

# Addendum No. 06



June 1, 2023

## Shields & Brawley Elementary School

Prepared By SIM-PBK Architects, Inc.; 7790 N. Palm Avenue; Fresno, California 93711

SIM-PBK Architects Project Number 17-67

### Notice to Bidders

- A. Receipt of this Addendum shall be acknowledged on the Proposal Form. Failure to acknowledge receipt of each addendum may subject bidder to disqualification.
- B. This Addendum forms part of the Contract Documents for the above referenced project and shall be incorporated integrally therewith.
- C. Each proposer shall make necessary adjustments and submit their proposal with full knowledge of all modifications, clarifications, and supplemental data included therein. Where provisions of the following supplemental data differ from those of the original Contract Documents, this Addendum shall govern.

### GENERAL

Item No. 6-01 **BUBBLES or CLOUDS and/or DELTA 6 TAGS**, indicates changes / revisions / modifications within the document, no changes to remaining of DSA approval set.

### CLARIFICATIONS

Item No. 6-02 **RESPONSIBLE LOWEST BIDDERS**  
Contractor awarded on sum of lowest Base Bid and Owner/Design Allowance for the TOTAL amount. Deductive Alternate NOT included in determining lowest bid.

Item No. 6-03 **DENS GLAS, GOLD**  
Contractor to provide TWO (2) layers of 1/2" DENS - GOLD at the entire perimeter of both buildings.

Item No. 6-04 **ELEVATOR CONTROL KEY**  
Contractor to provide and install elevator DROP KEY on corridor side.

Item No. 6-05 **WALL SAFE**  
Contractor to supply and install AMSEC wall safe, WS 1214.

### SPECIFICATIONS

Item No.6-06 **00 00 01 TABLE OF CONTENTS**  
**REPLACE** in its entirety AGAIN, see attached 6-06a.

Item No.6-07 **OWNER/DESIGN ALLOWANCES**  
ADD in its entirety, see attached AD 6-07a.

Item No.6-08 **BID FORM**  
**REPLACE** in its entirety, see attached 6-08a.

Item No. 6-09 **01 25 00 SUBSTITUTION PROCEDURES**

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**ADD** the attached page "REQUEST FOR SUBSTITUTION", see attached AD 6-09a. remaining spec to remain.

Item No. 6-10      **08 44 13 GLAZED ALUMINUM CURTAIN WALLS**  
**ADD** in its entirety, see attached AD 6-10a.

Item No. 6-11      **08 71 00 DOOR HARDWARE**  
**ADD** only these two, remaining spec no changes  
1. HW Group 06 add RX switch line item QELX-PA-AX-98-NL ELEC PANIC HARDWARE  
2. All PS902 900-2RS add 900-BBK battery backup

Item No. 6-12      **28 13 00 ACCESS CONTROL SYSTEM**  
**ADD** in its entirety, see attached AD 6-12a.

Item No. 6-13      **32 19 10 SYNTHETIC TURF**  
**ADD** in its entirety, see attached AD 6-13a.

### DRAWINGS

Item No. 6-14      **SHEET A0.1, OVERALL SITE PLAN, PARTIAL SITE**  
Provide the following revisions.  
**OMIT 36' x 40' PRE-SCHOOL** building including but not limited to underground fire infrastructures (i.e. FDC, PIV, FIRE RISER), storm drain lines, domestic water, sewer lines. **OMIT** pit set concrete stem wall foundation, concrete mow strips, under building vent grates, under building access grate, **OMIT 36' x 40' PRE-SCHOOL RELOCATABLE** and infill with 4" concrete slab. Modify chain link fencing to enclose pre-school play area. Omit painted (alphabet) snake; rotate and relocate turf area 90-degress to read 28' x 58' (inside to inside) with 1-foot concrete border to enlarge turf area and change to read SYNTHETIC TURF in lieu of nature grass. Relocate outdoor play equipment to the west. Outdoor play structure (N.I.C.); Shade structure (N.I.C.); painted tricycle track to be relocated (south of the outdoor play pit). Refer to additional items in this addendum for further information, see attached 6-14a.

Item No. 6-15      **SHEET LS.2.0, OVERALL IRRIGATION PLAN**  
**REVISE** Pre School Classroom space  
Overall Planting per architectural drawings and **Delete** Plan turf grass and tree planting indicated within the Pre School Classroom space.

Item No. 6-16      **Sheet LS.3.2, PARTIAL IRRIGATION PLAN**  
**REVISE** irrigation in the Pre School Partial Irrigation Classroom to delete the pop up spray heads and root watering systems entirely. In lieu of the pop up spray heads, provide and install six (6) Hunter I-20-06-SS pop up rotor heads with gray low angle nozzles in the synthetic turf area. Provide

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three (3) heads on both north / south edges of synthetic turf area spaced evenly and extend lateral lines to connect to valve A-26. Rotor heads will be utilized for cool down and wash down.

- Item No. 6-17      **SHEET LS.4.2, PARTIAL PLANTING PLAN**  
**DELETE** turf grass and tree planting in the Pre School Classroom space. In lieu of the Plan turf grass and tree planting provide and place synthetic turf over compacted aggregate base per new specification section 32 9310 SYNTHETIC TURF.  
Refer to attached specification section 32 93 10 and synthetic turf detail.
- Item No. 6-18      **SHEET A8.18, DETAILS**  
Compass (logo) diameter to read 6'-9", remaining dimensions are correct.
- Item No. 6-19      **SHEET A8.18, DETAILS**  
**ADD** Access Control Gate detail, see attached AD 6-19a; AD 6-19 b; AD 6-19c; AD 6-19d
- Item No. 6-20      **BUBBLES or CLOUDS and/or DELTA 4 TAGS, to read DELTA 5 TAGS in Addendum 5, Item No. 5-01.** indicates changes / revisions / modifications within the document, no changes to remaining of DSA approval set.
- Item No. 6-21      **AD 5-10, 21 00 01 FIRE PROTECTION SYSTEM**  
Addendum 5, Item 5-10, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-10a.
- Item No. 6-22      **AD 5-11, 21 00 02 IDENTIFICATION FOR FIRE SUPPRESSION PIPING AND EQUIPMENT**  
Addendum 5, Item 5-11, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-11a.
- Item No. 6-23      **AD 5-13, 22 00 00 GENERAL PLUMBING PROVISIONS**  
Addendum 5, Item 5-13, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-13a.
- Item No. 6-24      **AD 5-14, 22 00 01 PLUMBING**  
Addendum 5, Item 5-14, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-14a.
- Item No. 6-25      **AD 5-15, 23 00 00 GENERAL MECHANICAL PROVISIONS**  
Addendum 5, Item 5-15, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-15a.
- Item No. 6-26      **AD 5-16, 23 00 01 GENERAL MECHANICAL PROVISIONS**  
Addendum 5, Item 5-16, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-16a.

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- Item No. 6-27      **AD 5-17, 28 16 00 INTRUSION DETECTION**  
Addendum 5, Item 5-17, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-17a.  
**ADDED** main building, 1st floor, door locations for Intrusion Detection Systems. See attached 6-27a.
- Item No. 6-28      **AD 5-18, AT&T Drawing**  
Addendum 5, Item 5-18, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-18a.
- Item No. 6-29      **AD 5-19, SHEET E4.8 ELECTRICAL ROOF PLAN**  
Addendum 5, Item 5-19, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-19a.
- Item No. 6-30      **AD 5-20, SHEET E4.9 ELECTRICAL ROOF PLAN**  
Addendum 5, Item 5-20, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-20a.
- Item No. 6-31      **AD 5-21, SHEET E4.10 ELECTRICAL ROOF PLAN**  
Addendum 5, Item 5-21, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-21a.
- Item No. 6-32      **AD 5-22, SHEET E4.11 ELECTRICAL ROOF PLAN**  
Addendum 5, Item 5-22, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-22a.
- Item No. 6-33      **AD 5-23, SHEET M4, MECHANICAL FLOOR PLAN, 1<sup>ST</sup> FLOOR (WEST):**  
Addendum 5, Item 5-23, addendum insignia (yellow) tag number is incorrectly numbered, should read: AD 5-23a.
- Item No. 6-34      TWO number Item No. 26. CHANGE DUPLICATE second Item No. 26 to read: Item No. 27. **SHEET P4 PLUMBING FLOOR PLAN, 1<sup>ST</sup> FLOOR (WEST): COORDINATE** roof drain lines points of connection to Civil points of connection on C5.1 & C5.2.
- Item No. 6-35      **SHEET E2.2 POWER & LOW-VOLTAGE SYSTEMS SITE PLAN**  
**ADD** in its entirety, see attached AD 6-35a.
- Item No. 6-36      **DSA FIRE SPRINKLER MATERIAL DATA PACKAGE**  
**VOID** Addendum 5, Item 5-38. Replace in it's entirety, see attached AD 6-36a.
- Item No. 6-37      **SWPPP**  
**ADD** in its entirety, see attached AD 6-37a; 6-37b, 6-37c.

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### ADDITIONAL CLARIFICATIONS

- Item No. 6-38      **OWNER FURISHED CONTRACTOR TO INSTALL (OFCI) LIST  
ADDED** sheet in its entirety, see attached AD 6-38a.
- Item No. 6-39      **32 84 10 DXi LAGUNA RAIN MASTER  
ADD** in its entirety, see attached AD 6-39a.
- Item No. 6-40      **ADDITIONS, CLARIFICATIONS, REVISIONS TO ALL SB BID  
PACKAGES  
REPLACE** in it's entirety. See attached AD 6-40a.
- Item No. 6-41      **SYNTHETIC TURF SURFACING DETAIL  
ADD** in its entirety, see attached AD 6-41a.

### RFC RESPONSES

- Item No.6-42      Refer to attached **RFC's** including COVER Sheet.

