ADDENDUM #5

March 3, 2011

Re: Harrisburg Area Community College
Public Safety Center – Law Enforcement Complex & Site Improvements
Solicitation # 11-13

From: Eastern PCM, LLC
Construction Manager – HACC
645 N. 12th Street, Suite 200
Lemoyne, PA 17043

To: All Planholders

This Addendum is hereby made part of the Plans and Project Manual dated January 21, 2011for the above referenced project. The provisions of this Addendum are intended to supplement the provisions of the Plans and Project Manual and/or supersede them where contradictory thereto.

This Addendum contains changes to the requirements of the Plans and Project Manual. Such changes shall be incorporated into the Plans and Project Manual and shall apply to work with the same meaning and force as if they had been included in the original Plans and Project Manual. Where this Addendum modifies a portion of a paragraph or phrase of the Project Manual, the remaining unmodified portion of the paragraph or phrase shall remain in force.

The conditions and terms of the Plans and Project Manual shall govern work described in this Addendum. Whenever the conditions of work, or the quality or quantity of materials or workmanship are not fully described in this Addendum, the conditions of work etc. included in the Plans and Project Manual for similar items of work shall apply to the work described in this Addendum. If no similar items of work are included in the Plans and Project Manual, the quality of material and workmanship shall be subject to the written acceptance of the Architect.

5.1 ADDENDUM #4 CORRECTION

A. Item M.A. on page 5: REVISE to read: Paragraph 2.1.C: DELETE this paragraph in its entirety.

5.2 CHANGES TO THE PROJECT MANUAL

A. Section 00800 – Supplementary General Conditions

a. Article 7.3.12: ADD after the last sentence, “Itemization shall at a minimum include but not be limited to a brief description of the approved work, the value of each work item (if multiple), the original and adjusted contract amount, the

change to contract duration, if any, and a list of resulting change orders to any subcontractors, sub-subcontractors or any other entity employed to provide work on the project site.

B. Section 02833 – Steel Truss Bridge

a. Paragraph 1.2:

i. ADD Echo Bridge to the list of pre-approved manufacturers.
ii. DELETE Pioneer Bridge from the list of pre-approved manufacturers.

C. Section 03532 – Concrete Floor Topping: Replace this section in its entirety.

D. Section 10425 – Signs

a. Paragraph 2.2.A.4: REVISE to read, "Color selection for all aluminum letters, numbers and logos shall be selected by Architect during construction from full range of manufacturer available colors."

b. ADD Paragraph 2.2.A.6: All exterior aluminum letters, numbers and logos shall be fabricated hollow.

E. Section 15086 – Duct Insulation

a. CLARIFICATION: Outdoor ductwork will be double wall construction per section 15815 with no exterior insulation. Wrap the double wall duct with rubber roof membrane as noted in this section.

F. Section 15088 – HVAC Piping Insulation

a. Paragraphs 3.13, 3.14, 3.15: CLARIFICATION: Include hot water piping insulation to match heat pump piping insulation for noted services.

G. Section 15785 – Air-to-Air Energy Recovery Equipment: Replace this section in its entirety.

H. Section 15861 – Particulate Air Filtration

a. Paragraph 1.5.A.1: CLARIFICATION: Spare carbon filters are not required in the spare filters to be provided.

I. Section 15940 – Sequence of Operation

a. Paragraph 1.5.B.4: DELETE the sentence, "The controller will also monitor the carbon dioxide level and compare it to comfort conditions."

b. Paragraph 1.5.C.4: DELETE the sentence, "The controller will also monitor the carbon dioxide level and compare it to comfort conditions."

c. Paragraph 1.6.D.4: DELETE the sentence, "The controller will also monitor the carbon dioxide level and compare it to comfort conditions."

d. Paragraph 1.7.B.4: DELETE this paragraph in its entirety.

e. CLARIFICATION: Control dampers provided by the ATC supplier under this section. Delete reference to control dampers being furnished in other portions of the specifications.

f. CLARIFICATION: For cooling towers and air handling units, furnish and install all necessary hardware to interface to the ATC system. Communication interface shall be compatible with ATC system platform.

5.3 CHANGES TO THE DRAWINGS

A. Drawing C32

a. ADD sketch SC-19 attached to this addendum #5.

B. Drawing AA2.1

a. REVISE as identified in sketch A-1, attached to this Addendum #5.

b. ADD the following General Note: “All exterior aluminum letters, numbers and logos shall be fabricated hollow.”

c. ADD the following General Note: “Color selection for all exterior aluminum letters, numbers and logos shall be selected by architect during construction from full range of manufacturer available colors.”

C. Drawing AA2.2

a. REVISE as identified in sketch A-1, attached to this Addendum #5.

b. ADD the following General Note: “All exterior aluminum letters, numbers and logos shall be fabricated hollow.”

c. ADD the following General Note: “Color selection for all exterior aluminum letters, numbers and logos shall be selected by architect during construction from full range of manufacturer available colors.”

D. Drawing AA4.6

a. REVISE as identified in sketch A-1, attached to this Addendum #5.

b. ADD the following General Note: “All exterior aluminum letters, numbers and logos shall be fabricated hollow.”

c. ADD the following General Note: “Color selection for all exterior aluminum letters, numbers and logos shall be selected by architect during construction from full range of manufacturer available colors.”

E. Drawing AA4.7

a. REVISE as identified in sketch A-1, attached to this Addendum #5.

b. ADD the following General Note: “All exterior aluminum letters, numbers and logos shall be fabricated hollow.”

c. ADD the following General Note: “Color selection for all exterior aluminum letters, numbers and logos shall be selected by architect during construction from full range of manufacturer available colors.”

F. Drawing AB2.1

a. REVISE as identified in sketch A-1, attached to this Addendum #5.

b. ADD the following General Note: “All exterior aluminum letters, numbers and logos shall be fabricated hollow.”

c. ADD the following General Note: “Color selection for all exterior aluminum letters, numbers and logos shall be selected by architect during construction from full range of manufacturer available colors.”

d. REVISE lettering in Drawing 5/AB2.1 and 7AM2.1 to be 1” Thick Fabricated Hollow letters mounted ¾” off face of building. Backside of Aluminum letters, numbers and logos may be open.

G. Drawing AA4.1

a. REVISE as identified in sketch A-1, attached to this Addendum #5.

b. ADD the following General Note: “All exterior aluminum letters, numbers and logos shall be fabricated hollow.”

c. ADD the following General Note: “Color selection for all exterior aluminum letters, numbers and logos shall be selected by architect during construction from full range of manufacturer available colors.”

H. Drawing AA5.5

a. ADD the following not to detail 10/AA5.5: “Contractor may supply alternative manufacturer clip system in lieu of custom fabricated steel attachment clips. Contractor will be required to anchor into CMU back-up wall construction as identified in Drawing 10/AA5.5. Contractor will be required to supply calculations for review by structural engineer that alternative clip system will adequately support exterior Sun Shade.”

5.4 ATTACHMENTS

A. Specification Section 03532 – Concrete Floor Topping

B. Specification Section 15785 – Air-to-Air Energy Recovery Equipment

C. Sketch A-1 – Signage Revision

D. Sketch A-2 – Signage Revision

E. Sketch SC-19 – Revision to Drawing C32.

F. Wetland Mitigation Narrative

5.5 QUESTIONS

A. **Q:** In addendum #4, item: SSS, I asked for a description of the steel targets and the section given in the answer only tells me how many targets and no description at all. These are steel reactive targets and the cost can be from $500 to $50,000. I need some guidance on this.

