



NEW SCIENCE BUILDING

SMITHGROUP

301 BATTERY STREET
7TH FLOOR
SAN FRANCISCO, CA 94111
415.227.0100
www.smithgroup.com

BKF Engineers
CIVIL ENGINEER
1646 N. California Blvd. #400
Walnut Creek, CA 94595
(925) 940-2200

RHAA
LANDSCAPE ARCHITECT
225 Miller Avenue
Mill Valley, CA 94941
(415) 383-7900

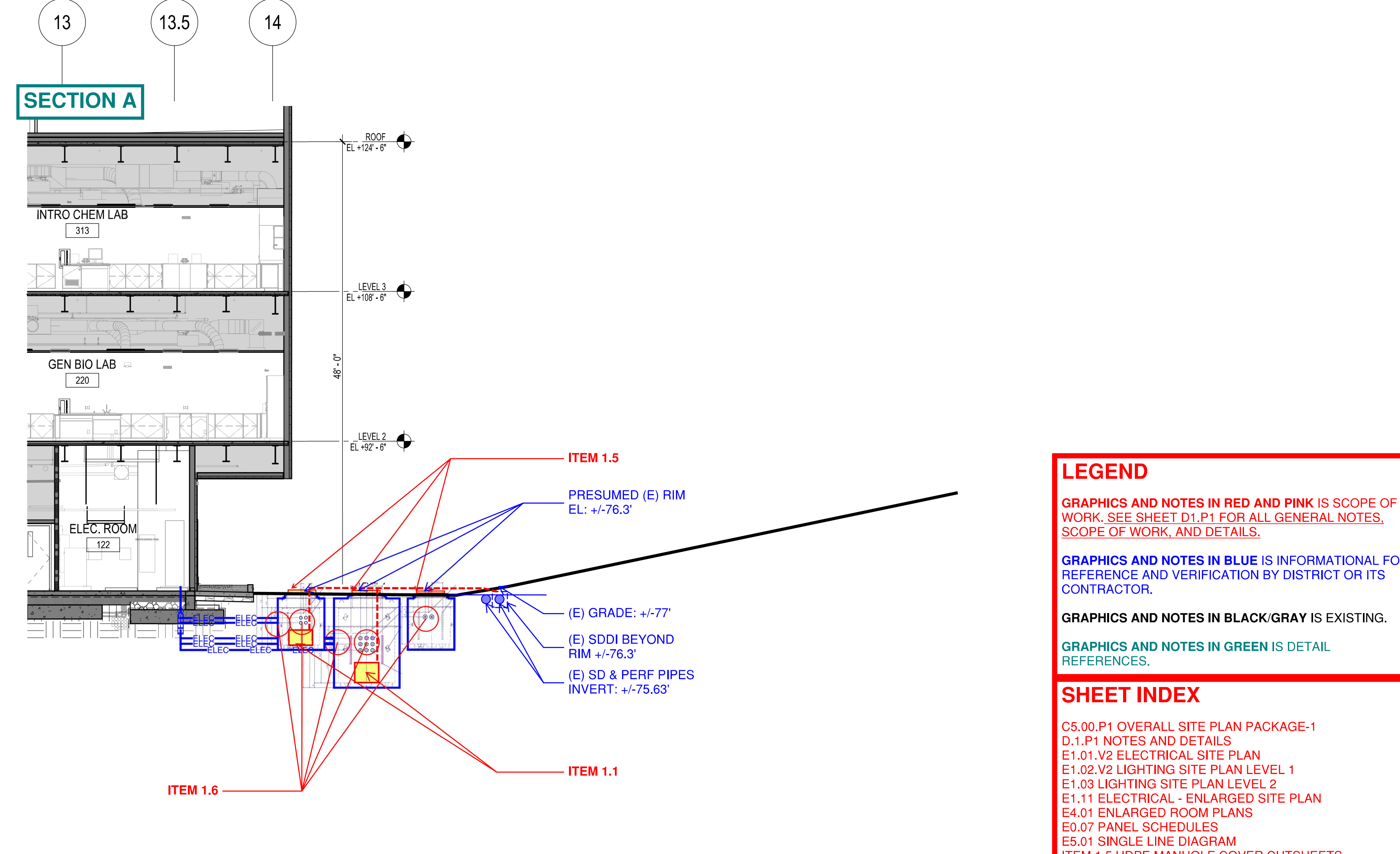
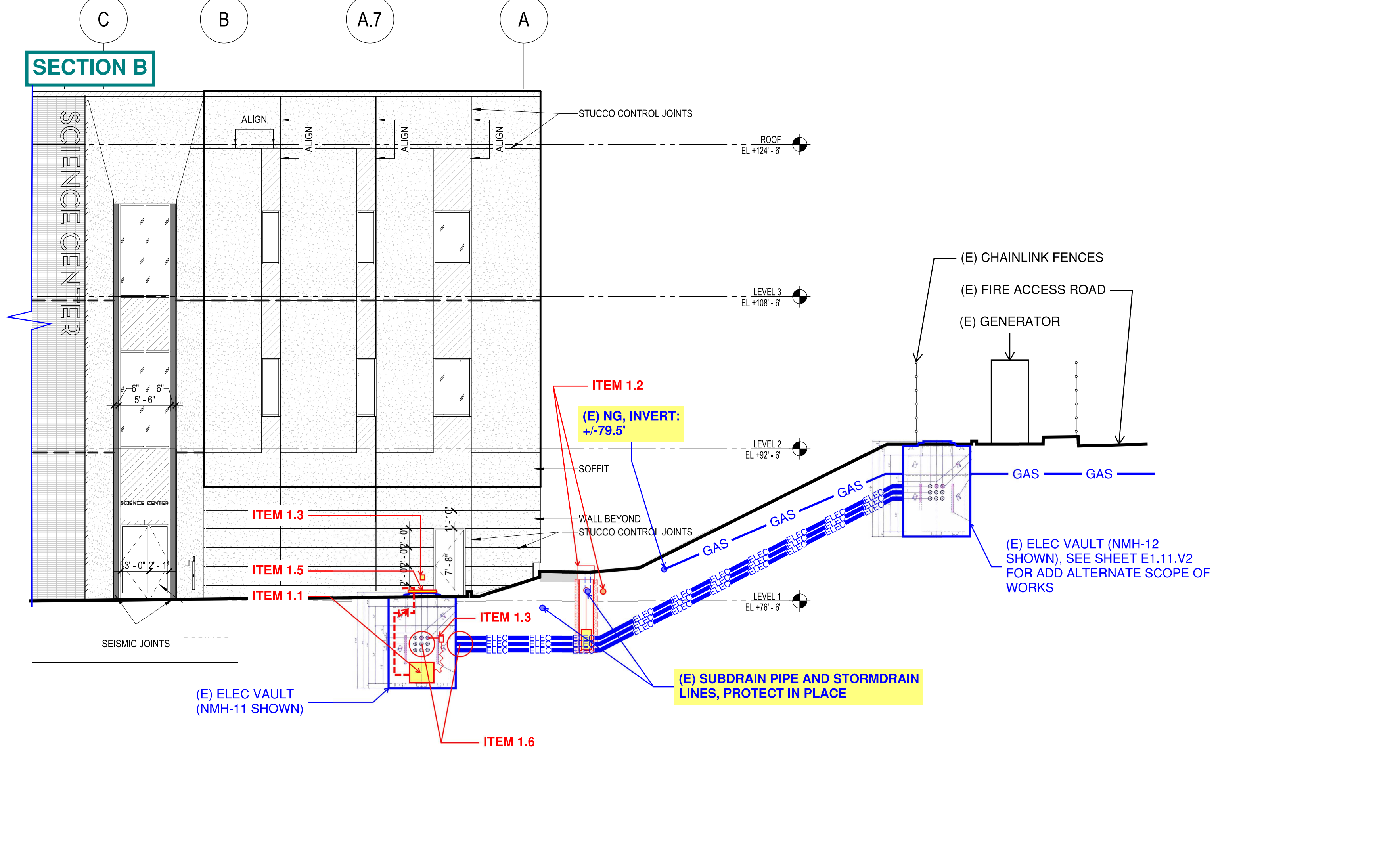
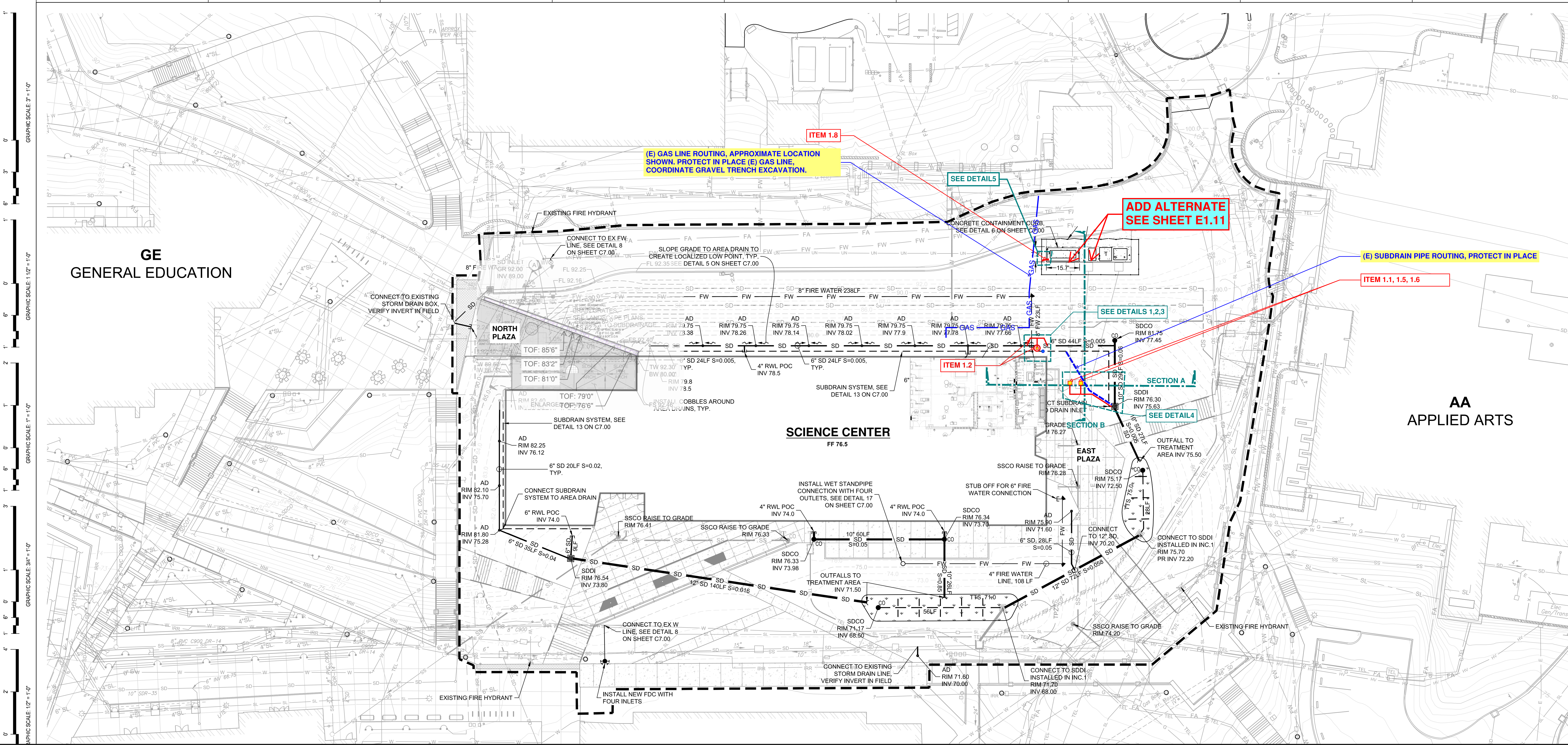
ISSUED FOR	REV	DATE
ISSUED TO COLLEGE		10 JULY 2023
ISSUED TO COLLEGE		01 MAY 2023
RECORD DRAWINGS		22 JULY 2022

