified.
- D. Field Measurements: Measure and confirm field conditions prior to installation of equipment. Notify Engineer and Owner within 24 hours of any discrepancy or code violations caused by field conditions.

1.11 SEQUENCING, SCHEDULING AND COORDINATION

- A. Work shall be coordinated to preclude interference between the work of different trades and to ensure necessary clearances at crossovers and equipment. Work requiring necessarily fixed locations (e.g., piping with required slopes, lighting fixtures in ceilings, etc.) shall take precedence over work not requiring such fixed locations. Furnish all labor, materials and incidental elements, such as junction and pull boxes, fittings, pull wires, connectors, support materials, fuses, lamps and labels, along with other necessary requirements to install, connect, start-up and result in complete and working systems in accordance with the requirements of the Contract Documents.
- B. Provide all wiring, connectors, fittings and all other accessories necessary for the complete installation of, and final connections to, equipment furnished under other Divisions and/or by the Owner where shown. Secure approved shop drawings from all required disciplines and verify final electrical characteristics before roughing power feeds to any equipment. When electrical data on approved shop drawings differs from contemplated design, notify the Engineer before proceeding with the installation. Attention is called to the fact that certain features of control, other functions, or systems may be specified in this Division by performance, and as such, all elements of wiring or other materials and devices required for the complete installation may not be shown.
- C. Coordinate electrical equipment and materials installation with other building structural components.
- D. Arrange for chases, slots, and openings in other building components to allow for electrical installations.
- E. Coordinate the installation of required supporting devices, conduit, and sleeves to be set in poured in place concrete and other structural components, as they are constructed.
- F. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work.
- G. Coordinate the cutting and patching of building components to accommodate the installation of electrical equipment and materials.

1.12 PERMITS/LICENSES/FEES

- A. Obtain all permits and licenses, and pay all fees as required for execution of the Contract. Arrange for necessary inspections required by the city, county, territory and other authorities having jurisdiction, and present certificates of approval to the owner.

1.13 WARRANTY

- A. All work specified in Divisions 26 shall be guaranteed to be free from defects in material and workmanship for a period of one year or longer as required from date of final acceptance by the Owner.
- B. During this guarantee period, all defects in materials and workmanship shall be corrected without incurring additions to the Contract. The correction shall include all required cutting, patching, repainting, or other work involved, including repair or restoration of any damaged sections or parts of the premises resulting from any fault included in the guarantee.
- C. In addition to this general guarantee, present to the Owner any other guarantees or warranties from equipment or system manufacturers. These supplemental guarantees or warranties shall not invalidate the general guarantee.
- D. The one-year warranty period shall commence upon system acceptance by the Owner.
- E. In the event that defects in materials or workmanship are encountered during the warranty period, the Contractor shall provide all materials and labor required for prompt and proper correction of such defects at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL MATERIALS AND WORKMANSHIP

- A. Materials and apparatus required for the work shall be new, of first-class quality, and shall be furnished, delivered, erected, connected, finished in every detail, and shall be so selected and arranged as to fit properly into the building spaces in compliance with all requirements.
- B. Manufacturer's catalog numbers listed are not necessarily complete. Products provided shall be a standard product which has a history of successful installation and operation for a minimum period of two years. Prototype or custom made equipment is not acceptable unless so specified.
- C. Manufacturer's instructions shall be obtained and used for the installation of all equipment and devices where such manufacturers' instructions are available.

2.2 SLEEVES AND BOX-OUTS

- A. Provide rigid galvanized sleeves of minimum 4" diameter for future work and minimum 1" larger inner diameter than outer diameter of conduit or cable to be sleeved.
- B. Provide fireproofing of all sleeves and box-outs.
- C. All sleeves shall be RGSC.

2.3 PLYWOOD BACKBOARDS (INTERIOR WORK)

- A. 3/4" thick, softwood face plywood backboard with equipment mounting sides "finish grade", and all sides and edges painted with at least two coats of fire retardant black paint.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Applicable provisions of the latest edition of NECA 1"Standard Practices for Good Workmanship in Electrical Construction, published by the National Electrical Contractors Association (NECA) shall set the standard for installation of materials and equipment and for workmanship. Install all materials in a neat and orderly manner. Cover conduits, boxes, cabinets, and other enclosures with plastic covers or caps to prevent entrance of plaster, concrete, or other debris when work is not being done. Materials and equipment shall be installed using tools and equipment designed for the particular application.
- B. Manufacturer's instructions shall be obtained and used for the installation of all equipment and devices where such manufacturer's instructions are available.