**END OF ADDENDUM**



**TABLE OF CONTENTS**

**SECTION 00 01 01**

**AD 6-06a  
S&B Elementary  
02-116800**

Division	Section Title
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**DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS**

**00 00 02**      *Table of Contents*

**00 10 00**      *Central Unified School District "Shields & Brawley Elementary School, Bid  
Packet with Notice Inviting Bids"*

**00 20 00**      *Instructions For Procurement*

**00 31 32**      *Geotechnical Data*

**00 72 00**      *General Conditions*

**SPECIFICATIONS GROUP**

*General Requirements Subgroup*

**DIVISION 01 GENERAL REQUIREMENTS**

**01 10 00**      **SUMMARY**

**01 10 00.13**      **CONSTRUCTION MANAGER'S SUMMARY and BID PACKAGES**

**01 23 00**      **ALTERNATES**

**01 25 00**      **SUBSTITUTION PROCEDURES**

01 29 73      SCHEDULE OF VALUES

01 31 19      PROJECT MEETINGS

01 32 00      CONSTRUCTION PROGRESS DOCUMENTATION

**01 33 00**      **SUBMITTAL PROCEDURES**

01 40 00      QUALITY REQUIREMENTS

01 50 00      TEMPORARY FACILITIES AND CONTROLS

**01 57 23**      **STORM WATER POLLUTION PREVENTION PLAN (SWPPP)**

**01 74 23**      **CLEANING**

01 77 01      GUARANTEE FORM

**01 91 00**      **COMMISSIONING**

*Facility Construction Subgroup*

**DIVISION 02 EXISTING CONDITIONS**

02 30 00      SUBSURFACE INVESTIGATION

**DIVISION 03 CONCRETE**

03 11 00	CONCRETE FORMING
03 20 00	CONCRETE REINFORCEMENT
03 30 00	CAST-IN-PLACE CONCRETE
03 33 00	ARCHITECTURAL CONCRETE
<b><u>03 35 43</u></b>	<b>TOPICAL POLISHED CONCRETE SYSTEM</b>
<b><u>03 80 00</u></b>	<b>BOMANITE -MICRO—TOP-ST-TOPPING-SYSTEM</b>
<b><u>03 80 13</u></b>	<b>BOMANITE EXTERIOR BROADCAST AGGREGATE FLORSPARTIC 100 SYSTEM</b>

#### **DIVISION 04 MASONRY**

04 22 00	CONCRETE UNIT MASONARY
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#### **DIVISION 05 METALS**

05 12 00	STRUCTURAL STEEL FRAMING
05 31 00	STEEL DECKING
05 40 00	COLD-FORMED METAL FRAMING
05 50 00	METAL FABRICATIONS
05 52 00	METAL RAILINGS
<b><u>05 73 00</u></b>	<b>DECORATIVE METAL RAILINGS</b>

#### **DIVISION 06 WOOD, PLASTICS, AND COMPOSITES**

06 10 00	ROUGH CARPENTRY
06 20 00	FINISH CARPENTRY
06 40 00	ARCHITECTURAL WOODWORK
06 41 16	LAMINATED PLASTIC CASEWORK

#### *Facility Construction Subgroup*

#### **DIVISION 7 THERMAL AND MOISTURE PROTECTION**

07 21 10	THERMAL BATT INSULATION
07 26 00	CONCRETE MOISTURE VAPOR EMISSION CONTROL
07 42 13	METAL WALL PANELS
07 42 13.23	METAL COMPOSITE MATERIAL WALL PANELS
07 52 00	MODIFIED BITUMINOUS SHEET ROOFING
<b><u>07 54 23</u></b>	<b>MEMBRANE ROOFING</b>
07 62 00	SHEET METAL FLASHING AND TRIM
07 72 00	ROOF HATCH
07 72 36	SMOKE VENTS
07 84 13	PENETRATION FIRESTOPPING
07 90 00	JOINT PROTECTION

#### **DIVISION 8 DOORS AND WINDOWS**

08 11 13	HOLLOW METAL DOORS AND FRAMES
08 14 23.16	PLASTIC LAMINATE FACED WOOD DOORS
08 31 13	ACCESS DOORS AND FRAMES
08 33 20	OVERHEAD COILING COUNTER DOORS
<b><u>08 41 00</u></b>	<b>ALUMINUM STOREFRONT AND ENTRANCES</b>
<b><u>08 44 13</u></b>	<b>GLAZED ALUMINUM CURTAIN WALLS</b>
08 51 13	ALUMINUM SERVING WINDOWS
<b><u>08 54 13</u></b>	<b>FIBERGLASS WINDOWS</b>
<b><u>08 71 00</u></b>	<b>DOOR HARDWARE</b>
<b><u>08 80 00</u></b>	<b>GLASS AND GLAZING</b>
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09 24 00	CEMENT PLASTERING
09 29 00	GYPSUM BOARD
09 30 00	TILING
09 51 13	ACOUSTICAL PANEL CIELINGS
<b><u>09 51 23</u></b>	<b>ACOUSTICAL WOOD FIBER PANELS</b>
09 64 66	WOOD ATHLETIC FLOORING
09 65 13	RESILIENT BASE AND ACCESSORIES
<b><u>09 66 00</u></b>	<b>RESILIENT FLOOR COVERING</b>
<b><u>09 67 00</u></b>	<b>EPOXY FLOOR COATING</b>
09 68 18	TILE CARPETING
<b><u>09 72 00</u></b>	<b>PROTECTIVE WALL PANELS</b>
<b><u>09 72 60</u></b>	<b>TACKABLE WALL COVERING</b>
09 77 20	DECORATIVE FIBERGLASS REINFORCED WALL PANELS
09 91 23	PAINTING

## **DIVISION 10 SPECIALTIES**

10 11 16	MARKERBOARDS
10 11 23	TACKBOARDS
10 12 00	TROPHY AND POSTER CASES
10 14 00	SIGNAGE
10 14 16	PLAQUES
<b><u>10 17 00</u></b>	<b>TOILET PARTITIONS – SOLID COLOR REINFORCED COMPOSITE</b>
10 21 23	CUBICLE CURTAINS AND TRACK
<b><u>10 26 00</u></b>	<b>ACROVYN</b>
10 26 13	CORNER GUARDS
10 28 13.13	ELECTRIC HAND DRYERS
<b><u>10 44 13</u></b>	<b>FIRE EXTINGUISHERS AND CABINETS</b>
<b><u>10 50 00</u></b>	<b>METAL LOCKERS AND BENCHES</b>
<b><u>10 51 00</u></b>	<b>HEAVY DUTY VENTILATED LOCKERS</b>
10 56 13	METAL STORAGE SHELVING
<b><u>10 75 00</u></b>	<b>FLAGPOLES</b>



10 80 00 TOILET AND BATH ACCESSORIES

**DIVISION 11 EQUIPMENT**

11 06 20 STAGE CURTAINS  
 11 31 00 RESIDENTIAL APPLIANCES  
**11 40 00 FOOD SERVICE EQUIPMENT**  
 11 41 27 WALK-IN COOLER AND FREEZER  
**11 50 00 MISCELLANEOUS SPECIALTIES**  
 11 52 13.52 ELECTRIC PROJECTION SCREENS

**DIVISION 12 FURNISHINGS**

**12 24 13 ROLLER WINDOW SHADES**

**DIVISION 14 CONVEYING SYSTEM**

14 24 00 HYDRAULIC ELEVATOR  
 14 42 00 WHEELCHAIR LIFTS

**DIVISION 21 FIRE SUPPRESSION**

21 00 00 GENERAL FIRE PROTECTION PROVISIONS  
 21 00 01 FIRE PROTECTION SYSTEM  
**21 00 02 IDENTIFICATION FOR FIRE SUPPRESSION PIPING AND EQUIPMENT**

**DIVISION 22 PLUMBING**

22 00 00 GENERAL PLUMBING PROVISIONS  
 22 00 01 PLUMBING

**DIVISION 23 HEATING, VENTILATING AND AIR CONDITIONING**

23 00 00 GENERAL MECHANICAL PROVISIONS  
 23 00 01 HEATING, VENTILATING AND AIR CONDITIONING

**DIVISION 26 ELECTRICAL**

26 00 00 ELECTRICAL  
 26 05 00 COMMON WORK RESULTS FOR ELECTRICAL  
 26 50 00 LIGHTING

**DIVISION 27 COMMUNICATIONS**

27 00 00 COMMUNICATIONS  
 27 10 00 STRUCTURED CABLING

<b><u>27 41 00</u></b>	<b>MPR AUDIO-VIDEO SYSTEM</b>
<b><u>27 42 00</u></b>	<b>CLASSROOM AV SYSTEM</b>
<b><u>27 51 13</u></b>	<b>PAGING SYSTEMS</b>

### **DIVISION 28 ELECTRONIC SAFETY AND SECURITY**

28 00 00	ELECTRONIC SAFETY AND SECURITY
<b><u>28 13 00</u></b>	<b>ACCESS CONTROL SYSTEM</b>
28 16 00	INTRUSION DETECTION
<b><u>28 31 00</u></b>	<b>FIRE DETECTION AND ALARM</b>

### ***Site and Infrastructure Subgroup***

### **DIVISION 31 EARTHWORK**

31 11 00	SITE CLEARING, STRIPPING AND GRUBBING
31 23 00	EARTHWORK
31 23 01	STORM WATER POLLUTION PREVENTION PLAN
31 23 16	TRENCHING, BACKFILL, AND COMPACTION

### **DIVISION 32 SITE IMPROVEMENTS**

32 11 23	AGGREGATE BASE COURSES
32 12 16	ASPHALT PAVING, STRIPING, AND MARKINGS
32 16 13	SIDEWALKS, CURBS, GUTTERS, AND DRIVEWAYS
32 31 13	CHAIN LINK FENCES AND GATES
<b><u>32 31 20</u></b>	<b>DECORATIVE GALVANIZED METAL FENCES AND GATES</b>
<b><u>32 84 00</u></b>	<b>PLANTING IRRIGATION</b>
<b><u>32 84 13</u></b>	<b>PLANTING IRRIGATION APPENDIX</b>
<b><u>32 93 00</u></b>	<b>PLANTS</b>
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33 05 13	MANHOLES AND STRUCTURES
33 05 16	UTILITY STRUCTURES
33 05 17	PRECAST CONCRETE VAULTS
33 12 13	WATER SERVICE CONNECTIONS
33 13 00	DISINFECTING WATER DISTRIBUTION SYSTEM
33 31 13	SANITARY SEWER PIPE
33 41 13	STORM DRAIN PIPING

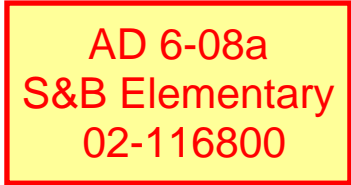
**OWNER/ DESIGN ALLOWANCE:**

6

Prime Contractors to provide an Owner/ Design Allowance to their respective base bid packages in the following amounts:

<b>Bid Form Bid</b>	<b>Bid Package</b>	<b>Owner/Design Allowance</b>
<b>Package #</b>	<b>Description</b>	<b>Amount</b>
SB 1	SITE WORK/UNDERGROUND UTILITIES	\$350,000.00
SB 2	GENERAL TRADES/BUILDING STUCTURE	\$400,000.00
SB 3	ROOFING	\$100,000.00
SB 4	N/A	N/A
SB 5	FIRE PROTECTION	\$100,000.00
SB 6	PLUMBING	\$300,000.00
SB 7	MECHANICAL	\$300,000.00
SB 8	ELECTRICAL/LOW VOLTAGE	\$500,000.00
SB 9	LANDSCAPE & IRRIGATION	\$100,000.00
SB 10	SURVEYING/STAKING	\$50,000.00
SB 11	SWPPP	\$15,000
SB 12	METAL/IRON FENCING, GATE & HANDRAILS	\$50,000.00

**AD 6-07a**  
**S&B Elementary**  
**02-116800**



Date \_\_\_\_\_, 2023

Company Name \_\_\_\_\_

Bid Package Number and Title \_\_\_\_\_

**CENTRAL UNIFIED  
SCHOOL DISTRICT  
5652 W. GETTYSBURG  
FRESNO, CALIFORNIA 93722**

The undersigned doing business under the firm name of \_\_\_\_\_ hereby propose and agree to enter into an agreement, to furnish any and all labor, materials, equipment, and services for the completion of work described hereinafter and in the contract documents entitled construction of:

**SHIELDS AND BRAWLEY ELEMENTARY SCHOOL**

**BASE BID AMOUNT**

The total Contract Amount to furnish all materials, including taxes, labor, equipment and incidentals for the Base Bid, and all other work as shown and indicated on the construction plans and the specifications, for the amount of: \_\_\_\_\_

\_\_\_\_\_ Dollars and \_\_\_\_\_ Cents.