A: As described in Specification Section 11485, Paragraph 1.2.A.1 The vendor is to provide an pneumatic oscillating shooting target system. It does not state to provide “steel reactive targets”. Paragraph 2.2.B outlines the overhead target system which is be equipped with a steel frame to hold the target in place and allow for rotation. Actual targets used are paper targets which will be provided by the college.

B. **Q:** In addendum #4, item: TTTT the specs show that both the acoustical and the ballistic wall material are applied to the protective baffles. There should be only one item applied to the protective baffles, either the Cortega acoustical or the Ballistic/acoustic wall material. The Plan drawings appear to only show the Cortega acoustical attached to the protective baffles.

A: Correct. The “Cortega” ceiling panels are to be adhered to the underside of all suspended baffles and the suspended safety ceilings as shown in the respective details. They are not to be applied to the vertical wall surfaces. Wall surfaces, farings and column protections are to receive the rubber protective material as specified in Specification Section 11488, Paragraph 2.2

C. **Q:** Can you please indicate which baffles are made of ¼” material and which are 3/8” material? It is typical to see all baffles in a tactical arrangement be made of 3/8” AR plate, while static ranges generally only require ¼” AR plate.

A: All protective ceiling systems, located at the fixed target lines of 25-yard, 50-yard and 100-yard are to utilize 3/8” thick AR 500 plate (Specification Section 11488) Suspended baffles shall be AR 500 plate in the locations as follows: 3/8” thick for Tactical baffles located between the target line and the 25-yard line ¼” thick for re-directive baffles located between the 25-yard line and the 100-yard line.

D. **Q:** Some specification items appear to be proprietary by their description. For instance, the trap dust system is specific to one manufacturer. Each manufacturer captures the lead dust differently by using the HEPA filters, but not necessarily by moving the air at 360 fpm.

A: Specification Section 11486, Paragraph 1.1.A.1 describes the provision for a bullet trap containment system with integral lead filtration and accumulation system. As addressed in question 279 above, the Basis of Design was the Action Target “Total Containment with Dust Collection”. Paragraph 2.2.F describes the Lead Filtration system, however alternate systems are acceptable which as a level of performance stated employs an active system designed to capture and remove airborne lead particulates within and surrounding the trap chamber.

E. **Q:** Another item that appears to be proprietary by description is the baffles. Our baffles use a structural steel frame welded to the back of the AR plate. We have been fabricating baffles with this method for over 15 years with no failures at numerous military, federal, and governmental facilities.

A: Specification Section 11488 does not state a proprietary Basis of Design. Paragraph 2.1 lists acceptable manufacturers only. All proposed systems meeting the criteria and performance set forth in the section are deemed acceptable, this includes, but is not limited to means of fabrication, methods of attachment or suspension of baffle units.

F. **Q:** Please confirm the unistrut channels to hang the baffles and safety ceiling will be provided by others.

A: As shown within the contract drawings, unistrut framing members will be provided and installed to the building structural steel members and spaced as noted. This is the responsibility of the General Trades contractor. If proposed suspension methods require additional framing members or support elements other that what is shown and detail (Reference Sheet SA4.5), this would be the responsibility of the installing vendor as to providing and installing.

G. **Q:** I need to know if drawing AD1.1 – Smoke Building notes #13-Light Fixtures, note #15-Electrical Panel is also part of the Electrical Contract.

A: Yes. All electrical work identified on drawing AD1.1 is the responsibility of the Electrical Contrator.

H. **Q:** While we can submit a bid that meets the training and functional requirements, we believe that it would not be possible for any other vendor to submit a 100% technically compliant bid. Will the bidder allow submissions that are not 100% technically compliant?

A: Products throughout the specifications are written using a “Basis of Design” which can be equipment, product, or material selected during the design phase along with the owner as meeting specific design intent such as; aesthetic, function, operation, cost etc. It should be noted that the specifications are written as a “performance” standard, of which alternate or substituted products must meet or exceed the standards stated. The technical applications, such as installation, construction, supports, etc. are not stated which would allow a competitor to submit a product which is as asked not “100% technically compliant.”

I. **Q:** Can fill deemed “unsuitable fill” be used for fill surcharge? The surcharge is only needed for weight and will be removed prior to construction of the structure.

A: Yes, unsuitable fill can be used for surcharge but must be disposed of per specification section 02300.

J. **Q:** 02300-11,3.22A Please provide a detail for the settlement platforms.

A: See Specification 02300 Section 2.3.C for description of settlement platform.

K. **Q:** Addendum 4 identifies areas of new wetlands, but I am having trouble finding any description on how we are to build the wetlands. Are we providing a specific soil blend for the bottom of the basins? Are we providing relocation of plants? Are we providing new plants/seeding in these areas?

A: A copy of the wetlands mitigation narrative has been included in this addendum #5.

END OF ADDENDUM

Please sign and return this page, via fax, to Eastern PCM, LLC at (717) 233-1666 indicating receipt of this Addendum.

Public Safety Center – Law Enforcement Complex and Site Improvements

Addendum #_____ has been received.

Company: _____
Print Company Name

Received By: _____
Print Name Signature

Date: _____

Please check one:

_____ We are bidding as a prime contractor
_____ We are not bidding
_____ We are a sub-contractor

SECTION 03532 CONCRETE FLOOR TOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide trowel-grade repair mortar for horizontal patch and repair [horizontal overlay] of existing substrate
B. Related Sections: Other specification sections which relate directly to the work of this section include the following:

1. Section 03300, Cast-In-Place Concrete.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include manufacturer's Material Safety Data Sheets.

1.3 REFERENCES

1. ASTM C 109, Compressive Strength
2. ASTM C 293, Flexural Strength
3. ASTM C 469, Modulus of Elasticity
4. ASTM C 157, Drying Shrinkage
5. ASTM C 1202, Chloride Permeability
6. ICRI Technical Guideline No. 03732 Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: The manufacturer shall be a company with at least five years experience and regularly engaged in the manufacture and marketing of products specified herein.

B. Installer's Qualifications: The contractor shall be qualified to perform the work specified by reason of experience.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver products in original packaging, labeled with product identification, manufacturer, batch number and shelf life.

B. Store products in a dry area with temperature maintained between 50° and 85° F (10° and 29° C). Protect from direct sunlight.

C. Handle products in accordance with manufacturer's printed recommendations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. ERM with CI: Single-component, polymer-modified, cement-based repair mortar, containing Portland cement, graded specialty aggregates, dry acrylic polymer and integral corrosion inhibitors. Comply with the following:
   1. Manufacturer: ARDEX Engineered Cements: 400 Ardex Park Drive, Aliquippa, Pa 15001 USA 724-203-5000 or Equal.
   2. Performance and Physical Properties: Meet or exceed the following values for material cured at 73° F (23° C) and 50 percent relative humidity:
      a. Application: Trowel.
      b. Working Time: 25 – 45 minutes.
      c. Compressive Strength: 7,000 psi (48.3MPa) at 7 days, 7,000 psi (56.58 MPa) at 28 days, ASTM C109.
      d. Flexural Strength: 1,200 psi (8.3 MPa) at 7 days, 1,500 psi (10.3 MPa) at 28 days, ASTM C78.
      e. Modulus of Elasticity in Compression: 3.67 x 10^6 psi at 28 days, ASTM C469, modified.
      f. Shrinkage: less than 0.06%at 7 days, less than 0.08%at 28 days, ASTM C157, air cured.
      g. Rapid Chloride Permeability: 820 Coulombs, at 28 days, ASTM C1202.
      h. Low -slump, non-sagging.
      i. Color: Concrete gray.
      j. Combustibility: Non-combustible, both before and after use.