3.2 PHASE ROTATION

- A. The phase rotation (A, B, C) of all service entrance, distribution and branch circuit installations shall be maintained throughout the entire project.
- B. Test the phase rotation at all distribution equipment to verify compliance.
- C. Confirm all existing phase rotation of equipment to remain and mark inside covers of pullboxes and disconnect switches. Marking shall match PIA standards and shall be in accordance with voltage and phase identification requirements of Section 260553, "Identification for Electrical Systems".

3.3 SLEEVES AND BOX-OUTS

- A. Structural portions of the work shall not be cut, channeled or core-drilled without the approval of the Engineer. Penetrations through fire rated walls shall be in a manner which will retain the original U.L. rating of the wall. All fire-stop materials shall be U.L. listed for the specific application in which they are being used. Fire-stop materials shall be installed per the manufacturer's directions for the particular rating applications.

3.4 PAINTING

- A. The surface of ungalvanized troughs, metal frames, support racks and plywood backboards, provided under this Section, shall be painted. Clean surfaces completely of all oil, wax, rust and old paint prior to painting. Paint shall be applied to backboards before switches, troughs and devices are installed on them. Paint shall include a

primer and two coats of finished paint. Backboards shall be painted with a flame retardant paint. Scratched or marred surfaces of lighting fixtures and other equipment shall be touched-up with paint specifically intended for that purpose, furnished by the equipment manufacturer.

- B. Where equipment finish is damaged, touch up by wire brushing clean and applying two coats of rust inhibitive primer and two coats of epoxy enamel to match factory finish.

3.5 EQUIPMENT ACCESS

- A. Install equipment so it is readily accessible for maintenance and operation. Provide access doors where required.

3.6 FIELD QUALITY CONTROL

- A. Tests and Reports: All systems and equipment shall be extensively tested by the electrical contractor prior to final inspection. Each test shall be signed off by the Owner in writing.
- B. At the time of the final inspection or at such time as part of the system may be completed, all electrical systems shall be tested, in the presence of the Engineer, for compliance with the Contract Documents. Furnish all necessary personnel and equipment, such as measuring instruments for current, voltage and resistance, and ladders, two-way radios, lights, etc. to assist the Owner in conducting the tests. Authorized representatives of the manufacturer of specialty equipment or systems shall be present during the tests to demonstrate compliance with the Contract Documents.
- C. Perform operational tests on all systems. Every system test report shall be performed according to the manufacturers instruction and shall include the following documentation, which shall be delivered to the Owner or a representative upon final acceptance of the system:
 - 1. Summary of Project.
 - 2. A complete list of equipment tested.
 - 3. Description of test.
 - 4. Indication that all equipment is properly installed and functions in conformance with the specifications.
 - 5. Tests results of equipment as applicable.
 - 6. Conclusions and recommendations
 - 7. Appendix, including appropriate test forms.
 - 8. List of test equipment used.
 - 9. Technician's name, certificate number and date.
- D. Final tests and inspection shall be held in the presence of the Owner's representatives and to their satisfaction. The Contractor shall supply personnel and required auxiliary equipment for this test.
- E. The complete system shall be tested to ensure that it is operating properly.

3.7 TEST INSTRUMENT CALIBRATION

- A. Calibrate instruments in accordance with the following frequency schedule:
 - 1. Field Instruments: Analog - 6 months maximum. Digital - 12 months maximum.
 - 2. Laboratory Instruments - 12 months maximum.
 - 3. Leased Specialty Equipment - 12 months.
- B. Dated calibration labels shall be visible on all test equipment.
- C. Records must be kept up to date which show date and results of instruments calibrated or tested.
- D. Maintain an up-to-date instrument calibration instruction procedure.
- E. Calibrating standard shall be of a higher accuracy than that of the instrument tested.

3.8 DEMONSTRATION AND TRAINING

- A. All training shall be scheduled and take place in a location and date agreed upon by the Owner. A course outline of the training program shall be forwarded to the Owner at least three weeks in advance of presentation of each course. All training must include all three work shifts with the hours to be coordinated with the Owner.
- B. Operational and Maintenance Training: Furnish time by responsible and knowledgeable manufacturer's representatives to fully instruct the Owner in the location, function and operation of devices and equipment specified in Division 26. Instruct the Owner in the Preventive Maintenance, troubleshooting and required maintenance checks of all items of equipment for which an operating and maintenance manual is specified.
- C. Video record all training sessions, and turn over to the owner for their use. Coordinate with the owner for preferred recording media format.

3.9 PROTECTION

- A. Protect all electrical equipment from damage at all times. Cover and enclose all equipment to protect from damage by water or moisture.