**TOTAL OF BASE BID: \$** \_\_\_\_\_

**OWNER'S ALLOWANCE:** \_\_\_\_\_

**TOTAL BID (BASE BID & OWNER'S ALLOWANCE):** \_\_\_\_\_

**DEDUCTIVE ALTERNATE ITEM NO. 1:** \_\_\_\_\_ *for the sum of \$* \_\_\_\_\_.

If written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned within sixty (60) days after the date of opening of the bids, or any time thereafter before this bid is withdrawn, the undersigned will, within ten (10) days after the date of such mailing, telegraphing, or delivering of such notice, execute and deliver a contract in the form of agreement present in these contract documents and give Performance and Payment Bonds in accordance with the specifications and bid as accepted.

The undersigned hereby designates as the office to which such notice of acceptance may be mailed, telegraphed, emailed, or delivered:

\_\_\_\_\_  
\_\_\_\_\_

Our Public Liability and Property Damage Insurance is placed with:

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Our Workers' Compensation Insurance is placed with:

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The following must be completed without exception:

1. Name of Foreman / Superintendent for this Project \_\_\_\_\_
2. Acknowledge receipt and review of full set of bid documents \_\_\_\_\_(Initial)
3. Crewing for this Project - Minimum Crew \_\_\_\_\_ Maximum Crew \_\_\_\_\_
4. Summary of Work has been reviewed and is included \_\_\_\_\_(Initial)
5. Bid Schedule has been reviewed and accepted \_\_\_\_\_(Initial)
6. The following items are attached to this bid form
  - a. Bid Bond \_\_\_\_\_(Initial)
  - b. Non-Collusion Affidavit \_\_\_\_\_(Initial)
  - c. Iran Contracting Act Certification \_\_\_\_\_(Initial)
  - d. Roof Project Certificate \_\_\_\_\_(Initial)
  - e. Prime Bidder Certification of DVBE \_\_\_\_\_(Initial)
  - f. Subcontractor Listing \_\_\_\_\_(Initial)
  - g. Job References \_\_\_\_\_(Initial)
  - h. Insurance Rating Submittal form \_\_\_\_\_(Initial)
  - i. Student Safety Declaration \_\_\_\_\_(Initial)
  - j. Sufficient Funds Declaration \_\_\_\_\_(Initial)
  - k. Worker's Compensation Certification \_\_\_\_\_(Initial)
  - l. Proof of Registration per Labor Code § 1725.5 \_\_\_\_\_(Initial)
  - m. Bid Packages/Scope of Work \_\_\_\_\_(Initial)
7. Proper Prevailing wages included in this bid \_\_\_\_\_(Initial)  
\*2015-2024 requirements for Certified Payroll Reporting is acknowledged.

Circular letters, bulletins, addenda, etc., bound with specifications or issued during the time of bidding are included in the proposal, and, in completing the contract, they are to become part thereof.

The receipt of the following addenda to the specifications is acknowledged:

Addendum No. _____ Dated: _____	Addendum No. _____ Dated: _____
Addendum No. _____ Dated: _____	Addendum No. _____ Dated: _____
Addendum No. _____ Dated: _____	Addendum No. _____ Dated: _____

*Note: Any exclusion to the scope of work or items noted in this bid form will be considered as cause to deem this bid non-responsive.*

This bid may be withdrawn at any time prior to the scheduled time for the opening of bids or any authorized postponement thereof.

NOTE: Each bid must give the full business address of the bidder and be signed by him with his usual signature. Bids by partnerships must furnish the full name of all partners and must be signed by one of the members of the partnership, or by an authorized representative, followed by the signature and designation of the person signing. Bid by corporations must be signed with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person signing shall also be typed or printed below the signature. Satisfactory evidence of the authority of the officer signing on behalf of a corporation shall be furnished.

Dated \_\_\_\_\_, 2023

Signed \_\_\_\_\_

Print or Type Name \_\_\_\_\_

Business Address \_\_\_\_\_  
\_\_\_\_\_

Phone # \_\_\_\_\_

Fax # \_\_\_\_\_

License # \_\_\_\_\_

Email Address to send contracts \_\_\_\_\_

DIR NUMBER \_\_\_\_\_

Additional Signature Lines if Applicable:

Signed \_\_\_\_\_

Print or Type Name \_\_\_\_\_

Business Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signed \_\_\_\_\_

Print or Type Name \_\_\_\_\_

Business Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Signed \_\_\_\_\_

Print or Type Name \_\_\_\_\_

Business Address \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

State of Incorporation if Applicable \_\_\_\_

( ) Evidence of authority to bind corporation is attached.

Print or Type Name \_\_\_\_\_

Business Address \_\_\_\_\_

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Phone Number: \_\_\_\_\_

FAX Number: \_\_\_\_\_

Contractor's License Number \_\_\_\_\_

Email Address \_\_\_\_\_

AD 6-09a  
S&B Elementary  
02-116800



REQUEST FOR SUBSTITUTION

Pursuant to Public Contract Code Section 3400, Bidder submits the following request to Substitute with the bid that is submitted. I understand that if the request to substitute is not "an/or equal" or is not accepted by DISTRICT and I answer "no" I will not provide the specified item, then I will be held non-responsive and my bid will be rejected. With this understanding, I hereby request Substitution of the following articles, devices, equipment, products, materials, fixtures, patented processes, forms, methods, or types of construction:

	Specification Section	Specification Item	Requested Substitute Item	Contractor Agrees to Provide Specified Item if request to Substitute is Denied <sup>1</sup> (circle one)	District Decision (circle one)
1.				Yes      No	Grant    Deny
2.				Yes      No	Grant    Deny
3.				Yes      No	Grant    Deny
4.				Yes      No	Grant    Deny
5.				Yes      No	Grant    Deny
6.				Yes      No	Grant    Deny
7.				Yes      No	Grant    Deny
8.				Yes      No	Grant    Deny
9.				Yes      No	Grant    Deny
10.				Yes      No	Grant    Deny
11.				Yes      No	Grant    Deny
12.				Yes      No	Grant    Deny

<sup>1</sup> Bidder must state whether Bidder will provide the Specified Item in the event the Substitution request is evaluate and denied. If Bidder states that Bidder will not provide the Specified Item the denial of a request to Substitute shall result in the rejection of the Bidder as non-responsive. However, if Bidder states that Bidder will provide the Specified Item in the event that Bidder's request for Substitution is denied, Bidder shall execute the Agreement and provide the Specified Item(s). If Bidder refuses to execute the Agreement due to the DISTRICT'S decision to require the Specified Item(s) at no additional cost, Bidder's Bid Bond shall be forfeited.





**SECTION 08 44 13**  
**GLAZED ALUMINUM CURTAIN WALLS**

**AD 6-10a**  
**S&B Elementary**  
**02-116800**

**PART 1 GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. Section includes requirements including but not limited to:
1. Glazed aluminum curtain walls.
  2. Accessories necessary for a complete installation.

**1.3 SUBMITTALS**

- A. Combined Submittals:
1. Combine submittals for exterior curtainwall and storefronts into a single submission. Submit combined shop drawings that have been reviewed, annotated, and coordinated by each of the principal exterior cladding subcontractors:
    - a. As an indication of review, and as a condition of acceptance by the Architect, provide combined submittal with a cover sheet clearly indicating the signatures of the Contractor and each exterior cladding subcontractor.
    - b. Coordinate curtainwall, storefronts and entrances, windows, ACM, and window wall submittals.
- B. Product Data: Manufacturer's technical data for each type of product, including construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- C. Shop Drawings:
1. Submit plans, elevations, sections, full size details, and attachments to other work:
    - a. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
    - b. Include full size isometric details of each vertical to horizontal intersection of glazed aluminum curtain walls showing the following:
      - 1) Joinery, including concealed welds.
      - 2) Anchorage.
      - 3) Expansion provisions.
      - 4) Glazing.
      - 5) Flashing and drainage.
      - 6) Thermal breaks.
      - 7) Interface with building construction.
    - c. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
    - d. Indicate glazing details, methods, locations of various types and thickness of glass, emergency breakout locations, and internal sealant requirements.
    - e. Indicate locations of exposed fasteners and joints for Architect's acceptance.
- D. Fabrication Sample (Mockup Drawings):
1. Submit drawings for field mockup 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:

- a. Joinery, including concealed welds.
  - b. Anchorage.
  - c. Expansion provisions.
  - d. Glazing.
  - e. Flashing and drainage.
- E. Delegated Design Submittal: For glazed aluminum curtain walls indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for the preparation.
- F. Structural Calculations: Submit sealed copies of structural calculations indicating complete compliance with the specified performance requirements. Submit calculations prepared, signed, and sealed by a professional engineer licensed in the State of California.
- G. Maintenance Data: Submit maintenance data to include in maintenance manuals.
- H. Maintenance Data for Structural Sealant: For structural sealant glazed curtain walls to include in maintenance manuals. Include ASTM C1401 recommendations for post-installation-phase quality control program.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, licensed in the State of California with experience in the design of curtainwalls and aluminum storefronts to design glazed aluminum curtain walls using performance requirements and design criteria indicated.
- B. Provide curtain wall assembly, storefront system, and windows by a single source and tested as a combined single assembly.
- C. System Description:
1. Curtainwall assembly fabricated from aluminum stick framed system with exposed interior and exterior metal framing. Design system to allow for installation tolerances, expansion and contraction of adjacent materials, and joint design:
    - a. Drawings are diagrammatic and do not identify or solve thermal or structural movement, glazing, anchorage, or moisture disposal. Details establish basic dimension of unit, sight lines, and profiles of members.
    - b. Glass, sealants, and interior finishes do not contribute to framing member strength, stiffness, or lateral stability.
    - c. Design and fabricate glazing systems for interior glazing.
    - d. Design perimeter conditions to allow for installation tolerances, expansion and contraction of adjacent materials, and sealant manufacturer's recommended joint design.
    - e. Design attachments to address site conditions, expansion and contraction movements to eliminate possibility of loosening, weakening, or fracturing connection between units and building structure or between units themselves.
    - f. Allow for expansion and contraction due to structural movement without detriment to appearance or performance.
    - g. Design system to drain to exterior face of wall, water entering joints and condensation occurring within system by drain holes and gutters of adequate size to evacuate water without infiltration to interior or the top of lower lites of glass.
    - h. Design metal faces to be visually flat under lighting conditions.
    - i. Design interior dense EPDM wedge gasket with sealed corners, with maximum 30 percent compression when glazed, to create a water and air seal.
    - j. Design rigid isolators to maintain flatness of face caps and provide thermal break

- between exterior and interior members.
  - k. For stresses placed on structural silicone sealants, maintain sealant manufacturer's recommended maximum.
  - l. Not Permitted: Vibration harmonics, wind whistles, noises caused by thermal movement, thermal movement transmitted to other building elements, loosening, weakening, or fracturing of attachments or components of system.
- D. Performance Criteria:
- 1. Coordinate with Section 08 41 00: Aluminum-Framed Entrances and Storefronts for performance criteria, fabrication, and erection standards. Provide curtain wall assemblies to meet or exceed performance requirements:
    - a. Design and fabricate curtain wall to withstand the operating loads without measurable permanent deflection. Limit deflections to provide the normal degree of rigidity required to avoid glass breakage, air infiltration, and objectionable results of excessive flexibility.
    - b. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
    - c. Failure also includes the following:
      - 1) Thermal stresses transferring to building structure.
      - 2) Glass breakage.
      - 3) Noise or vibration created by wind and thermal and structural movements.
      - 4) Loosening or weakening of fasteners, attachments, and other components.
      - 5) Failure of operating units.
- E. Structural - Test according to ASTM E330:
- 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 ten (10) seconds.
- F. Air Infiltration - Test according to ASTM E283 for infiltration:
- 1. Fixed framing and glass area: Maximum air leakage of 0.06 cfm/sq. ft. (0.30 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa) and 6.24 lbf/sq. ft. (300 Pa).
- G. Water Penetration under Static Pressure - Test according to ASTM E331: 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.
- H. Water Penetration under Dynamic Pressure - Test according to AAMA 501.1:
- 1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure.
  - 2. Maximum water leakage: According to AAMA 501.1. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.
- I. Interstory Drift - Accommodate design displacement of adjacent stories indicated:
- 1. Design displacement: Indicated on Drawings.
  - 2. Test performance: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.4 at design displacement.
- J. Seismic Performance:
- 1. Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to ASCE 7. Design and size components to withstand seismic