PART 3 - EXECUTION

3.1 INSTALLATION OF ERM WITH CI:

A. Examine substrates and conditions under which materials will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.

B. Coordinate installation with adjacent work to ensure proper sequence of construction. Protect adjacent areas and landscaping from contact due to mixing and handling of materials.

C. Surface Preparation: Comply with manufacturer's printed instructions and the following.
   1. Remove loose and deteriorated materials from surfaces to be patched, to obtain an ICRI concrete surface profile CSP 4 or greater.
      a. For patch and repair, use mechanical chipping, sand-blasting or hydrodemolition.
      b. For overlay, use scabbler or shot-blasting.
   2. Provide right-angle cuts at perimeter of repair by saw-cutting or chipping; do not feather edge.
   3. Clean surfaces of bond-inhibiting materials including oil, dust and dirt, laitance and standing water.
      a. If hydro-demolition is used cement and particulate slurry must be removed from the prepared surfaces before the slurry hardens.

D. Mixing: Comply with manufacturer's printed instructions and the following.

1. Precondition components to temperature of 70° plus or minus 5° F (21° plus or minus 2.5° C) prior to mixing.
2. Add 6 to 6.5 pints (2.8 to 3.0 L) of clean potable water per 60-pound (27.2 kg) bag.
3. Mix using a mechanical mixer to a uniform, lump-free consistency. Avoid over-mixing.
4. For application depths greater than 2 inches, add up to 40 pounds (18.1 kg) clean, uniformly graded, saturated-surface-dry 3/8-inch aggregate per bag, as directed by manufacturer.
5. Do not add water beyond manufacturer’s instructions. Do not add additional powder.

E. Application: Comply with manufacturer's printed instructions and the following.

1. Apply when ambient and surface temperatures are 45° F (7.5° C) and rising.
2. Do not apply in freezing conditions or during precipitation.
3. Comply with manufacturer’s guides for hot and cold weather application.
4. Dampen substrate to fill concrete pores with water. Remove ponding, glistening, or surface water (saturated surface dry).
5. Apply scrub coat of repair mortar into substrate to ensure intimate contact and establish bond.
6. Apply mortar while scrub coat is wet. Consolidate and trowel to the desired finish, with a minimum thickness of 1/4 inch.

F. Curing

1. Keep surface damp for 48 hours with continuous light water-fogging.
2. If no coating or sealer is to be applied, a water-based curing compound meeting ASTM standard C309 may be used.
3. Do not use solvent-based curing compounds.

G. Cleaning: Remove excess material before material cures. If material has cured, remove using mechanical methods which will not damage substrate.

END OF SECTION 03532

SECTION 15785 - AIR-TO-AIR ENERGY RECOVERY EQUIPMENT

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. Fixed-plate sensible heat exchangers.
2. Packaged energy recovery units.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Field quality control reports.

C. LEED Submittals:

1. Product Data for Credit EA 4: Documentation indicating that equipment and refrigerants comply.
2. Product Data for Prerequisite IEQ 1: Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."

D. Shop Drawings: For air-to-air energy recovery equipment. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, elevations, and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

1. Structural members to which equipment or suspension systems will be attached.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air-to-air energy recovery equipment to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set(s) of each type of filter specified.
2. Fan Belts: One set(s) of belts for each belt-driven fan in energy recovery units.

1.7 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. ARI Compliance:

1. Capacity ratings for air-to-air energy recovery equipment shall comply with ARI 1060, "Performance Rating of Air-to-Air Heat Exchangers for Energy Recovery Ventilation Equipment."
2. Capacity ratings for air coils shall comply with ARI 410, "Forced-Circulation Air-Cooling and Air-Heating Coils."

C. ASHRAE Compliance:

1. Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
2. Capacity ratings for air-to-air energy recovery equipment shall comply with ASHRAE 84, "Method of Testing Air-to-Air Heat Exchangers."

D. NRCA Compliance: Roof curbs for roof-mounted equipment shall be constructed according to recommendations of NRCA.

E. UL Compliance:

1. Packaged heat recovery ventilators shall comply with requirements in UL 1812, "Ducted Heat Recovery Ventilators"; or UL 1815, "Nonducted Heat Recovery Ventilators."
2. Electric coils shall comply with requirements in UL 1995, "Heating and Cooling Equipment."

1.8 COORDINATION

A. Coordinate layout and installation of air-to-air energy recovery equipment and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

B. Coordinate sizes and locations of concrete bases with actual equipment provided.

C. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of air-to-air energy recovery equipment that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Packaged Energy Recovery Units: Two years.
2. Warranty Period for Fixed-Plate Total Heat Exchangers: 10 years.

PART 2 - PRODUCTS

2.1 PACKAGED ENERGY RECOVERY UNITS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Innovent or a comparable product by one of the following:
1. Des Champs Technologies.
2. RenewAire LLC.
3. Innovent

B. Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

C. Construction:
1. General: Construct unit as specified herein. Single wall and 1” double wall casing are unacceptable. Fans and coils must be removable without dismantling the structural framing of the unit. Unit shall be suitable for outdoor installation as detailed on the plan drawings.
2. Base: Construct base of minimum 10 ga. welded structural steel with cross supports integral lifting lugs. Bolted bases are unacceptable. Base shall be insulated and provided with a minimum 22 ga. galvanized G90 steel subfloor. Coat base with epoxy primer and urethane modified enamel top coat.
3. Flooring: Provide double wall floor construction. Walk on floor material shall be a minimum of 18 ga. galvanized G90 steel. Flooring sheets shall be sealed with a closed-cell neoprene gasket material to minimize sound transmission to spaces located below the unit. Subfloor shall be welded to the base frame.
4. Framing: Frame is constructed of formed galvanized members designed to support flush-mounted double-wall panels. Framing must have gasketing

between support members and panels. Casing must be thermal break construction.

5. Panels: Unit shall have non-load bearing heavy gauge 2" double-wall panels.
6. Casing Ratings: Maximum casing panel deflection shall not exceed L/250th at 8" w.c. TSP (where L is the longest panel span on the unit). Casing shall meet a SMANCA duct class leakage rating of 5 at 8" w.c. TSP.
7. Insulation: All interior walls, floor, and roof shall be double wall and insulated. Walls and roof are insulated with 2 lb/ft3 injected polyurethane foam insulation having an average R-value of 6 per inch. Floors shall be insulated with 1.5 lb/ft3 fiberglass insulation to achieve minimum R16. No insulation shall be exposed to the air stream.
8. Coatings: Exterior casing shall be coated with a primer (min. thickness of .15 mils) and a light grey top coat (minimum thickness of .85 mils) for outdoor mounted equipment Galvanized exterior unacceptable if unit casing or framework is welded. Interior casing shall be galvanized G90 steel
9. Access Doors: Provide double wall doors insulated with 2 lb/ft3 polyurethane foam. Doors shall be full height with stainless steel piano hinges and Allegis corrosion resistant compression latches (tool lockable in fan sections). Supply and exhaust air streams shall not be covered by a single door. Provide doors for access to any area requiring routine maintenance. Access panels in lieu of access door are unacceptable.
10. Door Accessories:
11. Access doors shall be provided with stainless steel door tie backs
12. Weather hoods: Provide weather hoods and bird screens over all exposed inlets and outlets. Ship hoods loose for installation in the field.
13. Roof: Provide roof with standing seam construction. Pitch roof with sufficient slope to ensure water drainage. Roof overhang to be provided around complete perimeter of the unit.