3.10 ADJUSTMENT

- A. Calibrate and adjust all equipment in accordance with manufacturer's instruction. Adjust and set all circuit breakers and relays in accordance with the coordination study when required by other specification sections.

3.11 CLEANING

- A. At completion of the work, clean all elements of the electrical system so that all markings deteriorating the original finish appearance are removed.
- B. Additionally, examine the interiors of switchboards, panelboards, cabinets, boxes, and like components where conduit and/or wire connections have been made, and all resulting wire ends, insulation cuttings, knock-out plugs, metal filings and any other construction debris shall be removed so that interiors and exteriors are clean.

END OF SECTION 260100

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Metal-clad cable, Type MC, rated 600 V or less.
3. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:

1. Section 271000 "Structured Cabling Systems" for cabling used for voice and data circuits.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Standards:
1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- D. Conductor Insulation:
1. Type RHH and Type RHW-2: Comply with UL 44.

2. Type USE-2 and Type SE: Comply with UL 854.
3. Type THHN and Type THWN-2: Comply with UL 83.
4. Type THW and Type THW-2: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
5. Type XHHW-2: Comply with UL 44.

E. Insulation Color: Factory applied full-length.

2.2 METAL-CLAD CABLE, TYPE MC

A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.

B. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

C. Circuits:

1. Multi-circuit with color-coded conductors.

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Ground Conductor: Insulated.

F. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

G. Armor: Steel, interlocked.

H. Jacket: PVC applied over armor.

2.3 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.
2. Type: Two hole with long barrels.
3. Termination: Crimp.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders:

1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits:

1. Copper, Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type XHHW-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type XHHW-2, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

E. Feeders in Cable Tray: Type XHHW-2, single conductors larger than No. 1/0 AWG.

F. Exposed Branch Circuits, Including in Crawlspace: Type XHHW-2, single conductors in raceway.

G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type XHHW-2, single conductors in raceway.

H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceway and Boxes for Electrical Systems" prior to pulling conductors and cables.

- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inch of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.

3) Thermographic survey.

- c. Inspect compression-applied connectors for correct cable match and indentation.
- d. Inspect for correct identification.
- e. Inspect cable jacket and condition.
- f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500 V(dc) for 300 V rated cable and 1000 V(dc) for 600 V rated cable for a one-minute duration.
- g. Continuity test on each conductor and cable.
- h. Uniform resistance of parallel conductors.

B. Cables will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports to record the following:

- 1. Procedures used.
- 2. Results that comply with requirements.
- 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

3.7 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.8 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

END OF SECTION 260519

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SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Section C - Special Provisions apply to this Section.

1.2 SUMMARY

- A. Section Includes: Grounding systems and equipment.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals. Include the following:
 - 1. Instructions for periodic testing and inspection of grounding features based on NFPA 70B.
 - a. Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
 - b. Include recommended testing intervals.

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ed for intended location and application.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.2 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- D. Bus-bar Connectors: Mechanical type, cast silicon bronze, solderless compression-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel, sectional type; 3/4 inch by 10 feet (19 mm by 3 m) in diameter.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated. Insulation color shall be green.
- B. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors.
 - 3. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
 - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
- C. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet (18 m) apart.

3.4 LABELING

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.

- B. Install labels at the telecommunications bonding conductor and grounding equalizer.
 - 1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
- C. Grounding system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Section C - Special Provisions apply to this Section.
- B. SUMMARY
- C. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.

1.2 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.3 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.
- B. Delegated Design Submittal:

1. Include design calculations and details of hangers.
2. Include design calculations for seismic restraints.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

1.6 COORDINATION

- A. Coordinate installation of equipment supports.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. ERICO International Corporation.
 - d. GS Metals Corp.
 - e. Thomas & Betts Corporation.
 - f. Unistrut; Tyco International, Ltd.
 - g. Wesanco, Inc.
 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 5. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter. JULY 8, 2016 SELECTIVE STRUCTURAL DEMOLITION 024119-3
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RGSC as required by NFPA 70, with supports located a maximum of every 10 foot along conduit runs. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RGSC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 1. To Wood: Fasten with lag screws or through bolts.
 2. To New Concrete: Bolt to concrete inserts.
 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. To Existing Concrete: Expansion anchor fasteners.
 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
 7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 IDENTIFICATION

- A. Identify raceways in accordance with PIA standards as indicated in Section 260553, "Identification for Electrical Systems".

3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
 - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

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SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Section C - Special Provisions apply to this Section.