- loads and sway displacement as calculated in accordance with CBC Section 1613A:
- a. Seismic drift causing glass fallout: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.6 at design displacement.
  - b. Vertical interstory movement: Complying with criteria for passing based on building occupancy type when tested according to AAMA 501.7 at design displacement.
  - c. Design and size components to withstand seismic loads and sway displacement as calculated in accordance with CBC Section 1613A.
- K. Energy Performance:
1. Certify and label energy performance according to NFRC:
    - a. Thermal transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.69 Btu/sq. ft. x h x deg F (3.92 W/sq. m x K) as determined according to NFRC 100.
    - b. Solar heat gain coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.45 as determined according to NFRC 200.
    - c. Condensation resistance: Fixed glazing and framing areas shall have an NFRC certified condensation resistance rating of no less than 25 as determined according to NFRC 500. Excessive condensation is defined as the accumulation of uncontrolled condensate flowing from the curtain wall at any location, or visible ice, frost, or water on more than five percent (5%) of the area of any module of the exterior wall.
- L. Noise Reduction - Test according to ASTM E90, with ratings determined by ASTM E1332:
1. Outdoor-indoor transmission class (OITC): Minimum 30.
- M. Sound Transmission:
1. Provide window wall and storefront systems with fixed glazing and framing areas having sound transmission characteristics of:
    - a. Sound transmission class (STC): Minimum 35 standard and 41 laminated STC when tested for laboratory sound transmission loss according to ASTM E90 and determined by ASTM E413.
- N. Thermal Movements:
1. Allow for thermal movements resulting from ambient and surface temperature changes:
    - a. Temperature change: 120 degrees F (67 degrees C), ambient; 180 degrees F (100 degrees C), material surfaces.
    - b. Thermal cycling:
      - 1) No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5:
        - a) High exterior ambient air temperature: That which produces an exterior metal surface temperature of 180 degrees F (82 degrees C).
        - b) Low exterior ambient air temperature: 0 degrees F (minus 18 degrees C).
- O. Structural Sealant Joints:
1. Designed to carry gravity loads of glazing.
  2. Designed to produce tensile or shear stress of less than 20 psi (138 kPa).
- P. Structural Sealant:
1. Capable of withstanding tensile and shear stresses imposed by structural sealant glazed curtain walls without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure:

- a. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
- b. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate because sealant-to-substrate bond strength exceeds sealant's internal strength.

Q. Design Modifications:

- 1. Submit design modifications necessary to meet performance requirements and field coordination:
  - a. Variations in details or materials shall not adversely affect the appearance, durability, or strength of components, nor shall variations cause excessive stress, or deflections, to building structural frame.
  - b. Maintain general design concept without altering size of members, profiles, and alignment.

## 1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

- 1. Building code:
  - a. CBC 2019 California Building Code (CCR Title 24, Part 2, as adopted and amended by DSA):
    - 1) CBC Section 1609A Wind Loads.
    - 2) CBC Section 1613A Earthquake Loads.
- 2. Surface burning characteristics:
  - a. Comply with ASTM E84, 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.
- 3. Accessibility requirements:
  - a. Americans with Disabilities Act of 1990, as amended: ADA Title II Regulations and the 2010 ADA Standards for Accessible Design.
  - b. CBC Chapter 11B, Accessibility to Public Buildings, Public Accommodations, Commercial Buildings and Public Housing.
- 4. Welding standards: Welding shall be performed by skilled and qualified mechanics. Welding shall be performed in accordance with the applicable provisions of AWS for Steel and AWS D1.2 Structural Welding Code - Aluminum.
- 5. Structural sealant glazing: Comply with ASTM C1401 for design and installation of structural sealant glazed curtain walls.
- 6. Energy performance standards: NFRC for minimum standards of energy performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.

B. Manufacturer/Fabricator Qualifications: Fabricator specializing in the fabrication of aluminum framed window wall and window systems and components, having minimum ten (10) years' documented experience, and with sufficient production capacity, organized quality control and testing procedures, and published written and illustrated installation manuals to produce and install the entrance assemblies required.

C. Installer Qualifications:

- 1. Firm that specializes in the erection of aluminum framed window wall, storefront, and window systems, having minimum ten (10) years' documented experience, and approved or certified by manufacturer/fabricator:
  - a. Engineering responsibility:
    - 1) Prepare data for curtainwall, storefront, and window systems, including shop drawings, based on testing and engineering analysis of manufactured units in systems similar to those indicated:

- a) Professional engineer qualifications: A professional engineer who is legally licensed to practice in the State of California, experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of heavy glass storefront and entrance system similar to those indicated in material, design, and extent.
- D. Laboratory Mockup Testing Agency Qualifications: Qualified according to ASTM E699 for testing indicated.
- E. Testing Agency Qualifications: Qualified according to ASTM E699 for testing indicated.
- F. Product Options:
  - 1. Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction:
    - a. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.
- G. Source Limitations: Obtain components of curtain wall system, including framing spandrel panels, venting windows, entrances, sun control, and accessories from single manufacturer.
- H. Pre-Installation Conference: Conduct conference at site.
- I. Mockups:
  - 1. Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation:
    - a. Build mockup of typical wall area as shown on Drawings.
    - b. Perform testing on mockups according to specified requirements.
    - c. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
    - d. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- J. Preconstruction Laboratory Mockups:
  - 1. Preconstruction testing service: Owner will engage a qualified testing agency to perform testing on preconstruction laboratory mockups.
  - 2. Build preconstruction laboratory mockups at testing agency facility; use personnel, products, and methods of construction that will be used at Project site:
    - a. Size and configuration: As indicated on Drawings.
    - b. Notify Architect seven (7) days in advance of the dates and times when preconstruction laboratory mockups will be constructed and tested.
  - 3. Preconstruction laboratory mockup testing program:
    - a. Test preconstruction laboratory mockups according to requirements. Perform the following tests in the following order:
      - 1) Structural: ASTM E330 at 50 percent of positive test load.
      - 2) Air infiltration: ASTM E283.
      - 3) Water penetration under static pressure: ASTM E331.
      - 4) Water penetration under dynamic pressure: AAMA 501.1.
      - 5) Structural - ASTM E330 at 100 percent of positive and negative test loads:
        - a) Repeat the following: Air infiltration - ASTM E283; water penetration under static pressure - ASTM E331.
      - 6) Interstory drift - AAMA 501.4 at 100 percent of design displacement:

- a) Repeat the following: Air infiltration - ASTM E283; water penetration under static pressure - ASTM E331.
  - 7) Vertical interstory movement - AAMA 501.7:
    - a) Repeat the following: Air Infiltration - ASTM E283; water penetration under static pressure - ASTM E331.
  - 8) Thermal cycling - according to AAMA 501.5:
    - a) Repeat the following: Air infiltration - ASTM E283; water penetration under static pressure - ASTM E331.
  - 9) Structural - ASTM E330 at 100 and 150 percent of positive and negative test loads:
    - a) Repeat the following: Air infiltration - ASTM E283; water penetration under static pressure - ASTM E331.
- K. Laboratory Mockup Testing:
1. Curtain wall mockup testing shall include components of fixed window units, glazed framing including captured mullions and SSG mullions, and storefront units in mockup:
    - a. Provide mockups as specified for testing. Verify required mockup submittals are reviewed and have received final approval from the Architect prior to construction of the mockups:
      - 1) Laboratory testing mockups are used as a standard for judging visual and performance acceptability of the work for the Project. Replace unsatisfactory work as directed. Provide personnel to construct exterior wall mockups who will be the same personnel who will be performing and supervising the actual work. Simulate actual construction conditions as accurately as possible in every way. Provide extra materials necessary to replace any that fail during tests. Cut glass used in mockups to the minimum tolerances expected in the final exterior wall installation.
      - 2) Size: As shown but not less than the requirements of AAMA Standard 501 and ASTM E331 Section 9. Provide larger mockup(s) if the proposed exterior wall details create a condition requiring a larger mockup(s) for proper evaluation and testing. Provide mockups at wall testing facility complete with glass, aluminum framing, metal panels, anchors, connections, flashings, sealants, and joint fillers as accepted on the mockup shop drawings. Do not take special precautions or use techniques that do not represent those to be used on the work.
      - 3) Laboratory testing: Notify the Architect of the readiness of the mockups for preliminary and final testing. Do not begin the testing program without the presence of the Owner's representative and the Architect.
      - 4) Preliminary test: Conduct single static pressure test at 50 percent of the maximum wind pressure followed by a single test for water penetration at 50 percent of the pressure specified. The preliminary test is purposely limited to a single event. No interim or repeat preliminary testing for Contractor benefit or correction of systems shall be permitted.
      - 5) Perform tests of the mockup(s) in accordance with the standards except as modified, in the order listed, and in accordance with the specified performance criteria. Tests 1 and 5 shall be conducted at 1.57 lbf/sq. ft. (75 Pa) and 6.24 lbf/sq. ft. (300 Pa), respectively. Tests 2, 3, and 6 shall be conducted at 12 lbf/sq. ft. (600 Pa) for 1 cycle, maintaining the test pressure for 15 minutes:
        - a) Test 1 (for air infiltration): ASTM E283. Extraneous air leakage (tare) shall be limited to ten percent (10%) or less of the net air leakage through the exterior wall assembly as provided under ASTM E283. Provide pressure taps as required within the test chamber to ensure uniform stratification of design test pressure across the exterior wall assembly.
        - b) Test 2 (for water penetration - uniform static pressure): ASTM E331.