D. Flat Plate Heat Exchanger:
   1. Provide cross flow flat plate heat exchanger with performance as scheduled. Counter flow heat exchangers are unacceptable due to high pressure drop and fouling concerns.
   2. Heat exchanger plates shall be completely smooth with no dimples or corrugations for contaminants to adhere to.
   3. Maximum operating differential pressure of no less than 10” wc at 70°F. Maximum operating temperature no less than 400°F.
   4. Heat exchanger must have aluminum framing (steel framing not acceptable) and minimum 0.008” thick 99.5% pure aluminum plates.
   5. Entire heat transfer surface shall be visible for inspection and cleaning without disassembling the heat exchanger.
   6. Provide drain pans under entire heat exchanger. Terminate drain pan connections through the side of the unit. Drain lines must be properly trapped and freeze protected by the installing contractor.

E. Blower Motor
   1. Supply & Exhaust blower: 12 blade aluminum airfoil plenum fan with minimum L-50 400,000 hour rated bearings. Plenum fans with less than 12 blades are not acceptable due to increased noise levels. Non-airfoil blades are not acceptable

due to decreased efficiency of the fan. Fans shall be certified to bear the AMCA seal for air and sound performance

2. Motors shall be 3 phase TEFC with NEMA frame and 1.15 service factor. Motor base shall be adjustable. Motor brake horsepower shall not exceed scheduled values. Fan brake horsepower shall not exceed 85% of motor horsepower. All motors shall comply with EPACT efficiency requirements. All motors shall be premium efficiency.
3. Drives shall be adjustable for 10hp motors and smaller, fixed for 15 hp motors and larger. All drives shall be minimum 2-groove with 2 belts and minimum 1.2 service factor.
4. Isolation: Blower and motor shall be mounted on a unitary base with 1" housed seismic rated spring isolators.
5. Accessories:
   a. Variable frequency drives: Provide variable speed drive for supply and exhaust fans. VFDs shall be factory provided and installed inside the unit behind an access door.
      1) VFD options required: Manual bypass/Input line reactor. VFDs are used for filter loading / fan balancing purposes
   b. Airflow probes shall be provided around the fan inlet cone. Probes shall be provided by the fan manufacturer to ensure accurate airflow measurement & zero resistance to airflow. All electronics and controls required to output airflow measurement are provided by the unit manufacturer.

F. Dampers:
   1. Motorized dampers shall be low leakage type with galvanized steel construction, airfoil blades, vinyl edge seals, metal jamb seals, and synthetic bearings. Gravity dampers shall have aluminum frame, aluminum blades, extruded vinyl edge seals, and synthetic bearings.
   2. The following dampers shall be provided at a minimum (additional dampers may be required, please consult the sequence of operation to determine what is needed):
      a. Outside air shut-off damper, parallel blade type, 2-position actuator.
      b. Outside air heat exchanger face damper, opposed blade type, modulating actuator.
      c. Outside air heat exchanger bypass damper, opposed blade type, modulating actuator.
      d. Exhaust gravity damper.

G. Filters:
   1. Outside air filter: Provide 2" MERV 8 filter bank at the outside air inlet of the heat exchanger. Mount in a galvanized side access slide rack and size for 500 fpm maximum face velocity.
   2. Return air filter: Provide 2" MERV 8 filter bank at the return air inlet of the heat exchanger. Mount in a galvanizedside access slide rack and size for 500 fpm maximum face velocity.
   3. Filter Pressure Monitoring: Filter differential pressure switches shall be provided across all filter racks.

H. Heating:
1. Indirect fired duct furnace: An indirect fired duct furnace is provided with performance as specified in the schedule. Furnace shall be ETL listed using ANSI Z83.8 standards. Furnace shall have a tubular heat exchanger constructed of 409 stainless steel. Tubes shall have integral formed dimples to maximize heat transfer and condensate drainage. Burner assembly shall include inshot type burners, electronic spark ignition system, high temperature safety control, air proving switch, and draft inducer. Allowable gas inlet pressure is 6" to 14" w.c. Gas valve is minimum 4:1 turndown electronic modulating or turndown scheduled, whichever is greater. Vent pipe for indoor unit provided & installed by the contractor.

I. Electrical
1. Wire units according to NEC and ETL list the entire unit. ETL listing of electrical panel only is unacceptable. All major electrical components shall be UL listed. Factory wire unit for single point power connection. Enclose all power wiring in liquid tight conduit.
2. Provide non-fused disconnect, fan motor starters/protectors, contactors, control transformer, control circuit fusing, service switch, and terminal block. Units supplied with VFDs shall have individual branch fusing per drive. A motor protector shall be provided if equipment manufacturer's manual bypass is required.
3. Provide NEMA 3R electrical/control panel.
4. Factory test wiring and controls before shipment.
5. A door safety kill switch shall be provided on all blower section access doors. The door safety kill switch shall de-energize the blower motor if the access door is opened. The kill switch shall prevent motor startup if the blower section access door is open.
6. Lights: Provide vapor proof marine lights in [all access sections/fan sections/filter sections]. Wire lights to a single light switch. Mount light switch near the electrical panel and wire switch to a terminal strip in the electrical panel. Separate 120V power must be provided to the switch for indoor mounted equipment.

J. Controls:
1. Manufacturer must provide a stand-alone programmable digital control system for complete temperature & humidity control of the delivered air. The manufacturer will provide a standard sequence of operation for the type of equipment provided per this specification. The controller will be programmed to control discharge temperature The sequence of operation will include the following:
   a. Temperature control for all heating & cooling devices.
   b. Defrost control for all energy recovery devices.
2. The controller will communicate with the BAS through a Bacnet interface card provided by the equipment manufacturer. Only the points necessary to control the equipment will be provided unless a detailed points list is provided elsewhere on the plan drawings.
3. See Section Section 15940 "Sequence of Operation".

K. Accessories
1. Roof curb: A 16" prefabricated insulated roof curb will be provided for the unit. The curb will be suitable for a flat roof. The curb will be shipped disassembled.

2.2 CONTROLS

A. See Section 15900 ”HVAC Instrumentation and Control” and Section 15940 “Sequence of Operation”.

2.3 CAPACITIES AND CHARACTERISTICS

A. See Drawings for Characteristics.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine casing insulation materials and filter media before air-to-air energy recovery equipment installation. Reject insulation materials and filter media that are wet, moisture damaged, or mold damaged.

C. Examine roughing-in for electrical services to verify actual locations of connections before installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install gas-fired furnaces according to NFPA 54, "National Fuel Gas Code."

B. Roof Curb: Install on roof structure or concrete base, level and secure, according to The NRCA "Roofing and Waterproofing Manual - Volume 4: Construction Details - Low-Slope Roofing," Illustration "Raised Curb Detail for Rooftop Air Handling Units and Ducts." Install air-to-air energy recovery equipment on curbs and coordinate roof penetrations and flashing with roof construction specified in Section 07720 "Roof Accessories." Secure air-to-air energy recovery equipment to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.