RECORD DRAWINGS
COMPILED USING
INFORMATION FROM
BHM CONSTRUCTION, INC.

PACKAGE 1

OVERALL SITE PLAN - SCOPE OF WORK

PROJECT NUMBER
INC.2 C5.00.P1
SHEET NUMBER



LEGEND

GRAPHICS AND NOTES IN RED AND PINK IS SCOPE OF WORK. SEE SHEET D1.P1 FOR ALL GENERAL NOTES, SCOPE OF WORK, AND DETAILS.

GRAPHICS AND NOTES IN BLUE IS INFORMATIONAL FOR REFERENCE AND VERIFICATION BY DISTRICT OR ITS CONTRACTOR.

GRAPHICS AND NOTES IN BLACK/GRAY IS EXISTING.

GRAPHICS AND NOTES IN GREEN IS DETAIL REFERENCES.

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C5.00.P1 OVERALL SITE PLAN PACKAGE-1
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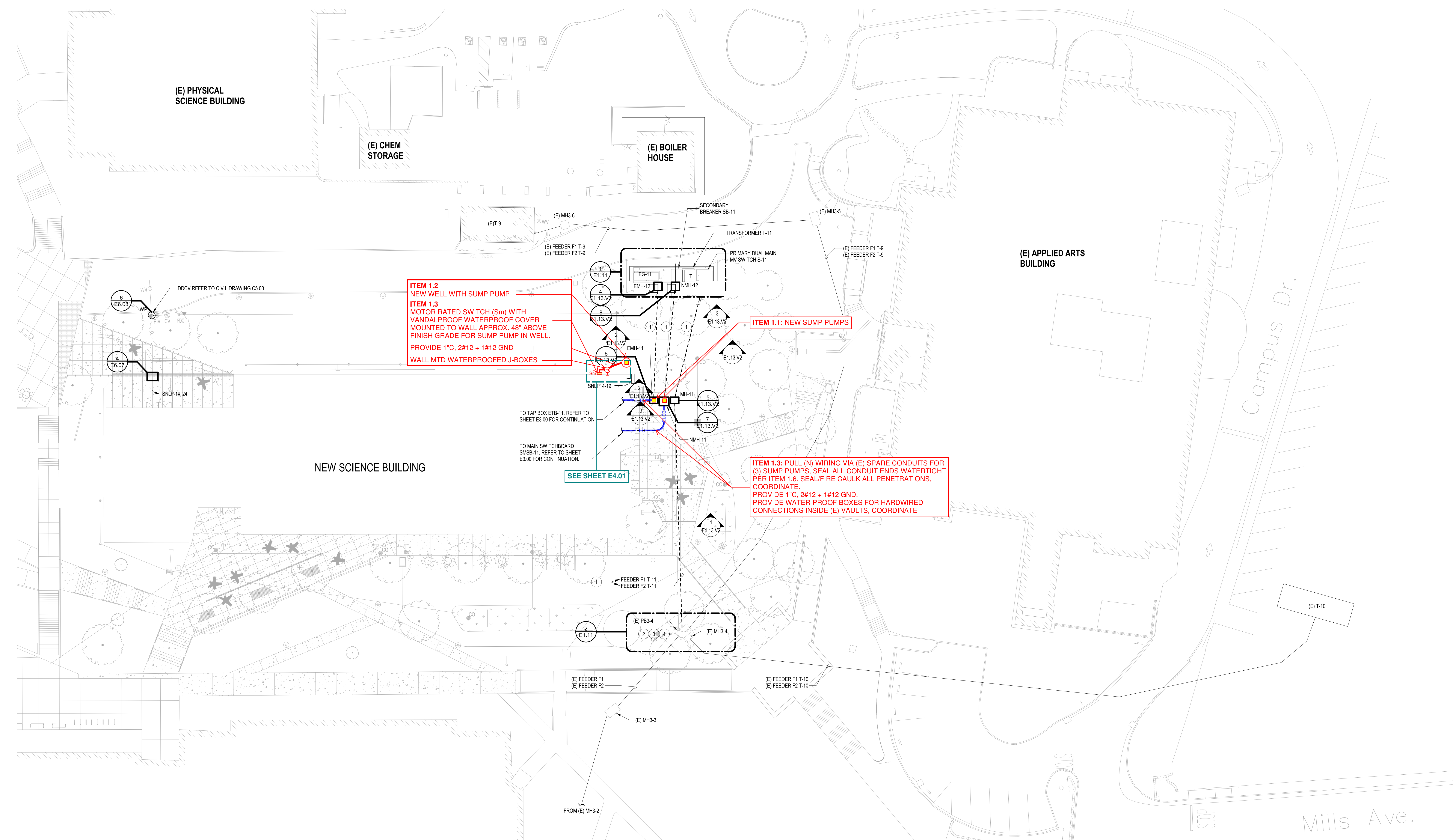
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PACKAGE 1