- c) Test 3 (for water penetration - dynamic pressure): AAMA 501.1.
  - d) Test 4 (for structural performance): ASTM E330, Method B, test to .5 and 1.0 times the wind pressure, during test. Deflection readings shall be taken at end connections and midspans of main framing members, at intersections of framing members and at midspans of glass holding members, glass, and panels. Take readings for both positive and negative loading. If failure occurs through glass breakage prior to achieving 1.5 times the maximum wind pressure, replace glass and repeat test. Two (2) successive failures of the same light or panel not otherwise attributable to inherent glass defects will be considered unacceptable. Further tests shall be suspended until deficiencies are corrected, which may include increasing the stiffness of glass holding members and/or adjustment of the glazing details.
  - e) Test 5 (retest for air infiltration): ASTM E283. Extraneous air leakage (tare) shall be limited to ten percent (10%) or less of the net air leakage through the exterior wall assembly as provided under ASTM E283. Provide pressure taps as required within the test chamber to ensure uniform stratification of design test pressure across the exterior wall assembly.
  - f) Test 6 (retest for water penetration, uniform static pressure): ASTM E331.
  - g) Test 7 (for structural performance): ASTM E330, Method B, except conduct test to 1.5 times the maximum wind pressure. Record pressures and deflections at 1.5 times the wind pressure, during test.
  - h) Test 8 (for live load deflection performance): AAMA 501.4 Modified. Test for live load deflection by applying vertical load to the frame supporting the mockup specimen so as to induce a deflection in the mockup equivalent to the live load deflection identified on the Drawings at the location the mockup is simulating. The load shall be applied and released through ten (10) cycles. Visually inspect mockup specimen after each displacement.
  - i) Test 9 (exterior window maintenance equipment test): Perform concentrated load testing on the exterior wall maintenance tie back equipment attached to the exterior wall framing. Apply outward, inward, and side-loading of a magnitude and for a duration as required to comply with the authorities having jurisdiction for window washing equipment. There shall be no failure or gross permanent distortion of the tie back equipment or any part of the exterior wall framing.
  - j) Test 10 (for thermal transmittance and condensation resistance): At the completion of Test 9, carefully disassemble the glass, glazing, and metal framing components and reassemble them as a mockup, and test the mockup, in accordance with AAMA 1503.
- b. Corrective measures:
- 1) Correct deficiencies in mockups observed during testing and repeat tests as required to show compliance with performance standards. Deficiencies requiring repair or modification to mockup(s) require complete retesting of mockup(s) beginning with the specified preliminary test unless otherwise directed by the Architect:
    - a) The Owner will pay the cost of the first mockup test. The cost of subsequent tests and retesting is the responsibility of the Contractor. The Contractor shall bear costs for additional retesting until compliance with performance standards is accomplished.
    - b) Incorporate corrective measures indicated by the test report into the final exterior wall assemblies after review by the Architect.



## 1.7 WARRANTY

- A. Assembly Warranty:
  - 1. Written warranty signed by manufacturer, Contractor, and installer in which the manufacturer agrees to repair or replace components of glazed aluminum curtain wall that do not comply with requirements or that fail in materials or workmanship within specified warranty period:
    - a. Failures include, but are not limited to, the following:
      - 1) Failure to meet performance requirements.
      - 2) Structural failures including, but not limited to, excessive deflection.
      - 3) Glass breakage due to defective design.
      - 4) Noise or vibration created by wind and thermal and structural movements.
      - 5) Deterioration of metals, finishes, and materials beyond normal weathering.
      - 6) Water penetration through fixed glazing and framing areas.
      - 7) Deterioration of materials and finishes beyond normal weathering.
      - 8) Failure of insulating glass.
      - 9) Noise or vibration created by wind and thermal and structural movements.
      - 10) Failure of operating components.
  - 2. Warranty period: Two (2) years from date of Substantial Completion.
- B. Finish Warranty:
  - 1. Written warranty signed by manufacturer in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory applied finishes within specified warranty period:
    - a. Deterioration includes, but is not limited to, the following:
      - 1) Color fading more than five (5) Hunter units when tested according to ASTM D2244.
      - 2) Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      - 3) Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Warranty period: Two (2) years from date of Substantial Completion.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Identify components of curtainwall work after fabrication by marks clearly indicating location in the building. Package components to protect components from damage during shipping and handling.
- B. Storage on Site: Store units, components, and materials in clean, dry location, away from uncured concrete, masonry work, sprayed on fireproofing work, and construction activities. Cover with nonstaining waterproof paper, tarpaulin, or polyethylene sheeting to permit circulation of air inside the covering.
- C. Keep handling on site to a minimum. Exercise care to avoid damage to finishes of metals or breakage of glass.

## PART 2 PRODUCTS

### 2.1 FRAMING

- A. Manufacturers are subject to compliance with requirements. Provide products by one of the following:
  - 1. Kawneer North America; an Alcoa company.
  - 2. Arcadia, Inc.

3. Equal or better
- B. Framing Members:
1. Extruded or formed aluminum framing members of thickness required and reinforced necessary to support imposed loads:
    - a. Construction: Thermally broken.
    - b. Glazing system: Retained mechanically with gaskets on four sides.
    - c. Glazing plane: Front.
    - d. Finish: Clear anodized.
    - e. Fabrication method: Either factory or field fabricated system.
- C. Pressure Caps: Aluminum components that mechanically retain glazing with snap on aluminum trim that conceals fasteners.
- D. Brackets and Reinforcements: High strength aluminum with nonstaining, nonferrous shims for aligning system components.
- E. Materials:
1. Aluminum:
    - a. Alloy and temper recommended by manufacturer for type of use and finish indicated:
      - 1) Sheet and plate: ASTM B209.
      - 2) Extruded bars, rods, profiles, and tubes: ASTM B221.
      - 3) Extruded structural pipe and tubes: ASTM B429.
  2. Steel reinforcement:
    - a. 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:
      - 1) Structural shapes, plates, and bars: ASTM A36.
      - 2) Cold rolled sheet and strip: ASTM A1008.
      - 3) Hot rolled sheet and strip: ASTM A1011.
  3. Carbon steel: ASTM A36.

## 2.2 INSULATED SPANDREL PANELS

- A. Insulated Spandrel Panels:
1. Laminated, metal faced flat panels with no deviations in plane exceeding 0.8 percent of panel dimension in width or length:
    - a. Overall panel thickness: One inch (25.4 mm).
    - b. Exterior skin – aluminum:
      - 1) Thickness: Standard for finish and texture indicated.
      - 2) Finish: Match framing system.
      - 3) Texture: Smooth.
      - 4) Backing sheet: 0.125-inch (3.2 mm) thick, corrugated, high density polyethylene.
    - c. Interior skin – aluminum:
      - 1) Thickness: Standard for finish and texture indicated.
      - 2) Finish: Matching curtain wall framing.
      - 3) Texture: Smooth.
      - 4) Backing sheet 0.125-inch (3.2 mm) thick, corrugated, high density polyethylene.
    - d. Thermal insulation core: Rigid, closed cell, polyisocyanurate board.

**PART 3****3.1 ENTRANCES**

- A. Entrances: Comply with Section 08 41 00: Aluminum-Framed Entrances and Storefronts.

**3.2 GLAZING**

- A. Glazing: Comply with Section 08 80 00: Glazing.
- B. Glazing Gaskets: Sealed corner pressure glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
- C. Glazing Sealants: Recommended by manufacturer.
- D. Structural Glazing Sealants - ASTM C1184:
  - 1. Chemically curing silicone formulation that is compatible with system components with which it comes in contact, specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in curtainwall assembly indicated:
    - a. Color: Black
- E. Weatherseal Sealants – ASTM C920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O:
  - 1. Chemically curing silicone formulation that is compatible with structural sealant and other system components with which it comes in contact; recommended by structural sealant, weatherseal sealant, and structural sealant glazed curtainwall manufacturers for this use:
    - a. Color: Match structural sealant.

**3.3 ACCESSORIES**

- A. Fasteners and Accessories:
  - 1. Corrosion resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials:
    - a. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
    - b. Reinforce members as required to receive fastener threads.
    - c. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.
- B. Anchors:
  - 1. Three-way adjustable anchors with minimum adjustment of one inch (25.4 mm) that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer:
    - a. Concrete and masonry inserts: Hot dip galvanized cast iron, malleable iron, or steel inserts complying with ASTM A123 or ASTM A153 requirements.
- C. Concealed Flashing: 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.

### 3.4 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. Provisions for field replacement of glazing from exterior.
  - 6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
  - 7. Components curved to indicate radii.
- D. Fabricate components to resist water penetration:
  - 1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
  - 2. Pressure equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.
- E. Factory Assembled Frame Units:
  - 1. Rigidly secure nonmovement joints.
  - 2. Prepare surfaces that are in contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion.
  - 3. Preparation includes, but is not limited to, cleaning and priming surfaces.
  - 4. Seal joints watertight unless otherwise indicated.
  - 5. Install glazing to comply with requirements in Section 08 80 00: Glazing.
- F. After fabrication, clearly mark components to identify locations according to shop drawings.

### 3.5 ALUMINUM FINISHES

- A. Color Anodic Finish - AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker:
  - 1. Color: Selected by Architect.

### 3.6 SOURCE QUALITY CONTROL

- A. Structural Sealant: Perform quality control procedures complying with ASTM C1401 recommendations including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

## PART 4 EXECUTION

### 4.1 PROJECT CONDITIONS

- A. Field Measurements:
  - 1. Verify dimensions of supporting structure by field measurements before fabrication so curtainwall work is accurately designed, fabricated, and fitted to the structure. Indicate

measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work. Use Contractor's lines and benchmarks as a basis for measurements:

- a. Established dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating curtainwalls without field measurements. Coordinate supporting structure construction to ensure actual dimensions correspond to established dimensions.

#### 4.2 EXAMINATION

- A. Examine openings, substrates, adjoining construction, structural support, anchorage, and conditions for compliance with requirements for installation tolerances and conditions affecting performance of the work:
  1. Verify rough opening dimensions, levelness of sill plate, and operational clearances. Examine wall flashings, vapor retarders, water and weather barriers, and built in components to ensure weathertight window wall installation.
  2. Notify Architect in writing of dimensions or conditions found that prevent proper execution of the window wall work, including specified tolerances.
- B. Proceed with installation after correcting unsatisfactory conditions.

#### 4.3 PREPARATION

- A. Prepare surfaces that will contact 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.

#### 4.4 INSTALLATION

- A. Coordinate installation with building enclosure work.
- B. Comply with manufacturer's written instructions for installing curtain wall, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112:
  1. Do not install damaged components.
  2. Fit frame joints to produce hairline joints free of burrs and distortion.
  3. Rigidly secure nonmovement joints.
  4. Remove loose particles present or resulting from fabrication or field cutting and drilling by blowing out joints with oil free compressed air, or by vacuuming joints.
  5. Remove protective coatings, oils from cutting and drilling operations, and residue on metallic surfaces with solvents that leave no residue.
  6. Do not allow solvent to air dry without wiping. Use lint free towels for wiping of surfaces. Wipe metal surfaces with IPA (isopropyl alcohol) or xylene unless otherwise required by compatibility and adhesion testing results. Seal joints watertight. Clean excess joint sealants from finished surfaces.
  7. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
  8. Where welding is required, weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
  9. Seal joints watertight unless otherwise indicated.
  10. Set components within erection tolerances with uniform joints. Place components on shims and fasten to supporting substrates using bolts and similar fasteners.
  11. Do not erect components that are warped, deformed, bowed, dented, defaced, or damaged and impair strength or appearance. Remove and replace members damaged in process of erection.
  12. Coat concealed surfaces of dissimilar materials, and ferrous metal components, with

heavy coating of bituminous paint, zinc rich primer or separation in accordance with manufacturer's recommendations. Where aluminum components will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

13. Do not burn, cut into, or field drill holes or slots in building framing member without written acceptance of the structural engineer.
- C. Metal Protection:
1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with primer, applying sealant or tape, or installing nonconductive spacers as recommended by manufacturer for this purpose.
  2. Where aluminum is in contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- D. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
- E. Install components plumb and true in alignment with established lines and grades.
- F. Permanently fasten to building structure with manufacturer recommended attachments and shims to permanently fasten system to building structure. Securely anchor components and units in place, allowing for required movement, including expansion and contraction. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weathertight construction.
- G. Water Drainage: Compartmentalize each light of glass using joint plugs and silicone sealant to divert water to the horizontal weep locations. Locate weep holes in the horizontal pressure plates and covers to divert water to the exterior of the building.
- H. Install operable units level and plumb, securely anchored, and without distortion. Adjust weather stripping contact and hardware movement to produce proper operation.
- I. Glazing:
1. Install glazing gaskets and sealants in accordance with manufacturer's instructions without exception; including surface preparations. Refer to Section 08 80 00: Glazing:
    - a. Prepare surfaces that will contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion:
      - 1) Preparation includes, but is not limited to, cleaning and priming surfaces.
- J. Insulation and Fire Stopping: Refer to Section 07 21 00: Thermal Insulation and Section 07 84 00: Firestopping, respectively.
- K. Weatherseal: Install weatherseal sealant according to Section 07 90 00: Joint Sealants and according to sealant manufacturer's written instructions to produce weatherproof joints. Install joint filler behind sealant as recommended by sealant manufacturer.