C. Install units with clearances for service and maintenance.

D. Install new filters at completion of equipment installation and before testing, adjusting, and balancing.

3.3 CONNECTIONS

A. Comply with requirements for piping specified in Section 15181 "Hydronic Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to unit to allow service and maintenance.

C. Connect piping to units mounted on vibration isolators with flexible connectors.

D. Gas Piping: Comply with requirements in Section 15195 "Facility Natural-Gas Piping." Connect gas piping with shutoff valve and union and with sufficient clearance for burner removal and service. Make connection with AGA-approved flexible connectors.

E. Comply with requirements for ductwork specified in Section 15815 "Metal Ducts."

F. Indirect-Fired Furnace Vent Connections: Comply with Section 15550 "Breechings, Chimneys, and Stacks."

G. Install electrical devices furnished with units but not factory mounted.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. 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.

C. Tests and Inspections:

1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
2. Adjust seals and purge.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
4. Set initial temperature and humidity set points.
5. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

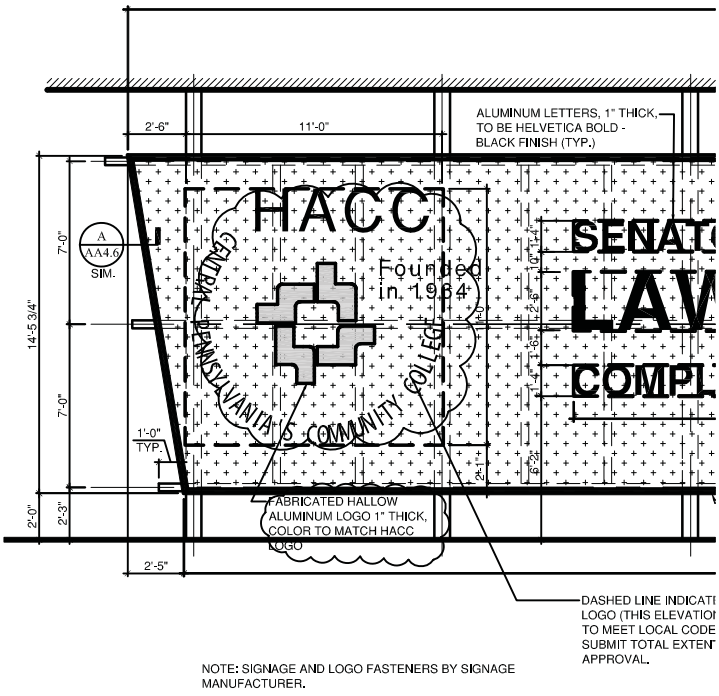
D. Air-to-air energy recovery equipment will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain air-to-air energy recovery units.

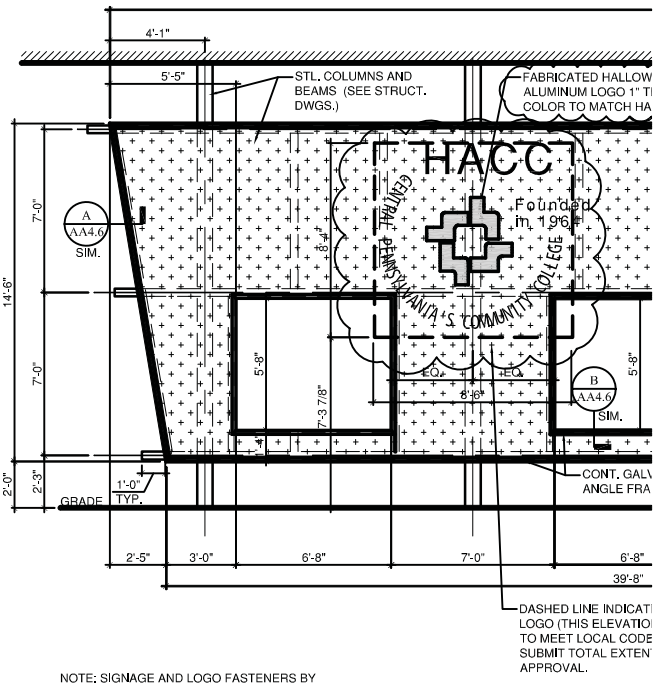
END OF SECTION 15785



NOTE: SIGNAGE AND LOGO FASTENERS BY SIGNAGE MANUFACTURER.

2 / AA4.7 PARTIAL BUILDING SIGNAGE ELEVATION

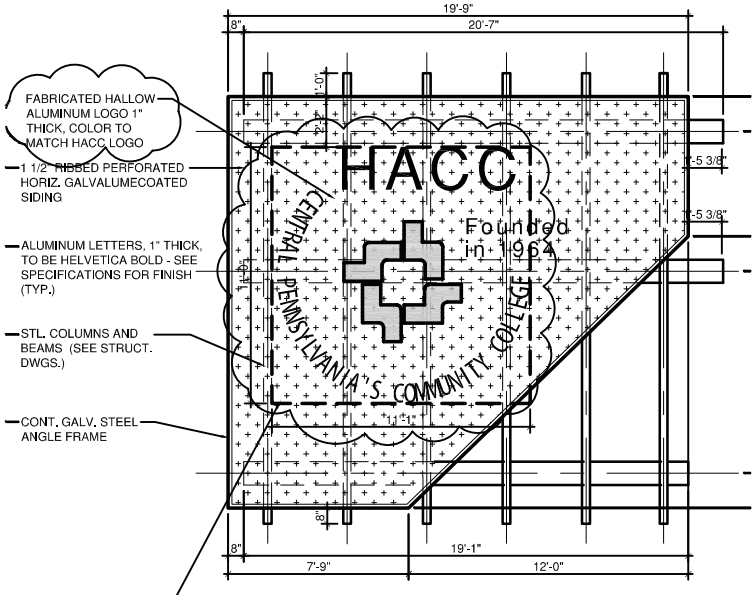
1/8" = 1'-0"



NOTE: SIGNAGE AND LOGO FASTENERS BY SIGNAGE/ LOGO MANUFACTURER.

2 / AA4.6 BUILDING SIGNAGE ELEVATION

1/8" = 1'-0"



2 / AB4.1 PARTIAL SCREEN ELEVATION

1/8" = 1'-0"

FONT TO BE NEW ASTER BOLD TEXT HEIGHT FOR 2/AA4.6 TO BE 16", TEXT HEIGHT FOR AB4.1 & 2/AA4.7 TO BE 23"

FONT TO BE BERLING BOLD, TEXT HEIGHT TO BE 6" FOR 2/AA2.6, TEXT HEIGHT TO BE 8½" FOR 2/AB4.1& 2/AA2.7

FONT TO BE ABADI CONDENSED LIGHT TEXT HEIGHT FOR 2/AA2.6 TO BE 7" TEXT HEIGHT FOR 2/AB4.1 & 2/AA2.7 TO BE 10"