SHEET TITLE
ELECTRICAL - SITE PLAN

PROJECT NUMBER 10418.000
INC. E1.01.V2
SHEET NUMBER



1 ELECTRICAL - SITE
1" = 20'-0"

GENERAL NOTES

- THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO BIDDING AND ALLOW FOR ALL FIELD CONDITIONS. OBTAIN CONTACT DOCUMENTS FOR ALL OTHER TRADES AND BE RESPONSIBLE FOR ALL ELECTRICAL WORK NOTED AND CALLED OUT ON THE CONTACT DOCUMENTS. COORDINATE ELECTRICAL WORK WITH ALL OTHER TRADES ON PROJECT. COORDINATE ALL CONDUIT RUNS, ELECTRICAL EQUIPMENT AND PANEL LOCATIONS WITH ALL OTHER WORK TO AVOID CONFLICTS.
- COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS. MATERIALS AND EQUIPMENT SHALL BE U.L. AND CALIFORNIA STATE FIRE MARSHAL (CSFM) LISTED AND LABELED FOR THE APPLICATION.
- BEFORE BEGINNING CONSTRUCTION, PROVIDE TO THE ARCHITECT A CONSTRUCTION SCHEDULE OF ELECTRICAL WORK. THE CONSTRUCTION SCHEDULE SHALL IDENTIFY ALL SIGNIFICANT MILESTONES WITH COMPLETION DATES.
- OBTAIN AND PAY FOR ALL PERMITS, LICENSES AND INSPECTION FEES AS REQUIRED BY THIS CONTACT WORK. UON.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF PERSONS AND PROPERTY AND SHALL PROVIDE INSURANCE COVERAGE AS NECESSARY FOR LIABILITY, PERSONAL PROPERTY DAMAGE, TO FULLY PROTECT THE OWNER, ARCHITECT AND ENGINEER FROM ANY AND ALL CLAIMS RESULTING FROM THE WORK.
- MAINTAIN RECORD DRAWINGS AT THE PROJECT SITE INDICATING ALL MODIFICATIONS TO ELECTRICAL SYSTEMS. AT THE CONCLUSION OF THE PROJECT, PROVIDE ACCURATE AS-BUILT DRAWINGS ACCEPTABLE TO THE ARCHITECT.
- ALL MATERIALS PROVIDED FOR THIS PROJECT SHALL BE NEW. UON. PROVIDE ALL INCIDENTAL MATERIALS REQUIRED FOR A COMPLETE INSTALLATION.
- PROVIDE ALL REQUIRED "CUTTING, PATCHING, BACK FILL AND REPAIRS" NECESSARY TO RESTORE DAMAGED SURFACES TO EQUAL OR BETTER THAN ORIGINAL CONDITIONS EXISTING AT THE START OF WORK.
- ALL ELECTRICAL EQUIPMENT INSTALLED OUTDOORS SHALL BE WEATHERPROOF. EXTERIOR CONDUIT RUNS INTO BUILDINGS SHALL BE INSTALLED WITH FLASHING, CAULKED AND SEALED. CONDUITS FOR EXTERIOR ELECTRICAL DEVICES SHALL BE RUN INSIDE OF BUILDING. UON. UNDERGROUND AND EXTERIOR CONDUIT SHALL HAVE WATER-TIGHT FITTINGS.
- THE CONTRACTOR SHALL, PRIOR TO BID, FIELD VERIFY ALL SITE REQUIREMENTS FOR MODIFYING THE EXISTING CATV, DATA, TELEPHONE, CLOCK AND INTERCOM SYSTEMS TO ACCOMMODATE ADDITIONS NOTED. PROVIDE ALL MATERIALS NEEDED TO MAKE A FULLY OPERATIONAL SYSTEM AT THE CONCLUSION OF PROJECT WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR SITE LOCATING ALL EXISTING UNDERGROUND SYSTEMS IN THE AREA OF UNDERGROUND WORK. REPAIR ALL DAMAGED SYSTEMS TO OWNERS SATISFACTION. MAINTAIN EXTREME CARE DURING TRENCHING AS EXISTING SYSTEMS ARE KNOWN TO EXIST IN THE AREA. THE DRAWINGS AND SPECIFICATIONS ARE FOR THE ASSISTANCE AND GUIDANCE OF THE CONTRACTOR. EXACT LOCATIONS, DISTANCES AND ELEVATIONS WILL BE GOVERNED BY ACTUAL CONDITIONS. COORDINATE THE CONTRACT DOCUMENTS AND FIELD CONDITIONS TO DETERMINE EXACT ROUTING AND FINAL TERMINATIONS FOR ALL WORK.

UNDER INCREMENT ONE DUCTBANK AND MANHOLES ARE INSTALLED. DUCTBANK RUN FROM EXISTING MANHOLE PB-4, MANHOLES MH-11, NMH-11, EMH-11 AND WITH IN 5'-0" OF THE BUILDING FOUNDATION AND UP TO THE MANHOLES MH-12, NMH-12 AND EMH-12 UP THE HILL. THE DUCTBANKS ARE CONDUIT ONLY AND PULLWIRES. UNDER INCREMENT TWO, THE DUCTBANK SHALL BE EXTENDED FROM THE MANHOLE MH-12, NMH-12 AND EMH-12 TO THE EQUIPMENT THEY SERVE. DUCTBANK FROM MANHOLE NMH-11 AND EMH-11 SHALL BE EXTENDED FROM 5'-0" OFF THE BUILDING FOUNDATION TO THE EQUIPMENT THEY CONNECT, INCLUDING CABLE PULLING, CONNECTION AND TERMINATION.

SHEET NOTES

- THE UNDERGROUND DUCTBANKS ARE ROUTED DOWN THE SIDE OF THE HILL. CONTRACTOR SHALL FOLLOW CIVIL ENGINEERS RECOMMENDATION ON DUCTBANK ROUTING, INCLUDING ALL ADDITIONAL METHOD AND ACCESSORY REQUIRED TO ROUTE THE DUCTBANK, AVOIDING SLIDING THE EARTH WHERE DUCTBANKS ARE ROUTED.
- EXISTING ABOVE GROUND SPLICE BOX PB-4 DIMENSION IS 93 1/2" L x 61 1/2" W x 42" H. SHALL BE REUSED AND PROVIDED WITH SIX DEAD FRONT CABLE JUNCTION THREE, PHASE A, PHASE B, AND PHASE C FOR FEEDER F1 AND THREE, PHASE A, PHASE B AND PHASE C FOR FEEDER F2. THE SIX DEAD FRONT JUNCTION SHALL BE MOUNTED ON FIBERGLASS LAMINATE 3/16" NOMINAL THICKNESS MOUNTED INSIDE THE EXISTING ABOVE GROUND SPLICE BOX PB-4. ON THE WALL THAT IS FIX (01 1/2"), THE EXISTING FEEDER F1 WILL BE PLACED ON ONE SIDE OF THE FIX WALL AND EXISTING FEEDER F2 WILL BE ON THE OTHER FIX WALL. THE EXISTING FEEDER FOR TRANSFORMER T-9 WILL SPLIT BETWEEN FEEDER F1 AND FEEDER F2. THE SAME SITUATION FOR EXISTING TRANSFORMER T-10 FEEDER.
- EXISTING HIGH VOLTAGE CABLE WITH EXISTING BOLD-T CONNECTOR WILL BE REMOVED AND REPLACED WITH ELBOW CONNECTOR. THE EXISTING HIGH VOLTAGE CABLES FOR FEEDER F1, EXISTING FEEDER FOR TRANSFORMER T-9, EXISTING FEEDER FOR TRANSFORMER T-10 AND EXISTING FEEDER F2 SHALL BE SPLICED AND EXTENDED TO REACH THE DEAD FRONT CABLE JUNCTION MOUNTED IN THE INSIDE OF THE EXISTING ABOVE GROUND SPLICE BOX.
- PROVIDE CABLE ELBOW CONNECTOR FOR TRANSFORMER T-11 FEEDERS. THE FEEDERS FOR TRANSFORMER T-11 WILL ALSO SPLIT BETWEEN FEEDER F1 AND FEEDER F2 DEAD FRONT CABLE JUNCTION, SIMILAR TO THE EXISTING FEEDER OF TRANSFORMER T-9 AND EXISTING FEEDER FOR TRANSFORMER T-10.
- PROVIDE DEDICATED 120V POWER TO IRRIGATION CONTROL PANEL. REFER TO LANDSCAPE DRAWINGS AND ARCHITECT FOR ADDITIONAL INFORMATION.

REFER TO C5.00.P1 FOR OVERALL PLAN, SHEET D1.P1 FOR DETAILS, BALANCE OF SCOPE OF WORK AND GENERAL SHEET NOTES FOR COORDINATION. VERIFY ALL EXISTING UTILITIES AND CONDITIONS IN FIELD. PROPOSED WORK SHOWN ARE DIAGRAMMATIC SHOWING DESIGN INTENTIONS ONLY, CONTRACTOR SHALL COORDINATE ROUTING, MOUNTING, MISC. ACCESSORIES AS REQUIRED, SEE SHEET C5.00.P1 GENERAL SHEET NOTES

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PCL Date:



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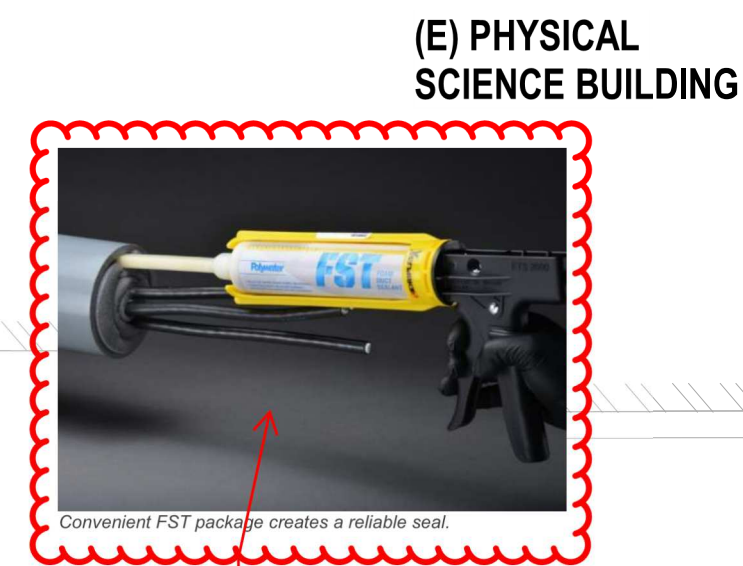
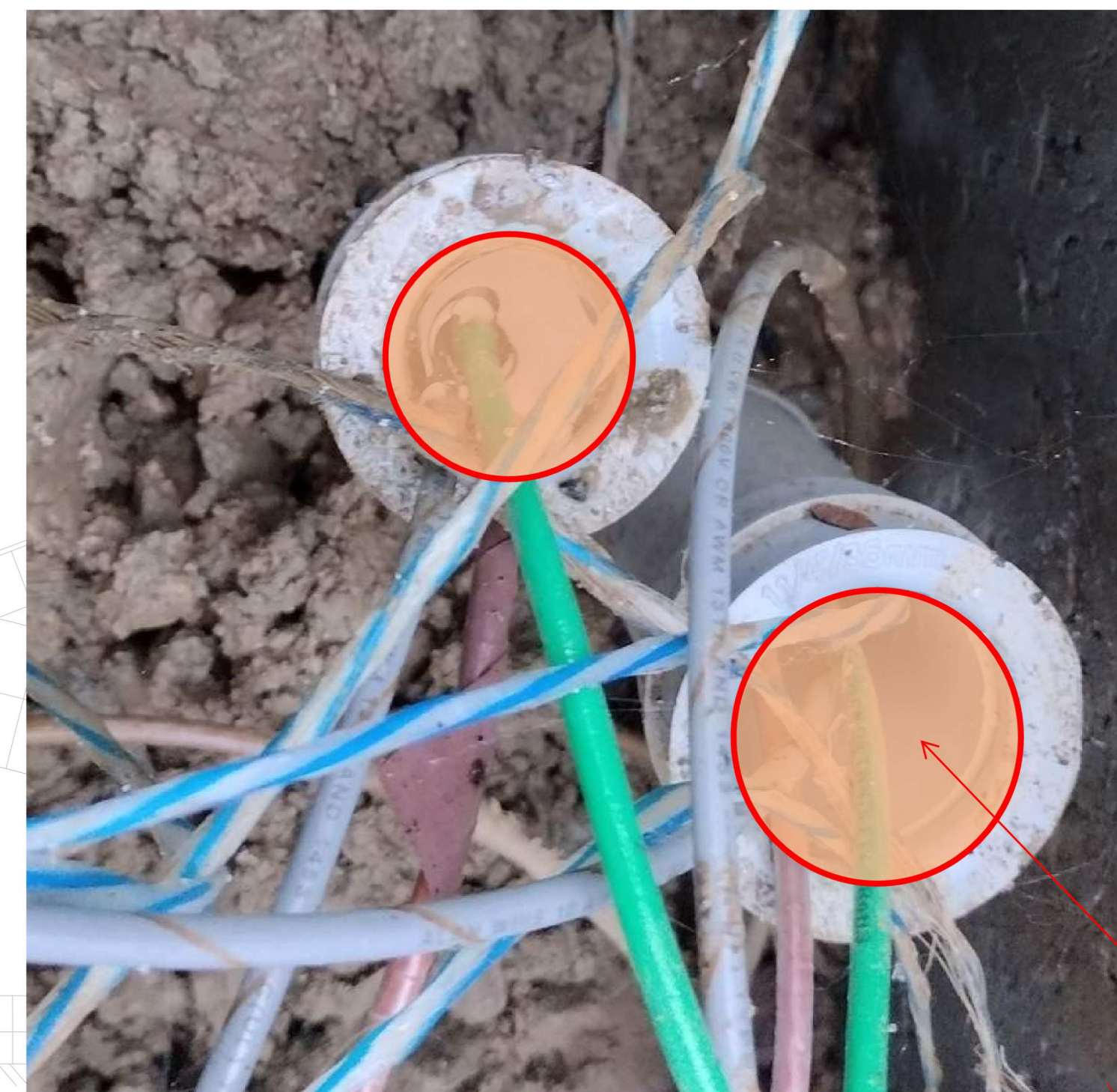
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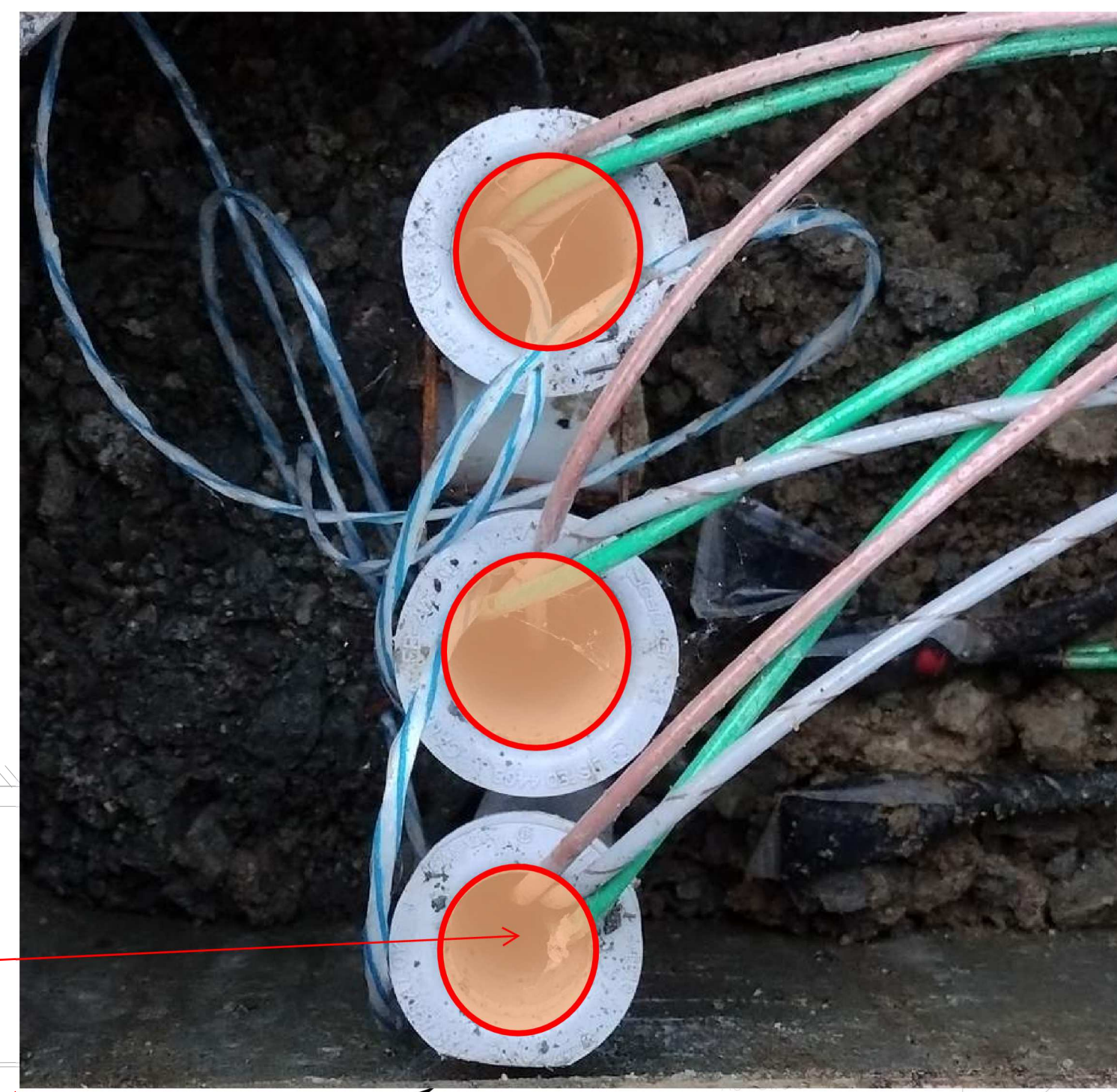
PACKAGE 1

SHEET TITLE
LIGHTING - SITE PLAN
LEVEL 2

PROJECT NUMBER 10418.000
INC.2 E1.03
SHEET NUMBER



ITEM 1.7 TYPICAL
COORDINATE/VERIFY IN FIELD.