#### 4.5 ERECTION TOLERANCES

- A. Erection Tolerances:
1. Install glazed aluminum curtain walls to comply with the following maximum tolerances:
    - a. Plumb: 1/8 inch in ten feet (3.2 mm in 3 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
    - b. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet (6.35 mm in 12.2 m).
    - c. Alignment:
      - 1) Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch (12.7 mm) wide, limit offset from true alignment to 1/16 inch

- (1.6 mm).
- 2) Where surfaces are separated by reveal or protruding element from 1/2 to one inch (12.7 to 25.4 mm) wide, limit offset from true alignment to 1/8 inch (3.2 mm).
- 3) Where surfaces are separated by reveal or protruding element of one inch (25.4 mm) wide or more, limit offset from true alignment to 1/4 inch (6 mm).
- d. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.6 m); 1/2 inch (12.7 mm) over total length.
- e. Tolerances are not accumulative.

#### 4.6 FIELD QUALITY CONTROL

- A. The Owner reserves the rights to engage an independent testing and inspection agency to verify the adequacy of the Contractor's quality control. Obtain inspections from representative of the Owner's independent testing and inspection agency. Testing and inspecting agency will interpret tests and state in each report whether tested work complies with or deviates from requirements.
- B. Test Area: Perform tests on representative areas of glazed aluminum curtain walls.
- C. Field Quality Control Testing:
  - 1. Perform the following tests on representative areas of glazed aluminum curtain walls.
    - a. Water spray test:
      - 1) 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:
        - a) Perform a minimum of two (2) tests in areas as directed by Architect.
        - b) Perform tests in each test area as directed by Architect. Perform at least three (3) tests, prior to 70 percent completion.
    - b. Air infiltration:
      - 1) ASTM E783 at 1.5 times the rate specified for laboratory testing but not more than 0.09 cfm/sq. ft. (0.45 L/s per sq. m) at a static-air-pressure differential of 1.57 lbf/sq. ft. (75 Pa):
        - a) Perform a minimum of [two] tests in areas as directed by Architect.
        - b) Perform tests in each test area as directed by Architect. Perform at least three (3) tests, prior to 70 percent completion.
    - c. Water penetration: ASTM E1105 at a minimum cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing, but not less than 6.24 lbf/sq. ft. (300 Pa) and shall not evidence water penetration.
- D. Structural Sealant Adhesion:
  - 1. Test structural sealant according to recommendations in ASTM C1401, Destructive Test Method A, Hand Pull Tab (Destructive), Appendix X2:
    - a. Test a minimum of two (2) areas on each building facade.
    - b. Repair installation areas damaged by testing.
- E. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports.
- G. Remove and replace noncomplying windows and retest as specified.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

**4.7 CLEANING**

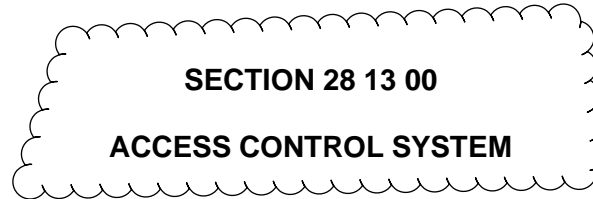
- A. Clean metal surfaces promptly after installation, exercising care to avoid damage to factory finished exposed surfaces.
- B. Wash glass on both faces not more than four (4) days prior to date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer. Remove excess glazing and sealant compounds, dirt, and other substances.
- C. Immediately remove deleterious material from surfaces of aluminum.

**4.8 PROTECTION**

- A. Institute protective measures required throughout the remainder of the construction period to ensure that window wall work will be without damage or deterioration, other than normal weathering, at time of acceptance.

**END OF SECTION 08 44 13**





**AD 6-12a  
S&B Elementary  
02-116800**

## PART 1 - GENERAL

### 1.01 INTRODUCTION: COMPLETE SYSTEM PROPOSAL

A. Contractor shall furnish and install a complete Access Control System based on design by **Sielox Pinnacle Software**. It is the intent of this specification to provide a complete network distributed platform for Access Control. The access control platform shall incorporate use of a Crisis Lockdown Alert Status System (CLASS) with notification and silent chat (see page 25 for full specification). All systems shall be network configured and controlled and shall be the contractor's responsibility to provide all software and configuration to accomplish this scope of work. Upon completion, the system shall provide a minimum of the following system features:

1. The ACS shall provide the speed and flexibility of 32 bit multiple-technology controllers and be managed by a client/server application using an intuitive graphical operator interface on the Microsoft Server 2008 R2, 2012, 2012 R2, 2016, 2019, Windows 8.1 Pro or Windows 10 Systems.
2. All devices, such as card readers, keypads, access cards, alarm inputs and outputs.
3. The ACS shall include all computer/server hardware and software, field controllers, communication boards, power supplies, battery backup, conduit, and all other equipment as indicated on the contract drawings and as specified herein. All material shall be the manufacturer's standard catalog products.

### 1.02 RELATED SECTIONS

A. Related sections include the following:

1. 08 70 00 – Door Hardware
2. 26 00 00 – Electrical
3. 27 10 00 – Communications

### 1.03 INTENT OF DRAWINGS AND SPECIFICATIONS

A. These Specifications, together with the Drawings accompanying them, are intended to depict the installation requirements necessary to support this Project. Contractor shall furnish materials shown and/or called for on the Drawings but not mentioned in the Specifications, or vice versa, that are necessary for the installation and support of a fully

functional access control system, whether or not specifically called for in both. In addition, Contractor shall provide incidental equipment and materials required for the completion of systems included in this contract whether or not specified or shown on the Drawings

#### 1.04 DESCRIPTION

- A. The ACS shall be a 32-bit native Microsoft Windows program with support for 64-Bit Operating Systems. OS options should include Microsoft Server 2008 R2, 2012, 2012 R2, 2016, 2019, Windows 8.1 Pro or Windows 10 Systems. Enterprise application with multi-operator and multi-threaded (multi-tasking) capability, allowing independent activities and monitoring to occur simultaneously at different locations. The Client workstation shall be easy to use and employ intuitive icon-based operator interface.
- B. The ACS shall be simple and economical enough to support a single site, yet powerful and flexible enough to manage multiple sites, across a LAN or WAN network.
- C. ACS shall operate in a client/server or client/database server to hardware server or sever thin client (web based) when configuration on high-quality servers or work station computers running Microsoft Windows Server 2008 R2, 2012, 2012 R2, 2016, 2019, Windows 8.1 Pro or Windows 10 Enterprise operating system and with a Microsoft SQL 2016 Standard or Enterprise edition databases. SQL 2014 Express with SP3 is included and will be acceptable for smaller or basic systems. The software shall be designed to support the manufacturer's past & present generation access control hardware.
- D. The ACS shall allow ODBC database access either through a defined ODBC interface or an SDK library set.
- E. The ACS shall conform to standard networking protocols, including TCP/IP iP4 and iPv6 Ethernet Protocols.
- F. All core ACS hardware and software shall be developed and manufactured by the same manufacturer, and be made and supported I the U.S.A.
- G. Manuals
  - 1. The manuals shall contain the following:
    - a. Installation Guide, this manual shall identify the operational requirements for the system and explain the theory of operation, design philosophy and specific functions.
    - b. Operator's Guide, the operator's manual shall fully explain all procedures and instructions for the operation of the system.
- H. Regulatory Requirements:
  - 1. Systems shall be designed, manufactured, tested, and installed in accordance with NFPA 70 (National Electrical Code), state codes, local codes, requirements of authorities having jurisdiction and in particular:

2. Equipment and materials for which there are UL standard testing requirements, listings, and labels shall be listed and labeled by UL or ETL and meet or exceed all appropriate FCC Regulations.

#### 1.05 WARRANTY

- A. **Manufacturer's Warranty:** Submit manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

#### 1.06 GENERAL SUBMITTAL REQUIREMENT

- A. Submittals shall be presented and formatted per the guidelines in the Division 1 section of this bid package.
- B. All product cut sheets shall represent the latest version, part number, and revision of the product. Where multiple products or part numbers appear on a page, a bold arrow or circle shall indicate which product or part numbers are to be used as part of the installation. Failure to identify exact part numbers on a page will result in the rejection of the entire submittal package. The submittal shall include all descriptive pages associated with the product, not just the page showing the part number.
- C. **Shop Drawings:** Detail the system including the following:
  1. **Cabling Diagrams:** Single-line block diagrams showing cabling interconnection of all components for this specific equipment.
  2. **Wiring Diagrams:** Detail power, signal, and control systems and differentiate between manufacturer-installed and field-installed wiring. Identify terminals.
  3. **Equipment Cabinet Drawings:** Dimensioned and to scale
  4. **Installer Certificates:** Signed by manufacturer certifying that installers comply with requirements. On request, submit evidence of experience and of relationship with equipment manufacturer.
  5. **Manufacturer Certificates:** Signed by manufacturers certifying that they comply with requirements.
  6. **Field Tests Reports and Observations:** Include record of final adjustments certified by Installer.
  7. **Maintenance Data:** Include the following in maintenance manuals specified in Division
    - a. Operating instructions

- b. Troubleshooting guide
- c. Wiring terminal identification
- d. Equipment parts list

#### 1.07 SOFTWARE MAINTENANCE

- A. The ACS manufacturer shall provide a minimum of two types of after warranty support
  - 1. A Standard Protection plan and an Enhanced Service plan. Pricing for each option will be included in the bid.
- B. The ACS manufacturer shall support the current version of the ACS software and at least [2] full version back.

#### 1.08 MANUFACTURERS AND SYSTEM SPECIFICATIONS:

- A. SIELOX, LLC  
170 East Ninth Avenue  
Runnemede, NJ 08078  
856-939-9300 Phone  
[www.sielox.com](http://www.sielox.com)

OR EQUAL

- B. Access Control System Specification
  - 1. Sielox Pinnacle Access Control Software – PN-SLX-PRF
  - 2. Additional Software Licensing As Needed
    - a. Client Workstations
    - b. LDAP
    - c. Data Exchange
    - d. Database Partitioning
    - e. Remote Access
  - 3. Sielox 1700 Controllers – CN-SLX-1700
  - 4. LifeSafety Enclosures – PW-LSP-SLX150-E4
  - 5. LifeSafety Components – B100, C8, D8
  - 6. Reader shall be Schlage MTB Series and/or AD or Engage Series Wireless Locks as needed.
  - 7. Credential shall be Schlage DESFire EV3 Imageable Card CD-SCH-XF8543
  - 8. Door Position Switch, REX Devices, and Electric Strikes by Allegion.