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. FMC: Flexible metal conduit.
- D. IMC: Intermediate metal conduit.
- E. LFMC: Liquidtight flexible metal conduit.
- F. NBR: Acrylonitrile-butadiene rubber.
- G. RGSC: Rigid galvanized steel conduit.

1.4 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Custom enclosures and cabinets.
- C. Source quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Alflex Inc.
 - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 - 5. Electri-Flex Co.
 - 6. Manhattan/CDT/Cole-Flex.
 - 7. Maverick Tube Corporation.
 - 8. O-Z Gedney; a unit of General Signal.
 - 9. Wheatland Tube Company.
- B. RGSC: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - 1. Comply with NEMA RN 1.
 - 2. Coating Thickness: 0.040 inch (1 mm), minimum.
- E. EMT: ANSI C80.3.
- F. FMC: Zinc-coated steel.
- G. LFMC: Flexible steel conduit with PVC jacket.
- H. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
 - 1. Fittings for EMT: Steel or die-cast, compression type.
 - 2. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
- I. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

2.2 METAL WIREWAYS

- A. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1 or 4X, unless otherwise indicated.
- B. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- C. Wireway Covers: Screw-cover type.
- D. Finish: Manufacturer's standard enamel finish.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- C. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- D. Large exterior Metal Pull and Junction Boxes: NEMA 4X stainless steel
- E. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
- F. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- G. Cabinets:
 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 2. Hinged door in front cover with flush latch and concealed hinge.
 3. Key latch to match panelboards.
 4. Metal barriers to separate wiring of different systems and voltage.
 5. Accessory feet where required for freestanding equipment.

2.4 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Firestopping".

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 - 1. Exposed Conduit: RGSC.
 - 2. Concealed Conduit, Aboveground: RGSC, or IMC.
 - 3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 4X Stainless Steel.
- B. Comply with the following indoor applications, unless otherwise indicated:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed and Subject to Severe Physical Damage: RGSC. Includes raceways in the following locations:
 - a. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
 - 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 - 5. Damp or Wet Locations: RGSC.
 - 6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4X, stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.
- K. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
 1. 3/4-Inch (19-mm) Trade Size and Smaller: Install raceways in maximum lengths of 50 feet (15 m).
 2. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).
 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

- L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- M. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- N. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- O. Expansion-Joint Fittings:
 - 1. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
 - 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
 - 3. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 - 4. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- P. Where conduits transition from exterior to interior, provide conduit drain consisting of LB fitting for removal of moisture from conduit.
- Q. Install exterior raceway systems to drain to low point. Provide a weep hole at appropriate low point.

3.3 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Firestopping".
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
 - 1. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Firestopping."
- L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- N. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway and sleeve for installing mechanical sleeve seals.

3.4 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Firestopping".

3.5 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Section C - Special Provisions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification for conductors.
 - 3. Equipment identification labels.
 - 4. Miscellaneous identification products.

1.3 ACTION SUBMITTALS

- A. Product Data: For each electrical identification product indicated.

1.4 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.5 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Label Size: As follows:
 - 1. Raceways 1-inch and smaller: 1-1/8 inches high by 4 inches long.
 - 2. Raceways larger than 1-inch: 1-1/8 inches high by 8 inches long.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage or system type.
- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.2 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- C. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
 - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

2.3 EQUIPMENT IDENTIFICATION LABELS

- A. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).
- B. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch (25 mm).

2.4 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self extinguishing, one piece, self locking, Type 6/6 nylon.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 12,000 psi (82.7 MPa).
 - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
 - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 7000 psi (48.2 MPa).
 - 3. UL 94 Flame Rating: 94V-0.
 - 4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 - 5. Color: Black.

2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in Division 09 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

- E. Attach plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
 - 1. Outdoors: UV-stabilized nylon.
 - 2. In Spaces Handling Environmental Air: Plenum rated.
- I. Painted Identification: Comply with requirements in Division 09 painting Sections for surface preparation and paint application.