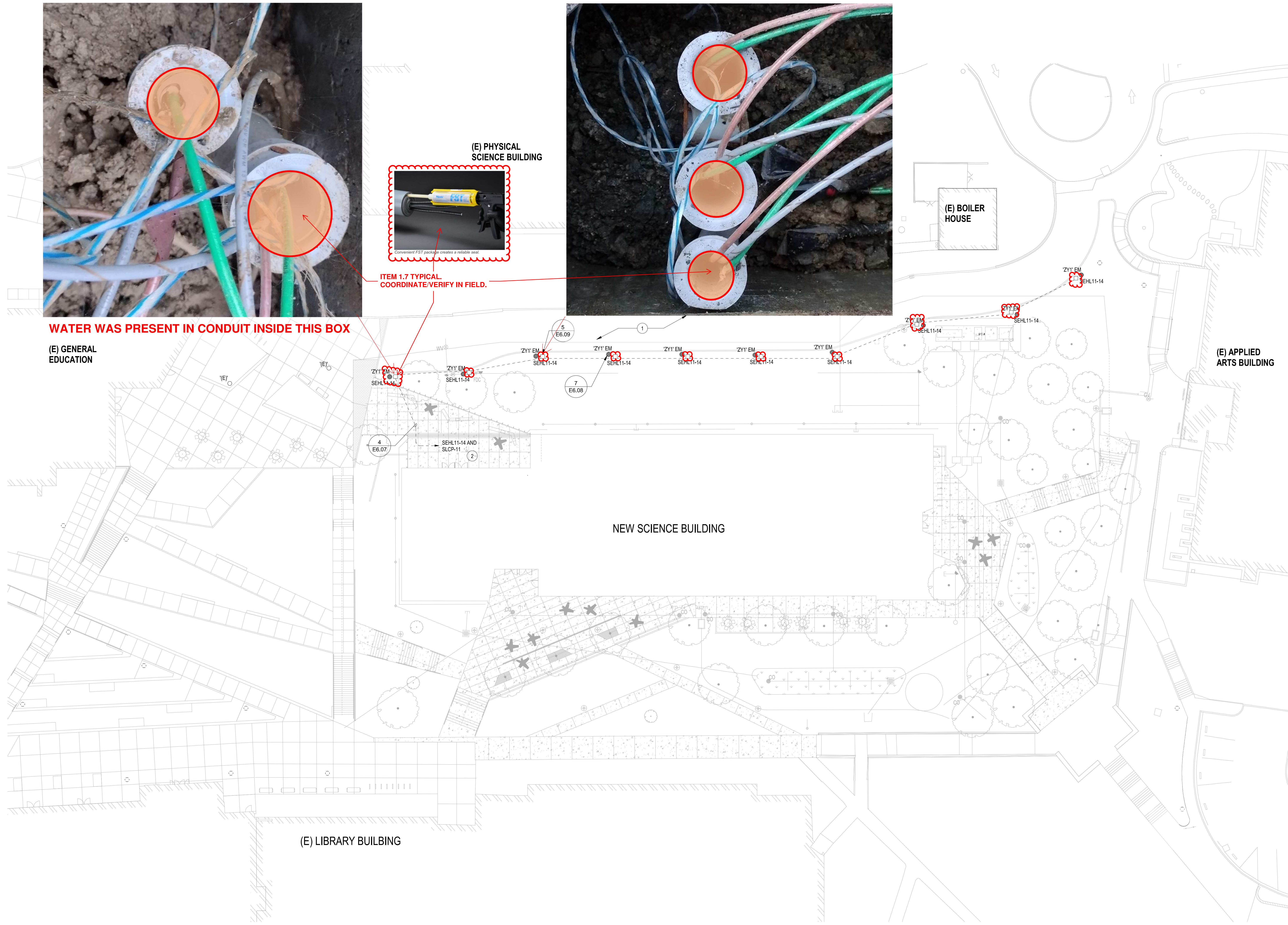


WATER WAS PRESENT IN CONDUIT INSIDE THIS BOX

(E) GENERAL EDUCATION

(E) BOILER HOUSE

(E) APPLIED ARTS BUILDING



1 LIGHTING - SITE LEVEL 2 1" = 20'-0"

GENERAL NOTES

- A. ALL NORMAL LIGHTING CIRCUITS ARE FROM PANEL SNHL-11, LOCATED IN JANITOR CLOSET 121.
- B. ALL EMERGENCY LIGHTING CIRCUITS ARE FROM PANEL SEHL-11, LOCATED IN JANITOR CLOSET 121.
- C. LIGHTING CONTROL PANEL SLC-P-11 LOCATED IN JANITOR CLOSET 121 USED FOR LOWER LEVEL EXTERIOR LIGHTING CONTROL.
- D. REFER TO DRAWING ED.04 FOR LIGHTING CONTROL SEQUENCE OF OPERATIONS.
- E. EXTERIOR SITE LIGHTING CONTROLLED BY SLC-P-11 AND ALC SYSTEM. PROVIDE CONNECTION TO EXISTING ALC SYSTEM FOR BUILDING AND GROUND SECURITY. COORDINATE WITH CAMPUS FACILITY AND ARCHITECT FOR CONNECTION BETWEEN EXISTING ALC SYSTEM AND SCIENCE BUILDING ALC SYSTEM.
- F. LOCATIONS OF EXISTING EXTERIOR SITE LIGHTING ARE APPROXIMATE.
- G. CAMPUS LIGHTING FOR PARKING AND PRIMARY WALKWAYS SHALL BE BASED ON THE RECOMMENDATIONS OF THE MOST CURRENT EDITION OF THE ILLUMINATION ENGINEERING SOCIETY LIGHTING HANDBOOK PER CBC, SEC. 1205.7.
- H. ALL SITE LIGHTING ARE CONTROLLED BY CAMPUS ALC SYSTEM. COORDINATE WITH CAMPUS FACILITY AND ARCHITECT FOR ALC SYSTEM CONTROL AND LIGHTING SECURITY REQUIREMENTS.
- I. REFER TO LANDSCAPE ARCHITECTURE DRAWINGS FOR EXACT LOCATIONS OF FIXTURES.

SHEET NOTES

- 1. REMOVE AND DECOMMISSION EXISTING POLE LIGHTS THIS SIDE OF FIRE LANE.
- 2. SITE LIGHTING IS CONTROLLED BY AUTOMATED LIGHTING CONTROL. COORDINATE WITH CAMPUS FACILITY FOR ALC ADDITIONAL INFORMATION.

ITEM 1.7. CAULK SEAL ALL EXISTING SITE LIGHTING BOXES/VAULTS CONDUIT/DUCT PENETRATIONS WITH CLOSED CELL FOAM ASSEMBLY. POLYWATER FST FOAM SEALANT (NO KNOWN EQUAL). FOLLOW MANUFACTURER RECOMMENDATIONS. VERIFY/COORDINATE ALL BOXES AND CONDUIT SIZES FOR APPROPRIATE PRODUCT SELECTIONS.

REFER TO C5.00.P1 FOR OVERALL PLAN, SHEET D1.P1 FOR DETAILS, BALANCE OF SCOPE OF WORK AND GENERAL SHEET NOTES FOR COORDINATION. VERIFY ALL EXISTING UTILITIES AND CONDITIONS IN FIELD. PROPOSED WORK SHOWN ARE DIAGRAMMATIC SHOWING DESIGN INTENTIONS ONLY, CONTRACTOR SHALL COORDINATE ROUTING, MOUNTING, MISC. ACCESSORIES AS REQUIRED, SEE SHEET C5.00.P1 GENERAL SHEET NOTES

7/22/2022 5:41:50 PM
GRAPHIC SCALE 3/8" = 1'-0"
GRAPHIC SCALE 1/2" = 1'-0"
GRAPHIC SCALE 1" = 1'-0"
GRAPHIC SCALE 3/4" = 1'-0"
GRAPHIC SCALE 1/2" = 1'-0"
GRAPHIC SCALE 1/4" = 1'-0"
GRAPHIC SCALE 1/8" = 1'-0"
GRAPHIC SCALE 1/16" = 1'-0"
GRAPHIC SCALE 1/32" = 1'-0"
GRAPHIC SCALE 1/64" = 1'-0"
PLOT DATE:

Providing Off-the-Shelf and Custom Residential, Industrial, and Municipal Odor Control Solutions



Industrial Odor Control.com

[. \(https://www.industrialodorcontrol.com/\)](https://www.industrialodorcontrol.com/)



WOLVERINE BRAND PLASTIC MANHOLE INFLOW PROTECTOR

[1 review](#)

Product Details

[Inflow Protector Specs Printable Version \(https://drive.google.com/open?id=0ByR7DvAc_KwYmE1OGM2YjA1Y2Q3OC00NGNLTq0ZWUINTE3ZDUwODEyNDJl\)](https://drive.google.com/open?id=0ByR7DvAc_KwYmE1OGM2YjA1Y2Q3OC00NGNLTq0ZWUINTE3ZDUwODEyNDJl)
[Measurement Sheet and Fax Order Form \(/mm5/graphics/00000001/Manhole-FILLABLE-Measurement-Sheet-and-Order-Form.pdf\)](#)

Lead time on this product is presently 4-6 weeks.

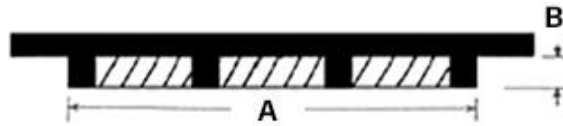
The Wolverine Brand® Plastic Manhole Inflow Protector Inserts are made of high density polyethylene and have been proven effective in reducing or preventing surface water inflow to the collection system, through the manhole lid. Operating and maintenance costs for plant equipment and pumps are minimized due to reduced flow during heavy rainfall. Also, utility costs are reduced because machinery is not operating for extended periods of time. These inserts are a practical solution to expensive plant expansions, new construction moratoriums or inflationary sewage treatment costs.