C. Server and Client Configuration:

Operating System	Lite, Standard, Plus, and Clients: Microsoft Server 2008 R2, 2012, 2012 R2, 2016, 2019, Windows 8.1 Pro or Windows 10 Professional/Enterprise Professional: Microsoft Server 2008 R2, 2012, 2012 R2, 2016, 2019, Windows 8.1 Pro or Windows 10 Professional/Enterprise
Microsoft SQL2014 Express Database Engine Guidelines	Lite, Standard, and Plus: Microsoft SQL 21 04 Express included greater than 128 readers or 10K cardholders OR 5K events per hour or 4 client workstations OR database partitioning requires Standard or Enterprise Editions of SQL which is not included. Professional: Standard or Enterprise Editions required (not included); SQL Express is included only to start up systems, MS SQL 2016 Standard or Enterprise required
Hard Disk Size	1 - 500 GB - Raid 1 Mirror for Lite, 2 - 500GB Raid SATA Hot Swappable Raid 1 SATA HD for Standard, Plus, and Professional, computers/server should be upgradeable to RAID 5 if needed
Processor	Lite and All Clients: Pentium 4, Single Core 3.8 GHz or higher Standard or Plus; 4 Dual Core 3.8 GHz or higher Professional: Pentium 4 Duo Core 3.8GHz or higher
Memory	Lite, Standard, Plus, and Clients: 4GB Lite, Standard, Plus Server: 4GB Professional Server: 8GB
Monitor/Video	19" LCD or Larger to suit application and desk space
Network Card	10/100/1000 MB
Mouse	USB or wireless
Ports	4 USB
Keyboard	USB or wireless
Speakers	Built in or external as application and desk space allow

D. Multi-Hardware Communication Servers

1. The ACS shall support an advance distributed architecture allowing the use of multiple hardware communication servers.
2. The multi-hardware communication server architecture shall also allow linked inputs and outputs between different hardware servers.

3. The ACS shall provide support for drag and drop and Cut and Paste of Controllers setting across hardware communication servers and within the same Hardware Server, allowing hardware communication servers and door/reader's to be easily added to an existing configuration.

E. System Field Controller

1. The controllers shall be 100% distributed intelligence architecture. Each controller shall operate independently of one another. If the ACS Controller communication is lost, it will NOT revert to a degraded mode of operation. The ACS Controller will continue operation without losing any features for cardholders or alarm functions, and it will retain a minimum of 10,000 events which will be downloaded to the server upon the restoration of network communications. The failure of any ACS controller will result in a Maximum of 1 or 2 Card Readers doors in the off-line condition. Any controller offline condition that affects more than 1 or 2 readers will be considered unacceptable. Controllers that control 4, 8 or 16 readers are not acceptable to the Owner.
2. The controllers shall provide intelligent interface to intrusion detection and duress alarm devices, card reader devices, door locking and gate control mechanisms, elevator systems, local alarm devices, Intercom systems, and other auxiliary systems that may be part of a building security systems.
3. The ACS AC-1700 controllers shall incorporate a 32-bit CPU, using high speed processing for maximum reliability. The design shall allow for a mixture of Readers and I/O support on a single board to facilitate expansion capabilities. Basic Controller
  - a. 1 or 2 Reader Controller AC-1700—Provides support for up to two card readers each with support for; door strike, door contact, and request-to-exit devices. All aspects of each input and output can be completely configured to meet owner's needs. Any controller that supports 4, 8 or 16 readers per controller will be considered unacceptable.
  - b. Each Controller AC-1700 shall have a minimum of 4 auxiliary inputs—each input could be independently configured to be Supervised 4 states or unsupervised 2 states. All aspects of shunting and other timing features shall also be independently configured.
  - c. Each Controller AC-1700 shall have a Minimum of 4 auxiliary outputs each—output should be capable of being supervised and completely programmable. Relays are assignable to activate in the normally open or normally closed positions. The outputs will be assignable to trip on any system event, either alarm type event or on any Card holders type event. Each relay on the controller AC- 1700 shall be removable and field replaceable.
  - d. Each Controller AC-1700 shall support the expansion of at least 56 auxiliary inputs and or outputs.
  - e. On board Ethernet Connection, and Network speed direct into controller CPU. A POE option should also be available. The POE option will power the Controller and up to two card readers attached to the AC-1700 ACS Controller.
  - f. Each Controller AC-1700 shall support up to 32 Allegion—Schlage AD and NDE series locks. The introduction of wireless locks shall not replace the use of the 2 hard wired reader ports enabling the controller to communicate with up to 34 doors.

4. Controllers shall incorporate the following basic features as minimums:
  - a. Cards stored on Controller 50,000 with one access level per cardholder
  - b. Cards stored on Controller 25,000 with three access levels per cardholder
  - c. Buffered events shall be a Minimum of 10,000
  - d. Equipment and materials for which there are ETL or UL standard testing requirements,
  - e. A Web based onboard port which will allow for remote; testing, status reports, rebooting of controller, input, and output tests as well as the ability to remotely update the controllers' firmware. (flash memory updates). This Maintenance port will remain operational even when the controller is communicating through the RS-485 port for day to day operation.
  - f. User-defined dry contact relays/outputs with or without supervision
  - g. User-defined SPDT dry contacts relays/outputs shall be a minimum of 2 Amps max at 24 VDC or 24 VAC and be removable (sockets) and field replaceable.
  - h. The ACS controller should run in a voltage range of 11.5 VDC to 18 VDC max.
  - i. All inputs and outputs of the ACS Controller shall be able to be supervised.
  - j. All communication through the Ethernet Port and RS-485 will have AES 256 encryption.
  - k. Provide support for FIPs 201 and CAC Card Standards.
  - l. Standard coin battery for memory and clock retention.
  - m. Secure SD card (standard type) for door configuration, database backup and end-user and field technician use, as well as remote setup without a network/computer, (Construction Mode).
  - n. The System shall have no limit to the number of Facilities codes that each controller will accept.
  - o. The controller will have LED indicators for the following, RS-485 ports, RS-232 ports, network port, relay's (outputs), storage device on controller. Any ACS that does not have these field trouble shooting aids will be considered unacceptable.
5. All database information shall be stored at the controller level resulting in 100% of decision-making being performed at the controller. Any controller that has a degraded mode of operation will NOT be acceptable and will be rejected.
6. Controllers shall support direct wiring of a 1 or 2 Wiegand output readers without the need for a separate reader interface board, including any proprietary formats that may need to be incorporated into the owner's system.
7. Controllers shall be compatible with any identification device that transmits data using Wiegand, ANSI or Custom ANSI, or other industry standard protocols. This shall include but not limited to Proximity, HID, AWID, INDALA, Bar code, Magnetic stripe, Iclass, Corporate 1000, Smart Card, Weigand Readers, Keypads and Biometric readers or any combination of the above type readers.
10. Local (server independent) Anti-Passback per Terminal Controller (TC) and server based global and Soft Anti-Passback supporting up to 20 TC's (40 Readers) per defined zone, each independent of location:
  - a. Hard APB Card must be used to exit before it can be used to enter or card must be used to enter before it can be used to exit. If this is out of sequence access is denied.

- b. Zoned (universal) APB enforcing anti-Passback rules for up to 40 readers or 20 controllers in a defined area.
  - c. Soft APB Card must be used to exit before it can be used to enter, or card must be used to enter before it can be used to exit. If this is out of sequence, access is granted, and a soft anti-Passback violation event is posted.
  - d. Timed APB is time or group of times will automatically reset all APB logic forgiving anyone that may have resulted in an APB violation.
11. The ACS Controller AC-1700:
- a. System architecture shall provide for controllers to communicate with Legacy controllers via point-to-point RS-485 2 wire, up to 4,000 feet from the Main Controller.
  - b. Local APB defined as being server-independent and performed at the entrance and exit point of a single 2-Reader Terminal Controller module.
  - c. The Controllers AC-1700 shall have the capability of being upgraded (flashed) either from host computer or Maintenance Port directly to the board.
- F. Card Reader / Keypad
1. The ACS shall support proximity card, Wiegand, Magnetic Stripe, and barcode technologies to include the following manufacturers:
    - a. Sielox Mirage SG, Mirage 2, Performa, and AC-160 Keypad Readers
    - b. Integrated Biometric Readers
    - c. FIPS 201, PIV, TWIC, and CAC Reader Standards
    - d. Morpho V-Flex, V-Prox, V-Pass, V-Smart and V-Station
    - e. ALLEGION Schlage Readers
    - f. HID including iCLASS, Corporate 1000, BioCLASS, MultiClass and Indala
    - g. AWID Proximity Readers [26-75] bit
    - h. Sentex Passport Readers
    - i. Any Wiegand formatted Reader, [26-75] bit
    - j. Select [Specified] barcode Reader
    - k. FarPointe Readers
  2. The Allegion AptiQ proximity reader shall be low profile, weatherized and have a read range of up to [five] inches. The reader shall communicate to the controller through a five conductor, stranded, shielded 18 AWG cable for distances up to 500 feet. The reader shall utilize a [26] bit wiegand data output and operate at [13.56 MHz]. The reader shall be available in industry standard switch plate size and mullion mount. The reader shall be suitable for indoor and outdoor applications and feature bi-color LED status indicator. The reader shall be powered by 12 VDC, supplied by the controller.
- G. Access Cards and Key Tags
1. The ACS shall be compatible with the following access control cards:
    - a. Sielox Performa – Proximity Plus, Cards and Key Tags/Fobs
    - b. ALLEGION Schlage Proximity, Cards and Key Tags/Fobs
    - c. AWID – Proximity, Cards and Key Tags/Fobs
    - d. HID – Proximity, Cards and Key Tags/Fobs
    - e. HID iClass – Contactless Smart Card/Corporate 1000, Cards and Key Tags/Fobs
    - f. Sentex Passport Credentials



- g. Any Wiegand Card or Tag or Fob, 26-75 bit
  - h. US Government Issued PIV, TWIC, and CAC Credentials
  - i. FarPointe Proximity Cards and Key Tags
2. Allegion AptiQ Proximity cards shall be approximating the Thickness of a standard credit card. The card shall utilize 13.56 MHz operating technology. The card shall be compatible with the ACS manufacturer's card readers. The card shall be available with pre-programmed customer-specific ID numbers and available in clamshell or graphics quality direct print. The graphics-quality direct print card shall also be available in a dual-technology proximity/magnetic stripe card.