3.2 IDENTIFICATION SCHEDULE

- A. Identify raceways of certain systems with color banding: Band exposed or accessible raceways of the following systems for identification. Bands shall be pretensioned, snap-around colored sleeves, colored adhesive marking tape, or a combination of the two. Make each color band 2 inches wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side. Install bands at changes in direction, at penetrations of walls and floors, and at 40-foot maximum intervals in straight runs. Apply the following colors:
 - 1. Voice: White
 - 2. Airport LAN: Blue
 - 3. Security System (non-CCTV): Purple
 - 4. CCTV: Orange
 - 5. Mechanical and Electrical Supervisory System: Green
 - 6. 480 Volt Power Conduits: Black and Orange with 1" high lettering "277/480 Volts"
 - 7. 208 Volt Power Conduits: Black and Red with 1" high lettering "277/480 Volts"
- B. Identify junction and pull boxes: Code required caution sign for boxes shall be pressure sensitive, self-adhesive label indicating system voltage in black, preprinted on orange background. Also label box covers with identity of contained circuits. Use pressure sensitive plastic labels at exposed locations and similar labels or plasticized card stock tags at concealed boxes.
- C. Power Circuit Identification: Securely fasten identifying metal tags or aluminum wraparound marker bands to cables, feeders, and power circuits in vaults, pull boxes, junction boxes, manholes, and switchboard rooms with 1/4-inch steel letter and number stamps with legend to correspond with designations on Drawings. If metal tags are

provided, attach them with approximately 55-lb test monofilament line or one-piece self locking nylon cable ties.

D. Tag or label conductors as follows:

1. Multiple Circuits: Where multiple branch circuits or control wiring or communications/signal conductors are present in the same box or enclosure (except for three-circuit, four-wire home runs), label each conductor or cable. Provide legend indicating source, voltage, circuit number, and phase for branch circuit wiring. Phase and voltage of branch circuit wiring may be indicated by mean of coded color of conductor insulation. For control and communications/signal wiring, use color coding or wire/cable marking tape at terminations and at intermediate locations where conductors appear in wiring boxes, troughs, and control cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tapes.
2. Match identification markings with designations used in panelboards shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installations.

E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
 - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue
 - 4) Neutral: White
 - 5) Ground: Green.
 - c. Colors for 480/277-V Circuits:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral: White.
 - 5) Ground: Green
 - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

- F. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- H. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 - 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.
 - d. Switchboards.
 - e. Enclosed switches.
 - f. Enclosed circuit breakers.

END OF SECTION 260553

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Section C - Special Provisions apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Molded case circuit breakers for use in existing switchboards and panelboards, and for stand-alone enclosure use.
 - 4. Enclosures.

1.3 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
 - 1. Enclosure types and details for types other than NEMA 250, Type 1.
 - 2. Current and voltage ratings.
 - 3. Short-circuit current ratings (interrupting and withstand, as appropriate).
 - 4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
 - 5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

1. Wiring Diagrams: For power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
 1. Test procedures used.
 2. Test results that comply with requirements.
 3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- B. Manufacturer's field service report.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. Include the following:
 1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

1.7 QUALITY ASSURANCE

- A. Source Limitations: Obtain enclosed switches, components, and accessories, within same product category, from single source from single manufacturer. Where circuit breakers are to be added within existing equipment, match existing manufacturer, short circuit rating and type of devices.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NFPA 70.

1.8 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
 2. Altitude: Not exceeding 6600 feet (2010 m).
- B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
 2. Indicate method of providing temporary electric service.
 3. Do not proceed with interruption of electric service without Owner's written permission.
 4. Comply with NFPA 70E.

1.9 COORDINATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.1 FUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Eaton Electrical Inc.; Cutler-Hammer Business Unit or comparable product by one of the following:
1. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 2. Siemens Energy & Automation, Inc.
 3. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate specified fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
5. Hookstick Handle: Allows use of a hookstick to operate the handle.
6. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.2 NONFUSIBLE SWITCHES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Eaton Electrical Inc.; Cutler-Hammer Business Unit or comparable product by one of the following:
 1. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 2. Siemens Energy & Automation, Inc.
 3. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- C. Accessories:
 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
 3. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
 4. Hookstick Handle: Allows use of a hookstick to operate the handle.
 5. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.3 MOLDED-CASE CIRCUIT BREAKERS

- A. Products: Subject to compliance with requirements, provide product by one of the following:
 1. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
 2. Eaton Electrical Inc.; Cutler-Hammer Business Unit
 3. Siemens Energy & Automation, Inc.
 4. Square D; a brand of Schneider Electric.
- B. Where devices are being added to an existing piece of equipment, match the equipment manufacturer, rating and type
- C. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- D. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

- E. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
- F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.
- G. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
- H. Ground-Fault, Equipment-Protection (GFEP) Circuit Breakers: With Class B ground-fault protection (30-mA trip).
- I. Features and Accessories:
 - 1. Standard frame sizes, trip ratings, and number of poles.
 - 2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
 - 3. Application Listing: Appropriate for application.
 - 4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
 - 5. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
 - 6. Zone-Selective Interlocking: Integral with ground-fault trip unit; for interlocking ground-fault protection function.

2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 4X, stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
 - 3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers. Include notation of deficiencies detected, remedial action taken and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges.

END OF SECTION 262816

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