ADDENDUM #5
DRAWING REF AA2.1, AA2.2, AA4.6, AA4.7 & AB4.1

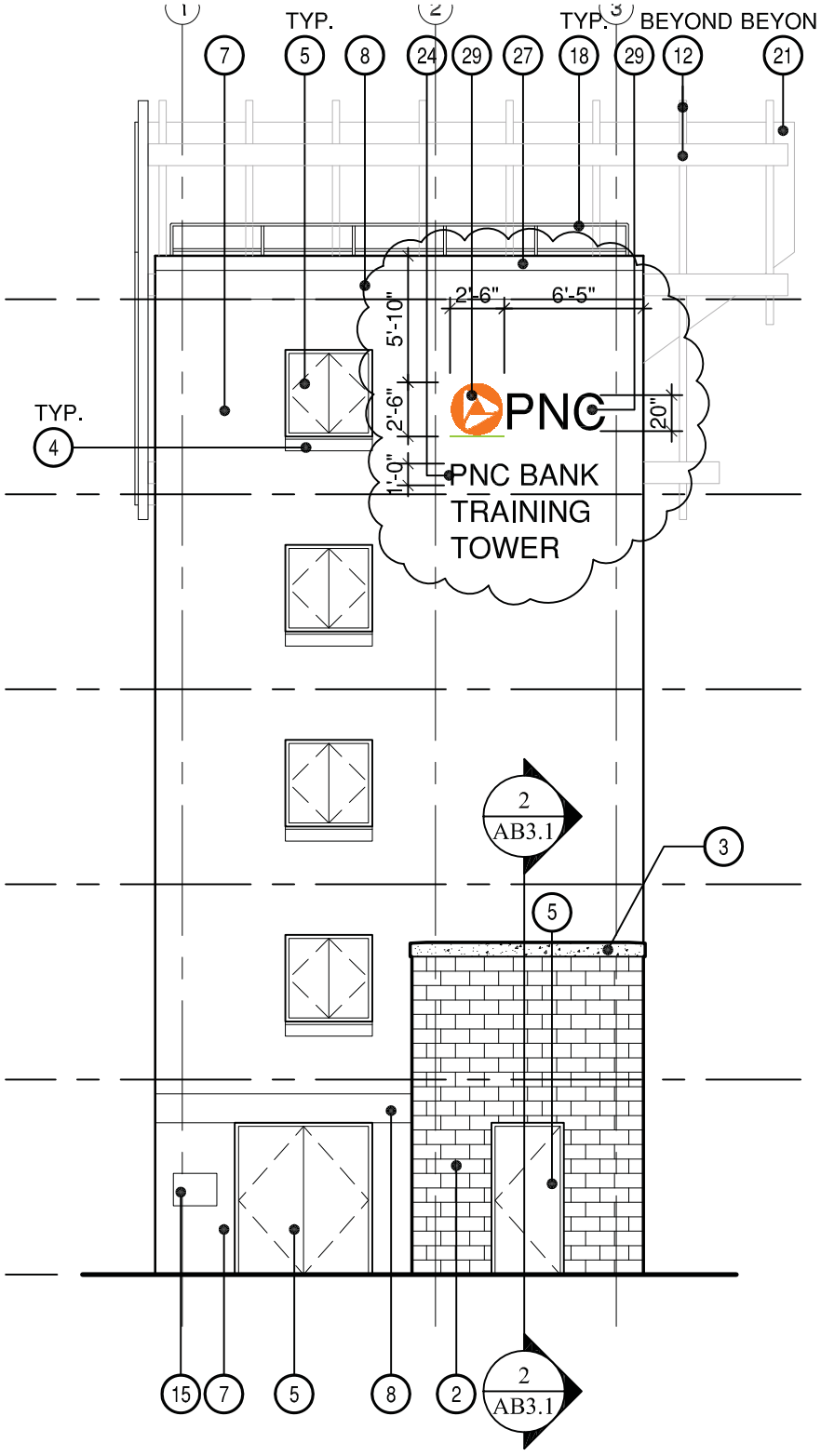
CRABTREE ROHRBAUGH & ASSOCIATES ARCHITECTS
401 E. WINDING HILL ROAD - MECHANICSBURG PA 17055
717-458-0272 FAX 717-458-0047 www.cra-architects.com

PUBLIC SAFETY CENTER - LAW ENFORCEMENT COMPLEX

PROJECT 2319

A-1

MARCH 3, 2011



ELEVATION LEGEND

(APPLIES TO TRAINING TOWER EXTERIOR ELEVATIONS)

DESIGNATION	DESCRIPTION
1	**TYPE "A"** G.F.C.M.U.
2	**TYPE "B"** G.F.C.M.U.
3	PRECAST CONCRETE CAP
4	EXISTING PRECAST CONCRETE SILL
5	HOLLOW METAL DOOR AND FRAME
6	EXISTING FLOOR SCUPPER -SEE DETAIL 3/AB5.1
7	EXISTING BRICK TO REMAIN
8	EXISTING PRECAST CONCRETE BAND
9	EXISTING STEEL ANGLE- PAINT TO MATCH G.F.C.M.U. TYPE "A"
10	EXISTING DOOR AND FRAME TO REMAIN
11	GALVANIZED METAL DOWNSPOUT W/ GUARD/ LEADER BOX (PAINTED) AND CONCRETE SPLASH BLOCK. SEE SHEET AB5.1.
12	PAINTED STEEL STRUCTURE
13	PAINTED STAIRS/ LANDING AND ALL ASSOCIATED COMPONENTS
14	EXPANSION JOINT - SEE TYPICAL DETAILS AB5.1
15	EXISTING PLAQUE
16	SLIDING DOOR - SEE DOOR SCHEDULE
17	FLOOR SCUPPER AND GALVANIZED METAL LEADER BOX (PAINTED) - SEE DETAIL 4/AB5.1
18	RAILING SYSTEM - PAINTED.
19	EXISTING RAILING SYSTEM- PAINTED.
20	EXISTING REPELLING POST- PAINTED.
21	PERFORATED METAL SCREEN -SEE SHEET AB4.1
22	ALUM. CAGED LADDER AND PLATFORMS ASSEMBLY- ALTERNATE.
23	LASER CUT ALUMINUM LOGO -ATTACH TO WALL/ SCREEN.
24	BUILDING SIGNAGE - "HELVETICA BOLD" FONT - BLACK. FIN. LETTERS TO BE 1" THK. -ATTACH TO WALL/ SCREEN.
25	BUILDING SIGNAGE - SEE DETAIL 7/AB2.1
26	ROOF SCUPPER AND GALVANIZED METAL LEADER BOX (PAINTED) - SEE DETAIL 4/AB5.1 (SIM.)
27	EXISTING PRECAST CONCRETE CAP
28	CONTROL JOINT - SEE TYPICAL DETAIL AB5.1
29	LOGO FABRICATED HALLOW 1" THICK ALUMINUM - FINAL LOGO AND FONT TO BE APPROVED BY PNC BANK

6 / AB2.1 SOUTH ELEVATION - TRAINING TOWER

1/8" = 1'-0"

ADDENDUM #5
DRAWING REF AB2.1

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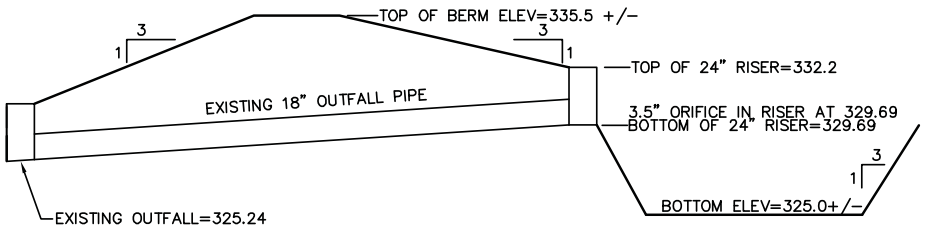
PUBLIC SAFETY CENTER - LAW ENFORCEMENT COMPLEX