PLEASE READ BEFORE ORDERING

Our inflow protectors and manhole odor inserts are custom made to order based upon four required dimensions. As such, all sales are final.

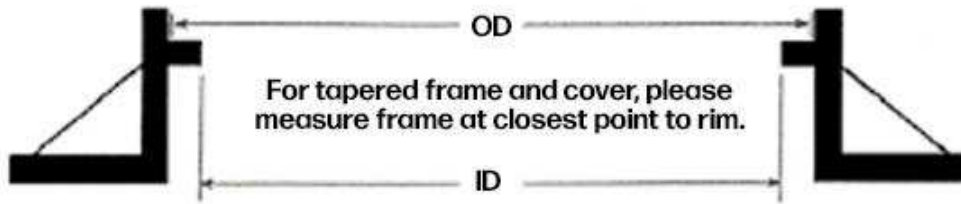
Below you will find a diagram (also available on our downloadable [Measurement Sheet \(mms5graphics/00000001/Manhole-FILLABLE-Measurement-Sheet-and-Order-Form.pdf\)](#)) that shows you the numbers we need to receive from you to complete order. If you call us to order, a signed copy of the measurement sheet will be required to be sent to us either via fax (973-858-0219) or by using our [contact form \(https://www.industrialodorcontrol.com/contact-us.html\)](#). We're happy to assist you in getting the correct measurements.

Looking at the lid diagram below, you will notice that the first graphic represents the width and depth of the drop ring under the lid. If you have a flat lid (nothing extending below the lid) you should write "flat lid" for the A and B measurement.



**COORDINATE
APPROPRIATE
MANHOLE COVER
TYPE.**

In the image below you will see the opening of the manhole. You will need the Outside Diameter (not the lid width) of the opening and the Inside Diameter of the opening. If you have a drop ring as indicated above, your A measurement can not be larger than your ID.



Please refer to the chart below for help in selecting the correct lid type from the radio buttons below.

A



B



C

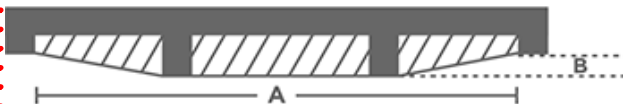


D



FLAT COVERS: A & B ARE ZERO

E



F



G



How to Measure a Manhole for Inflow Protectors and Odor...

Scroll below "Add to Cart" for more product specifications...

Lid Type:

- Lid Style A
- Lid Style B
- Lid Style C
- Lid Style D - Flat Lid - A & B are Zero
- Lid Style E
- Lid Style F
- Lid Style G

**COORDINATE
APPROPRIATE
MANHOLE COVER
TYPE.**

A: Drop Ring Diameter (in inches):**B: Drop Ring Depth (in inches):****OD: Manhole Frame Diameter (in inches):****ID: Inside Frame Diameter (in inches):**

Price: **\$109.00**

ADD TO CART

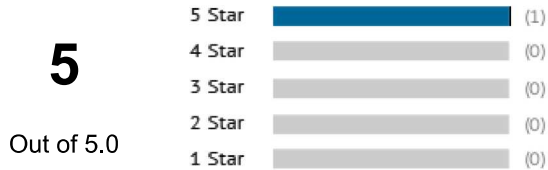
- GUARANTEED for THREE years against manufacturing defects
- NO VALVE method of ventilation available
- Single or double valve ventilation system available
- NO corrosive parts
- Easy installation and removal
- Requires no maintenance
- Controls **sewer odors** in residential areas
- Keeps grit, sand, salt, chemical spills, foreign objects, road oils, etc. from entering collection systems
- Cost-effective alternative to replacing existing manhole covers with "water-tight" covers
- Dramatically reduce sewage treatment costs
- Deep and shallow bowl designs available

Physical Properties

The Wolverine Brand® Plastic Manhole Inflow Protector Inserts are manufactured from High Density Polyethylene, meeting the requirements of ASTM D-1248, Class A, Category 5, with a finish thickness of 1/8". Ventilation is achieved by either the thru-bore, single or double valve methods. A nylon strap is factory installed to make removal of the unit a simple, one person operation. Factory installed closed-cell neoprene or cross-linked polyethylene gasket is available upon request.

Installation

No special tools are required to install The Wolverine Brand Plastic Manhole Inflow Insert. Just remove the manhole cover and clean the rim of the frame. Place the Wolverine Brand Plastic Manhole Inflow Insert on the manhole frame rim and replace the manhole cover .



**Overall
Rating**

100%

of customers that
buy this product give
it a 4 or 5-Star rating.

Write a review about this product ►

"Great price"

Verified Buyer

February 7, 2023 by Steven C. (NC, united states)

"Well made. Exactly as sized."

Display Options

Highest to Lowest



CLICK HERE FOR
MORE REVIEWS



(<https://www.shopperapproved.com/reviews/industrialodorcontrol.com>)

Polywater®

**ITEM
1.6&1.7**




FST™ Foam Duct Sealant Family

2-PART, CLOSED-CELL FOAM DUCT SEALANT



A Proven Track Record for Providing Durable and Reliable Protection in the Toughest Environments

Polywater® FST™ Foam Duct Sealant is used to protect mission-critical electrical and telecommunication systems from water, gases, and other unwelcome intrusions. The closed-cell, foam sealant technology evenly flows around cables and in conduit space to create a strong bond. It expands and completely cures into a rigid, robust seal without relying on environmental moisture.


Polywater FST is a UL recognized component and passed UL 94 with a Class HBF fire retardant rating



FEATURES AND BENEFITS

- **RELIABLE**
Holds 22 ft (6.7 m) continuous water head pressure and up to 90-ft (27 m) surges
- **VERSATILE**
Seals conduits of all sizes and complex cable configurations
- **RE-ENTERABLE**
Seal can be removed for future cable installations
- **COMPATIBLE**
Use with a wide range of cable jacket and conduit materials
- **NEC COMPLIANT**
Creates airtight/watertight conduit seals and is fire retardant

polywater.com | +1 651-430-2270

Polywater® FST™ Foam Duct Sealant Family

ITEM 1.6&1.7



CATALOG #	PACKAGE DESCRIPTION	UNITS/CASE
FST-250KIT1	Kit Includes: 1 – 8.5 oz. FST Cartridge (cat# FST-250); 3 – Mixing Nozzles (cat# MXR-30T-10); 4 – 24” Foam Damming Strips (cat# FST-DAM); 1 – 12” Sanding Cloth; 1 – Pair of Gloves; 1 – Positioning Rod for Foam Dam; 1 – Pre-treating Wipe (cat# HP-P158ID); 1 – Resealing Cap; 1 – Instruction Sheet TOOL-250 NOT INCLUDED. SOLD SEPARATELY.	1
FST-250KIT	Same as Kit Above in a Box of 6	6
FST-250	1 – 8.5 oz. FST Cartridge; 1 – Mixing Nozzle; 1 – Resealing Cap	12
MXR-30T-10	10-Pack of Mixing Nozzles for FST-250	1
TOOL-250	High-Ratio Caulking Tool for FST-250	1
FST-DAM	1 – 24” Foam Damming Strip	24
FST-MINI-1	Kit Includes: 1 – 50 ml FST Cartridge; 2 – Mixing Nozzles (cat# MXR- 20T-10); 6 – Foam Discs; 2 – Pairs of Gloves; 1 – Instruction Sheet	1
FST-MINI-B6	6 – FST-MINI-1	1
TOOL-50-11	1 – Dispensing Tool for FST MINI	1
MXR-20T-10	10-Pack of Mixing Nozzles for FST MINI	1



Polywater FST-250 used to seal U-Guards™.

SPECIFICATIONS AND APPLICATIONS

VERIFY CONDUIT SIZES AND ORDER APPROPRIATE PRODUCTS/QUANTITIES.

• **Application:** Polywater FST-250 is recommended for conduits of 2 inches (50 mm) or larger. Polywater FST™ MINI is recommended for conduits less than 2 inches (50 mm).

• **Codes:** Meets most countries’ electrical codes. Creates air/watertight seals and is self-extinguishing. Check local codes for performance criteria. Meets 2011, 2014, 2017, 2020 NEC Articles v225.27, 230.8, 300.5(G), 300.7 (A), 501.15 (b)(2) on Raceway Seals.

• **Materials:** Bonds to PVC, GRS, EMT, IMC fiberglass, and PE conduits.

• **Fire Retardant:** Polywater FST is a UL recognized component and passed UL 94 with a Class HBF fire retardant rating.



Polywater Foam Sealant Quantity Calculator

Perform calculations of how much FST Foam Sealant to use based on conduit ID, cable occupancy, and number of seals.

CALCULATE QUANTITY

polywater.com | +1 651-430-2270

IMPORTANT NOTICE: The statements here are made in good faith based on tests and observations we believe to be reliable. However, the completeness and accuracy of the information is not guaranteed. Before using, the end-user should conduct whatever evaluations are necessary to determine that the product is suitable for the intended use.

American Polywater expressly disclaims any implied warranties and conditions of merchantability and fitness for a particular purpose. American Polywater’s only obligation shall be to replace such quantity of the product proven to be defective. Except for the replacement remedy, American Polywater shall not be liable for any loss, injury, or direct, indirect, or consequential damages resulting from a product’s use, regardless of the legal theory asserted.