PROJECT 2319

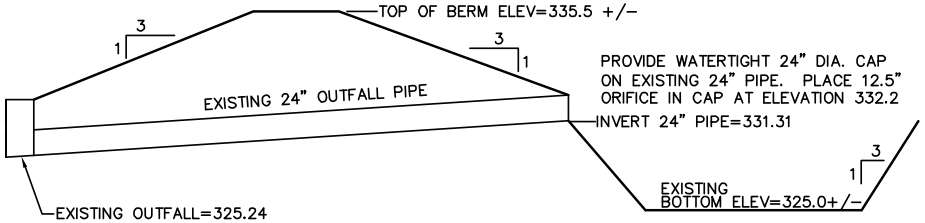
A-2

MARCH 3, 2011



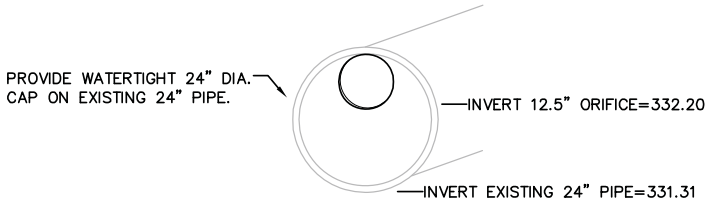
SECTION THROUGH EXISTING 18" STORAGE BASIN OUTFALL PIPE

NOT TO SCALE



SECTION THROUGH EXISTING 24" STORAGE BASIN OUTFALL PIPE

NOT TO SCALE



NOTE: PROVIDE TRASH RACK ON ORIFICE CAP FOR 12.5" ORIFICE.

EXISTING 24" STORAGE BASIN OUTFALL PIPE ORIFICE CAP

NOT TO SCALE

ADDENDUM NOTES:
1. ADDED 24" RISER TO EXISTING FIRE STORAGE POND 18" PIPE OUTLET
2. ADDED 24" ORIFICE CAP TO EXISTING FIRE STORAGE POND 24" PIPE OUTLET

REFER TO PLAN SHEET NO.: 32

ADDENDUM NO.: 5

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PUBLIC SAFETY CENTER - SITE IMPROVEMENTS
SENATOR JOHN J. SHUMAKER PUBLIC SAFETY CENTER
OPTION 1B - PHASE 1 & 2 IMPROVEMENTS
FOR
HACC - CENTRAL PENNSYLVANIA'S COMMUNITY COLLEGE
CITY OF HARRISBURG
DAUPHIN COUNTY, PA

SCALE:	AS SHOWN
DATE:	MAR. 3, 2011
K&W PROJECT:	2091.001
DRAWN BY:	ROE
CAD DRAWING:	2091001-I_cdDLTS.dwg
SHEET:	SC-19

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Compensatory Mitigation Narrative for the
HACC – Senator John J. Shumaker Public Safety Center
(Phase 1 and 2 Improvements Project)

This wetland mitigation narrative has been prepared to provide details on the compensatory mitigation package for the proposed wetland impacts associated with the HACC – Senator John J. Shumaker Public Safety Center (Phase 1 and 2 Improvements Project). The campus is located in the northwestern portion of the City of Harrisburg, Dauphin County, PA. The Public Safety Center is situated in the northern portion of the campus, east of Industrial Road and south of Interstate 81 (Figure 1).

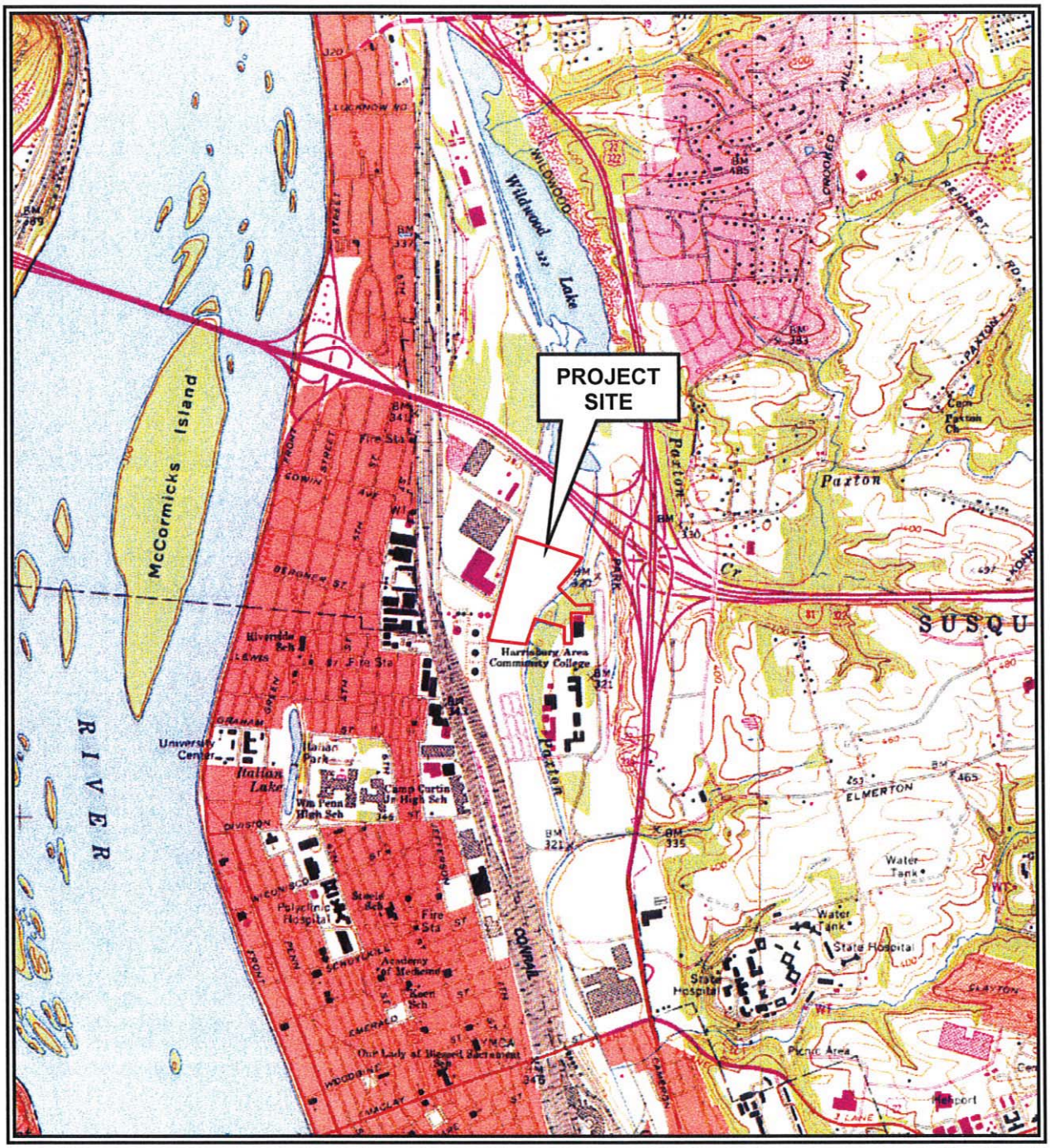
The proposed development associated with Phases 1 and 2 includes a new one-story law enforcement center and associated parking areas. This building will provide an indoor shooting range and offices. The building footprint is 49,000± SF. Adjacent to the new law enforcement center will be an athletic track and drill area for training activities related to the Public Safety Center. Additional work includes improvements to the training facilities located on-site, such as the driving course / skid pad area and the car extraction area. The project also proposes a pedestrian bridge across Paxton Creek to provide access to the Public Safety Center from the main campus facilities east of the creek.