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Polywater®
Solutions at work.

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+31 10 233 0578 Europe, Middle East, N. Africa
email: support@polywater.com

DESCRIPTION

FST[™] closed-cell sealant provides superior pressure-blocking in the toughest environments. It stops water, methane, and other gases to protect electrical systems. FST Sealant is durable and easy to install.

FST expands and hardens to a semi-permanent, but removable, seal. The foam wets and adheres to metals, plastics, and concrete. It conforms around complex cable fill configurations to keep out moisture, gases, dust, insects, and rodents. FST is a proven solution used to protect switchgear, panels, riser poles, combiner boxes, and meters.

HYDROSTATIC (PRESSURE) TESTING

FST Sealant is an excellent water block. To test water blocking performance, it is installed into a conduit according to standard procedures, forming a 3-inch plug. Water is added to the system and then pressurized to create a “water head”. Seal passes if there is no leakage observed.

CONDUIT	TEST CONDITION	RESULT
2" PVC	3 cables, bent 45° two directions, then pulled 15 lbs (6.8 Kg) axial force 40 psi (2.7 bar), 15 min	Pass
2" PVC	12 polyethylene wires, 40 psi (2.7 bar), 7 months	Pass
2" Fiberglass	30 psi (2.0 bar), 7 days	Pass
2" HDPE	30 psi (2.0 bar), 7 days	Pass
3" Steel	4 copper cables, 40 psi (2.7 bar), 7 days	Pass
4" Steel	30 psi (2.0 bar), 24 hours	Pass
4" HDPE	(4) 12AWG THHN Wires 30 psi (2.0 bar), 7 days	Pass
5" PVC	25 psi (1.7 bar), 7 days	Pass



Convenient FST package creates a reliable seal.

PRODUCT FEATURES

- Reliable—Holds 22 feet (6.7 m) water head pressure continuous; 90-foot (27 m) surges
- Versatile—Seals multiple conduits with different sizes and cable fill configurations
- Compatible—Use with a wide range of cable and conduit materials
- Reenterable—Cured foam is semi-permanent and can be removed

STANDARDS

- Complies with 2011 NEC Articles 225.27, 230.8, 300.5(G) and 300.7(A) on Raceway Seals
- Minimizes gas and vapor passage for boundary seals described in NEC Article 501.15(B)(2) for Class 1, Div 2
- Complies with TIA-758-B Standard 5.1.1.2.8, 5.4.2.3 and 7.4.2.8.1

APPROVALS

UL Recognized
Passes UL94
Class HBF fire retardant rating



COMPONENT PHYSICAL PROPERTIES

FST Sealant is a two-part, urethane foam. The liquid Part A and B are formulated to be mixed at a 1/1 ratio using the two-part coaxial caulking tube and mixing nozzle, provided.

PROPERTY	PART A	PART B
Color	Amber	Clear
Form, Viscosity	Liquid, 250 cps	Liquid, 650 cps
VOC	0 g/L	0 g/L
Specific Gravity	1.2	1.1

CURED RESIN PROPERTIES

FST Sealant cures to solid, closed-cell foam.

PROPERTY	RESULT
Appearance	Light yellow color with small, even cells
Closed Cell Percent	98%
Density	6 lbs/ft ³ (0.1 g/cm ³)
Moisture Absorption (ASTM D2842)	<4%
Compressive Strength (ASTM D1621)	145 psi (1.00 N/mm ²)
Tensile Strength (ASTM D1623)	120 psi (0.83 N/mm ²)
Seal Strength – Water	90 ft (27 m) intermittent 22 ft (6.7 m) continuous
Seal Strength – Air	>5 psi (>0.3 bar)

SEAL STRENGTH, AIR AND GAS

FST Sealant seals out manhole gases. Seal strength was tested by installing FST per standard directions. Conduit was then pressurized with both air and helium. Helium represents methane as it is less than half the molecular size.

CONDITION	RESULT
Air, 20 psi (1.4 bar), 168 hrs	Pass (Holds Seal)
Helium, 5 psi (0.3 bar), 72 hrs	Pass (Holds Seal)

CABLE REMOVAL TESTING

FST acts as a theft deterrent by sealing cables into conduit.

CABLE TYPE	AVERAGE PULL OUT TENSION
2 AWG THHN	171 lbf (77.6 Kgf)
4/0 XHHW	320 lbf (145 Kgf)

A standard application of FST is used to seal 3 cables into conduit. Force to pull out each cable is measured.

FST seals in the cables, making removal by hand very difficult.

CABLE COMPATIBILITY

FST Sealant is compatible with common cable jacket materials. The cured foam is an inert solid that does not affect cable components. It does not change physical or electrical property of cable, based on tensile elongation and volume resistivity testing.

SEMI-CONDUCTING MATERIAL	VOLUME RESISTIVITY (42 DAY EXPOSURE)
TR-XLPE	Pass (Shows stability)
EPR	Pass (Shows stability)

CABLE JACKET	TENSILE	ELONGATION
PVC	>99% control	>93% control
XLPE	>96% control	>91% control

Testing based on IEEE 1210. Full report available upon request.

ENVIRONMENTAL RESISTANCE

FST Sealant withstands the rigors of the conduit exposure environment.

In Service Temperature Use Range

-20°F to 200°F (-30°C to 95°C) Continuous
-40°F to 250°F (-40°C to 120°C) Peak

FST Sealant does not lose function in direct sunlight. Reacted foam that is exposed to UV will yellow. This discoloration does not affect performance. The foam seal retains its hardness and continues to act as a duct block.

The foam sealant can be protected with a weather-proofing paint. Both urethane and epoxy-based products have been tested with good results and excellent adhesion to the foam.

CHEMICAL RESISTANCE

FST Sealant is chemically resistant to gasoline, oils, dilute acids and bases, and most unsaturated hydrocarbons.

Cured FST was soaked in chemical for 45 days following ASTM C267. Weight change is noted.

CHEMICAL EXPOSURE	Δ% WEIGHT	RESULT
Sodium Hydroxide (1N)	0.80	Resistant
Hydrochloric Acid (1N)	1.88	Resistant
Sulfuric Acid (1N)	1.00	Resistant
Hydrogen Peroxide (30%)	1.57	Resistant
Dielectric Oil	0.48	Resistant
Mineral Oil	0.35	Resistant
Gasoline	0.18	Resistant

APPLICATION

Field-Ready Kit

The FST Sealant kit includes all materials required to install a finished duct block.

Seal Length (Depth)

It is most important to make a seal of adequate length by using and properly spacing the damming strips. A 3-inch (75-mm) plug will meet performance guidelines.

Application Temperature

Working temperature for Polywater FST Sealant is 40°F to 95°F (4°C to 35°C).

Water in Duct

FST Sealant will cure and seal duct with small amounts of water present. The water should not be flowing and should be relatively clean. FST foam will incorporate water into its cure. However, excessive water will weaken the seal.

For full installation information, please see [FST use instructions](#).

CURE RATE

The FST Sealant can be used in temperatures down to 40°F (4°C). At low temperatures, the reaction is slower, but the sealant will completely foam and cure with time. At cold temperatures, the sealant components become more viscous and flow through the mixing nozzle at a slower rate. Cure times are as follows:

REACTION TIME	40°F (4°C)	70°F (21°C)
Foaming expansion complete	8-9 minutes	4-5 minutes
Hard, non-sticky skin formation	15-18 minutes	7-9 minutes

To decrease cure time in cold temperatures, warm FST Sealant cartridges prior to use.

CLEAN-UP

Any unreacted material may be cleaned from surfaces with a solvent wipe such as Polywater's Type HP™ Cleaner/Degreaser. The part A amber resin will react with water if surfaces are washed with a soap and water solution. Once reacted, the foam has strong adhesion, and may be scraped or cut from surface.

REENTERABILITY AND REMOVAL 1.6&1.7

FST Sealant can be mechanically removed with some effort. Use a long screwdriver to puncture holes throughout the seal. With a hammer, punch the screwdriver through the foam, twist it to enlarge the cavity, and pull out. Once the foam is weakened, it can be chipped away, and the cable should break free.

TROUBLE-SHOOTING

Once a skin has formed, the foam may be visually inspected to determine whether the seal has completely filled the void. After the sealant has cured, the positioning rod or a screwdriver can be used to check for voids in the finished seal.

STORAGE AND HANDLING

Keep containers cool, dry and away from sunlight. Leave cartridges in the protective foil pouch until ready to use/reuse.

Product shelf life is 15 months. Cartridge can be used for one month after the product is opened.

SAFETY

FST Sealant is a two-part urethane foam containing reactive chemicals. Polyurethanes are common in the construction industry and have been used for many years. Some individuals may become sensitized to components in the unreacted resin. Precautions must be observed during use and handling of these materials.

The use of FST in the prepackaged cartridge controls and reduces exposure. A monitoring study using OSHA Sampling Method 47 MOD shows that exposure is well under limits set by this agency. Full paper can be found on our website: [Urethane MDI Monitoring White Paper](#).