A total of 0.28-acre of emergent wetlands and 0.02-acre of forested wetlands are proposed to be disturbed by the site improvements. The emergent wetlands replacement ratio is 1:1, and the forested wetlands replacement ratio is 2:1. The compensatory mitigation package for the proposed wetland impacts associated with this project consists of a 0.36-acre wetland mitigation area. The wetland mitigation area is located in the central portion of the project site, adjacent to an existing emergent wetland complex.

Wetland Mitigation Area Narrative

The proposed wetland mitigation area is located adjacent to the existing emergent wetland complex in the central portion of the project site. The wetland mitigation area consists of 0.36-acre. The proposed wetland mitigation area will be graded, then seeded with a wetland meadow seed mixture, stabilized with straw mulch, and planted with native trees and shrubs.

The wetland mitigation area was selected due to its location adjacent to the existing wetland complex and the presence of existing poorly drained soils. The existing wetland areas are situated within shallow depressions on a large man-made fill plateau. This man-made plateau has a dense clay cap, which is relatively impermeable. The existing wetlands are supported hydrologically by the water that falls within the wetland itself and immediately adjacent uplands. There is very little drainage to these shallow wetland depressions, but due to the



Legend: Property Boundary ———	SCALE: 1" = 2,000'

Figure 1: USGS Map for the HACC – Shumaker Public Safety Center Project
Harrisburg West, PA - 7.5-minute USGS Topographic Quadrangle, 1969, Photorevised 1987
City of Harrisburg, Dauphin County, Pennsylvania

VORTEX ENVIRONMENTAL, INC.

dense clay cap, the hydrology is retained within the depressions. The wetland mitigation area will be supported by similar hydrologic conditions, although a proposed stormwater management basin will discharge into Wetland Mitigation Cell 1. The proposed mitigation area will result in a fairly large contiguous block of emergent wetland habitat in the central portion of the Public Safety Center facility. This block of wetland habitat is located adjacent to the proposed parking areas. The proposed wetland mitigation area will expand and enhance the existing functions of values of the wetland habitat on this project site. The proposed seeding and native tree and shrub plantings will improve biodiversity and wildlife habitat within the overall wetland complex.

The mitigation area will be graded to the depth specified on the Wetland Mitigation Plan. The areas will be graded 12 inches below the required depth, and then the high organic material top soil will be placed on the subgrade to provide a suitable growing medium.

After grading, the mitigation area will be seeded with a FACW wetland meadow mixture from Ernst Conservation Seeds (ERNMX-122), that includes the following species; fox sedge, Virginia wild rye, blue vervain, lurid sedge, blunt broom sedge, green bulrush, ox eye sunflower, Joe pye weed, boneset, American mannagrass, soft rush, sensitive fern, cosmos sedge, hop sedge, spotted Joe pye weed, path rush, square stemmed monkey flower, many leaved bulrush, giant ironweed, awl sedge, bristlebract sedge, grass leaved goldenrod, rough avens, rattlesnake grass, and seedbox. Annual ryegrass will also be seeded as a companion crop.

The wetland mitigation area will also be planted with forty two (42) native trees and shrubs. A total of eighteen (18) trees are proposed including red maple, river birch, and sweet gum. Twenty four (24) shrubs are proposed including speckled alder, red chokeberry, red osier dogwood, and elderberry.

The wetland mitigation area will provide additional emergent wetland habitat for the project site. These areas will provide good general wildlife habitat, including feeding areas, escape cover, and nesting grounds within this urban setting. The mitigation area will help enhance the plant diversity of the adjacent wetland complex. This wetland mitigation area will be permanently protected by the standard ACOE deed restrictions.

A detailed plant list and grading plan are also included with this narrative.

Protective Deed Restrictions

The mitigation package also includes the permanent protection of the proposed wetland mitigation area and adjacent existing wetland areas. The standard model deed restrictions “Declaration of Restrictive Covenants for Conservation” from the United States Army Corps of Engineers will be used as the protection

instrument. The proposed deed restrictions will protect the mitigation features and adjacent existing natural resources from any future impacts. The deed restrictions will be filed with the Dauphin County Courthouse, with copies supplied to PADEP and the ACOE. An example copy of this document and an exhibit plan showing the proposed protected areas is included in Appendix XIV.

Two separate, but adjacent blocks of wetland habitat will be protected by the proposed deed restrictions. These two blocks are separated by a proposed access driveway for the project.

HACC – Senator John J. Shumaker Public Safety Center
(Phases 1 and 2 Improvements Project)
Wetland Mitigation Plant List

Wetland Mitigation Area (0.36 acre - 15,682 square feet)

FACW Wetland Meadow Mixture (ERNMZ-122) – 1/2 lb per 1,000 sq.ft.

Carex vulpinoidea	(Fox Sedge)	20.00%
Elymus virginicus	(Virginia wild rye)	20.00%
Verbena hastata	(Blue vervain)	6.00%
Carex lurida	(Lurid sedge)	5.00%
Carex scoparia	(Blunt broom sedge)	5.00%
Scirpus atrovirens	(Green bulrush)	5.00%
Heliopsis helianthoides	(Ox eye sunflower)	4.00%
Eupatorium fistulosum	(Joe pye weed)	3.00%
Eupatorium perfoliatum	(Boneset)	3.00%
Glyceria grandis	(American Mannagrass)	3.00%
Juncus effusus	(Soft rush)	3.00%
Onoclea sensibilis	(Sensitive fern)	3.00%
Carex comosa	(Cosmos sedge)	2.00%
Carex lupulina	(Hop sedge)	2.00%
Eupatorium maculatum	(Spotted Joe pye weed)	2.00%
Juncus tenuis	(Path rush)	2.00%
Mimulus ringens	(Square stemmed monkey flower)	2.00%
Scirpus polyphyllus	(Many leaved bulrush)	2.00%
Vernonia gigantea	(Giant ironweed)	2.00%
Carex stipata	(Awl sedge)	1.00%
Carex tribuloides	(Bristlebract sedge)	1.00%
Euthamia graminifolia	(Grassleaved goldenrod)	1.00%
Geum laciniatum	(Rough avens)	1.00%
Glyceria canadensis	(Rattlesnake grass)	1.00%
Ludwigia alternifolia	(Seedbox)	1.00%
Total		100.00%

Annual Ryegrass (Companion Crop) – 10 lbs./acre

Tree and Shrub Species – 42 combined species

- 6 - *Alnus rugosa* (Speckled Alder) – 2 gallon containers
- 6 - *Aronia arbutifolia* (Red Chokeberry) – 2 gallon containers
- 6 - *Cornus sericea* (Red Osier Dogwood) – 2 gallon containers
- 6 - *Sambucus Canadensis* (Elderberry) – 2 gallon containers
- 6 – *Acer rubrum* (Red Maple) – 1" B&B
- 6 – Betula nigra (River Birch) – 1" B&B
- 6 – Liquidambar styraciflua (Sweet Gum) – 1" B&B