Once reacted, the foam is solid, closed-cell polyurethane. The finished product is non-toxic. See SDS for more information.

Combustion of Cured Foam

Irritating and toxic smoke and vapors may form during combustion of cured FST Foam Sealant. If burning the sealant material cannot be avoided, provide appropriate ventilation/respiratory protection against decomposition products during flame cutting operations.

MODEL SPECIFICATION

The statement below may be inserted into a customer specification to help maintain engineering standards and ensure work integrity.

Duct sealant shall be Polywater FST Foam Sealant. Duct sealant shall be a 2-part, 98% closed-cell urethane foam that reacts to set in 5-10 minutes at 70°F (21°C). It shall be reusable and capable of sealing up to 12-inch (30-cm) conduits with multiple cable configurations. Duct sealant shall be reenterable. It shall be capable of withstanding temperatures from -20°F to 200°F (-30°C to 95°C); and be chemically resistant to gasoline, oils, dilute acids and bases. Duct sealant shall not affect the physical or electrical properties of wire and cable.

Duct sealant shall have good adhesion to duct and cable jacket surfaces with good structural strength. It shall have 145-lb compressive strength (ASTM D1621). Duct sealant shall be capable of holding 22 ft (6.7 m) water head pressure continuous or 90 ft (27 m) water head pressure short-term. It shall block up to 5 psi (0.3 bar) gas or vapor continuous. It shall meet NEC codes for raceway seals and meet UL 94 fire rating HBF to be UL recognized.

ORDER INFORMATION

CAT #	PACKAGE DESCRIPTION
FST-250KIT1	1 - FST Foam Sealant two-part caulking tube 3 - mixing nozzles 4 - 24-inch foam damming strips 1 - 12-inch abrasive strip 1 - pair disposable gloves 1 - positioning rod for foam dam 1 - pre-treating wipe 1 - resealing cap 1 - instruction sheet TOOL-250 NOT INCLUDED
FST-250KIT	Same as FST-250KIT1 in a case of 6
FST-250	1 - FST Foam Sealant two-part caulking tube 1 - mixing nozzle 1 - resealing cap
TOOL-250	1 - high-ratio dispensing tool
MXR-30T-10	10-pack mixing nozzles for FST-250
FST-DAM	1 – 24-inch foam damming strip

CONTACT US

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American Polywater expressly disclaims any implied warranties and conditions of merchantability and fitness for a particular purpose. American Polywater's only obligation shall be to replace such quantity of the product proven to be defective. Except for the replacement remedy, American Polywater shall not be liable for any loss, injury, or direct, indirect, or consequential damages resulting from product's use, regardless of the legal theory asserted.

DESCRIPTION

FST[™] closed-cell sealant provides superior pressure-blocking in the toughest environments. It stops water, methane, and other gases to protect electrical systems. FST Sealant is durable and easy to install.

FST expands and hardens to a semi-permanent, but removable, seal. The foam wets and adheres to metals, plastics, and concrete. It conforms around complex cable fill configurations to keep out moisture, gases, dust, insects, and rodents. FST is a proven solution used to protect switchgear, panels, riser poles, combiner boxes, and meters.

HYDROSTATIC (PRESSURE) TESTING

FST Sealant is an excellent water block. To test water blocking performance, it is installed into a conduit according to standard procedures, forming a 2-inch plug. Water is added to the system and then pressurized to create a “water head”. Seal passes if there is no leakage observed.

CONDUIT	TEST CONDITION	RESULT
1" PVC	30 psi (2.0 bar), 24 hours	
2" PVC	3 cables, <i>bent</i> 45° two directions, then <i>pulled</i> 15 lbs (6.8 Kg) axial force 30 psi (2.0 bar), 24 hours	Pass
2" PVC	12 polyethylene wires, 30 psi (2.0 bar), 24 hours	Pass
2" Steel	30 psi (2.0 bar), 24 hours	Pass
2" Steel	8 THHN wires, 30 psi (2.0 bar), 24 hours	Pass
2" Fiberglass	30 psi (2.0 bar), 24 hours	Pass



Convenient FST package creates a reliable seal.

PRODUCT FEATURES

- **Reliable**—Holds 22 feet (6.7 m) water head pressure continuous; 65-foot (20 m) surges
- **Versatile**—Seals multiple conduits with different sizes and cable fill configurations
- **Compatible**—Use with a wide range of cable and conduit materials
- **Reenterable**—Cured foam is semi-permanent and can be removed

STANDARDS

- Complies with 2011 NEC Articles 225.27, 230.8, 300.5(G) and 300.7(A) on Raceway Seals
- Minimizes gas and vapor passage for boundary seals described in NEC Article 501.15(B)(2) for Class 1, Div 2
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APPROVALS

UL Recognized
Passes UL94
Class HBF fire retardant rating



COMPONENT PHYSICAL PROPERTIES

FST Sealant is a two-part, urethane foam. The liquid Part A and B are formulated to be mixed at a 1/1 ratio using the two-part side by side cartridge and mixing nozzle, provided.

PROPERTY	PART A	PART B
Color	Amber	Clear
Form, Viscosity	Liquid, 250 cps	Liquid, 650 cps
VOC	0 g/L	0 g/L
Specific Gravity	1.2	1.1

CURED RESIN PROPERTIES

FST Sealant cures to solid, closed-cell foam.

PROPERTY	RESULT
Appearance	Light yellow color with small, even cells
Closed Cell Percent	98%
Density	6 lbs/ft ³ (0.1 g/cm ³)
Moisture Absorption (ASTM D2842)	<4%
Compressive Strength (ASTM D1621)	145 psi (1.00 N/mm ²)
Tensile Strength (ASTM D1623)	120 psi (0.83 N/mm ²)
Seal Strength – Water	65 ft (20 m) intermittent 22 ft (6.7 m) continuous
Seal Strength – Air	>5 psi (>0.3 bar)

SEAL STRENGTH, AIR AND GAS

FST Sealant seals out manhole gases. Seal strength was tested by installing FST per standard directions. Conduit was then pressurized with both air and helium. Helium represents methane as it is less than half the molecular size.

CONDITION	RESULT
Air, 20 psi (1.4 bar), 168 hrs	Pass (Holds Seal)
Helium, 5 psi (0.3 bar), 72 hrs	Pass (Holds Seal)

CABLE COMPATIBILITY

FST Sealant is compatible with common cable jacket materials. The cured foam is an inert solid that does not affect cable components. It does not change physical or electrical property of cable, based on tensile elongation and volume resistivity testing.

SEMI-CONDUCTING MATERIAL	VOLUME RESISTIVITY (42 DAY EXPOSURE)
TR-XLPE	Pass (Shows stability)
EPR	Pass (Shows stability)

CABLE JACKET	TENSILE	ELONGATION
PVC	>99% control	>93% control
XLPE	>96% control	>91% control

Testing based on IEEE 1210. Full report available upon request.

ENVIRONMENTAL RESISTANCE

FST Sealant withstands the rigors of the conduit exposure environment.

In Service Temperature Use Range

-20°F to 200°F (-30°C to 95°C) Continuous
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Mineral Oil	0.35	Resistant
Gasoline	0.18	Resistant

APPLICATION

Field-Ready Kit

The FST Sealant kit includes all materials required to install a finished duct block.

Seal Length (Depth)

It is most important to make a seal of adequate length by using and properly spacing the damming strips. A 2-inch (50-mm) plug will meet performance guidelines.

Application Temperature

Working temperature for Polywater FST Sealant is 40°F to 95°F (4°C to 35°C).

Water in Duct

FST Sealant will cure and seal duct with small amounts of water present. The water should not be flowing and should be relatively clean. FST foam will incorporate water into its cure. However, excessive water will weaken the seal.

For full installation information, please see [FST MINI use instructions](#).

CURE RATE

The FST Sealant can be used in temperatures down to 40°F (4°C). At low temperatures, the reaction is slower, but the sealant will completely foam and cure with time. At cold temperatures, the sealant components become more viscous and flow through the mixing nozzle at a slower rate. Cure times are as follows:

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TROUBLE-SHOOTING

Once a skin has formed, the foam may be visually inspected to determine whether the seal has completely filled the void. After the sealant has cured, the positioning rod or a screwdriver can be used to check for voids in the finished seal.

STORAGE AND HANDLING

Keep containers cool, dry and away from sunlight. Leave cartridges in the protective foil pouch until ready to use/reuse.

Product shelf life is 15 months. Cartridge can be used for one month after the product is opened.

SAFETY

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Combustion of Cured Foam

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MODEL SPECIFICATION

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ORDER INFORMATION

CAT #	PACKAGE DESCRIPTION
FST-MINI-1	1 – 50 ml FST Cartridge 2 – Mixing Nozzles (cat# MXR-20T-10) 6 – Foam Discs 2 – Pairs of Gloves 1 – Instruction Sheet
FST-MINI-B6	6 – FST-MINI-1
TOOL-50-11	1 – Dispensing Tool for FST MINI
MXR-20T-10	10-Pack of Mixing Nozzles for FST MINI

CONTACT US

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