#### 1.09 ACS SOFTWARE PLATFORM

##### A. Basic Functions and Scalability / Expandability

1. The basic functions of the ACS software shall be:
  - a. Access granted, with card, tag, pin, or a combination of several.
  - b. Monitoring of all alarms and card events and general system activity.
  - c. Perform database management tasks like back-up, repair, and maintenance.
  - d. Database reporting, including errors and status.
  - e. Device or Controller Status and door lock override and control.
2. The ACS manufacturer shall provide a minimum of four levels of product scalability from entry to enterprise levels. Each low level will be expandable without penalty or the repurchase of an entire system. Any System Manufacture that cannot provide a scalable system to meet the end users growth will be considered unacceptable.
3. The ACS shall provide straightforward expandability with the following capabilities:
  - a. Support for one (1) online reader with maximum unlimited capacity
  - b. Support for one (1) cardholder with a maximum unlimited capacity
  - c. Support an unlimited number of cardholder custom fields
  - d. Support an unlimited number of client (thick) and Web (thin) workstations
  - e. Support an unlimited number of hardware communication servers
  - f. Support an unlimited number of addressable controllers
  - g. Support an unlimited number of total access levels and time zones
  - h. Support a maximum of 99 individual expiring access levels per cardholder, each with the ability of having the independent activation dates.
  - i. Support a maximum of 99 alarms levels, each customizable
  - j. Unlimited inputs and outputs, all programmable and customizable
  - k. Unlimited User defined Users (computer operators) Levels
  - l. Support an Unlimited number of Database Partitions
  - m. Support an unlimited number of Allegion – Schlage AD, NDE, LE, and RU/RM Series Locks.
  - n. Support an unlimited number of ASSA Abloy – Aperio Series Locks

##### B. Operating System

1. The ACS shall be a 32-bit Access Control Software, with 64-Bit support. ACS shall operate in a client/server or client/database server to hardware server or sever thin client (web based) when configuration on high-quality servers or work station computers running Microsoft Windows Server 2008 R2, 2012, 2012 R2, 2016, 2019,

Windows 8.1 Pro or Windows 10 Enterprise operating system and with a Microsoft SQL 2016 Standard or Enterprise edition databases. SQL 2014 Express with SP3 is included and will be acceptable for smaller or basic systems. The software shall be designed to support the manufacturer's past & present generation access control hardware.

- a. This ACS shall allow the ACS to take full advantage of these and other features inherent in the Microsoft family of products.
- b. Operating Systems including:
  - 1) Multi-operator and multi-threaded (multi-tasking) operation on an open architecture system
  - 2) Complete support for most standard networking protocols, including:
    - a) TCP/IP
    - b) UDP
  - 3) Graphical operator interface, pull-down menus, mouse and keyboard control, standard Windows type environment.

#### C. Database

1. The ACS software shall utilize Microsoft SQL Server 2008 R2, 2012, 2012 R2, 2016, 2019, or SQL Express for smaller or basic systems

#### D. Networking

1. Networking capability shall be necessary to implement large scale and/or multi-location systems with ACS devices including intelligent field controllers and/or remote clients while overall control of the network is maintained at a central location. Local Area Networks (LAN) or Wide Area Networks (WAN) may be required.
2. The ACS shall support IP Tunneling and VPN communications in a multi-cast network environment.
3. A diagnostic utility (CKP Ping) shall be supplied to allow the operator to verify network communications between a server and workstations or between multiple workstations using LAN topology.
4. The ACS shall support Workstation LAN Disconnect messaging with automatic reconnect options as outlined below:
  - a. When LAN communications with the server is interrupted, a Network Status message shall be displayed at each effected workstation. The dialog box shall be accompanied by a system beep that continues until the "Silence" button is clicked, the ACS is closed or the user logs in, whichever happens first. The ACS shall receive new events or alarms at the workstation while disconnected or while Pinnacle is closed.
  - b. When LAN communications are restored, the Network Status message shall be updated. A system beep shall accompany the new message with a "Connect" button enabled. Clicking the "Connect" button shall cause the ACS to restart and the user to be prompted to log in again.

#### K. Administration and Operating Features

1. The ACS shall provide an easy-to-operate graphical interface for security operators while performing complex access control, security management and reporting

functions. The provided graphical operator interface (GUI) shall be designed following Microsoft Window's guidelines.

2. The features below shall be standard without the need for any add-on software.
  - a. The ACS shall provide interactive on-line help with extensive on-line manual. The on-line manual shall be available to allow the operator to obtain detailed help without having to consult a manual.
  - b. Each workstation shall have access to all features if password level allows. Password levels shall be individually customized to allow or disallow operator access to a program function.
  - c. The operator shall have ability to view and operate up to four independently configured Events screens simultaneously. Each screen shall be capable of displaying its own title, filter, columns and cardholder image.
  - d. Each workstation shall have the option of having an Alarm Pop-up window appear to alert of pending alarms. The window shall also contain alarm response instructions and a field to enter security console operator comments. The ACS shall have the ability to cascade a maximum of ten Alarm Pop-Up windows per workstation.
  - e. Each workstation shall have the ability to filter alarms, events, and time-controlled zones. Users shall be capable of defining alarms, events, and time-controlled filters that will be displayed at each workstation. The set-up of an ACS will also allow the ability to trigger an email notification off a filtered event.
  - f. Alarm routing shall be provided so that if an alarm is unacknowledged for a preset amount of time the alarm will automatically appear on another user's workstation. The system shall provide a minimum of 99 levels of alarm priority.
  - g. The ACS shall provide a device find feature on the device configuration screen.
  - h. The ACS shall provide for .wav files or system beep to be associated with alarm events for alarm annunciation. The playback frequency of the audible alarms shall be configurable from 1 to 10 times or until the alarm is acknowledged.
  - i. The ACS shall support the ability to perform a lock down via an input and be configurable to control one, many or all doors/locks in the system. When the button is reset, the lock should return the state it should be in at the time of the reset.
  - j. The ACS shall support the ability to perform a block of any or all readers associated with the lockdown which restricts access to all blocked readers except to those responders assigned a privileged access level.
  - k. The ACS shall support up to 8 privilege cardholders per reader as well as up to 16 privilege access groups per system.
  - l. The ACS shall provide the following Input and Output Linking:
    - 1) Local = I/O Linking within the same Controller
    - 2) Regional = I/O Linking within the same Controller Group [AC-1700's] of controllers
    - 3) Global = I/O Linking across [AC-1700] Controllers within the same server
    - 4) Universal (when using hardware communication servers for enhanced communications)
  - m. The ACS shall provide the ability for an access level to shunt on or off an input in response to a card read. The shunt shall be either momentary, toggle or latch.

- n. The ACS shall provide the ability for an access level to activate an output in response to a card read. The output shall activate for the momentary toggle or latch activation time set in the output configuration and should be able to be controlled with a time zone.
- o. The ACS shall provide n-screen image enhancements that allow color, brightness, and contrast control, along with image cropping, and red eye removal.
- p. The ACS shall provide an Image Library feature that allows up to nine images to be associated with one cardholder record.
- q. The ACS shall automatically activate and deactivate temporary access levels for a cardholder without affecting the cardholder's regular access level.
- r. The ACS shall provide a cardholder quick entry screen that allows the operator to configure and issue a card from that single screen.
- s. The ACS shall provide First Person Rule (FPR, or snow day option), this feature disables the "Time-Unlock" door schedule until an authorized cardholder is admitted prior to the "Timed Unlock."
- t. The ACS shall support entry of card internal identification number in decimal or hexadecimal formats.
- u. The ACS shall support of multiple card formats, across multiple controllers and readers, independently configurable on a per controller [AC-1700] basis, including card only, card + PIN, or ANSI and Custom ANSI format. The following should be pre-programmed for speedy installation of the ACS system:
  - 1) 26-bit Std & 33-bit CKP Wiegand
  - 2) 26-bit Std & 33-bit CKP Wiegand + Pin
  - 3) ANSI Mag/Custom Wiegand
  - 4) HID Corp 1000
  - 5) HID Corp 1000 + PIN
- v. The ACS shall provide a library consisting of over 19 standard reports or "canned reports" using formula queries and Boolean statements.
- w. A Crystal reports engine for customization shall allow reports to be tailored to exact requirements of who, what, when, where. The system shall use a Report "wizard" technique to assist the operator in generating all reports. Additional crystal reports license shall not be acceptable.
- x. An Alarms report shall be included with the standard reports offered by the ACS. The report shall give the operator the ability to selectively record new, acknowledged and cleared alarms.
- y. Duress code for card and PIN applications shall allow a cardholder to utilize duress PIN when forced to access a card and PIN door. The duress PIN shall unlock the door and send an alarm event to the operator.
- z. The ACS shall provide a maintenance port password for technicians accessing the ACS controllers so that unauthorized persons do not gain direct serial port access to the controllers.

L. Passwords

- 1. Passwords shall be programmed to either never expire or to expire in a user definable number of days.

2. The system shall permit the Administrator to allow blank passwords or to specify that passwords be at least a user definable amount of characters long.
3. The system shall permit the Administrator to never lock out accounts or to lock out accounts after a user defined number of bad attempts and to continue that lock out until either the Administrator resets it or to forgive the lockout after a user defined number of minutes.
4. The ACS system will have an option of supporting Window Authentication. Any ACS that cannot support Microsoft Windows Authentication will not be acceptable.

M. Extended System Applications and Utilities

1. The ACS shall provide operator-friendly, stand-alone system applications designed to assist, configure, or maintain the ACS software. The utilities shall include but not be limited to the following:
  - a. Administration Management Utility: A utility that scans the system looking for unused or otherwise unnecessary items that can be removed. The application shall enable the operator to select from the following:
    - 1) Unused Access Levels
    - 2) Duplicate Access Levels
    - 3) Inactive Cardholders
    - 4) Expired Cardholders
    - 5) Cardholders with No Cards Issued
    - 6) Cardholders with No Access Levels Assigned
    - 7) Cardholders who have Not Used Their Card for a Specified Timeframe
    - 8) Past Holidays
  - b. Report Utility: Shall allow the operator to generate reports without having to log into the ACS main application. The utility shall be capable of accepting a series of command line parameters so that report templates can be configured and saved to the desktop. Allowing the report to be run by clicking on the ICON speeding up the process of gathering data and displaying information in an emergency.
  - c. Event-Link Utility: A utility that receives filtered events and is capable of displaying the contents of the image library for a corresponding cardholder. The application shall be capable of displaying an event grid to allow the operator to refer back to recent events and view the corresponding images.
  - d. Event-Counter Utility: An application that increments and decrements a counter based on operator defined ACS events. The application shall be capable of controlling up to four (4) devices (inputs, outputs, doors, and readers) that are triggered by the counter's value. Two Event Grids; one for incrementing, the other for decrementing events shall be displayed on the operator screen once the application has been launched. Each grid shall be capable of being defined by the Operator. The application shall also support Play/Pause and will display the current counter value and allow the Operator to change the value at any time.
  - e. Network Communication Verification: An application that allows the operator to verify network communications between a server and workstations or between multiple workstations using LAN topology.

- f. Door Control Utility: An application that allows the operator to unlock, lock or momentarily unlock selected doors. The utility shall also provide the capability of displaying a lock/unlock icon on the desktop in addition to the Door Control Utility window. The utility shall also display all events triggered by the ACS.
- g. Independent Report Processing Utility: Shall allow the operator to execute reports for pre-configured reports and formulas.
- h. Scheduler Utility: A utility that allows the scheduling of reports to a predetermined email destination.
- i. N-Man Rule / Occupancy Restriction Utility: A utility that is fully configurable to allow access and limiting occupancy to a secured area. The utility employs a rule for transitioning between two occupancy levels as well as determining which events are permissible. The utility shall feature the following:
  - 1) Control up to four (4) devices (inputs, outputs, doors or readers) via commands that are triggered by the utility's counter value
  - 2) The ability to allow the user to select one (1) incrementing filter that increases the counter value and one (1) decrementing filter that decreases the counter value
  - 3) A display of Event Grids for filtered events impacting the counter value with such grids capable of being configured by the user, support Play/Pause and display on the first five (5) columns of the transaction table
  - 4) A display of a current value counter with the ability for the user to reset the value at any time
  - 5) A manual override for each device in the event an immediate override is necessary
  - 6) The ability to allow the user to use a text name to customize the Counter Name
  - 7) A rule option to allow the user to configure the required number of admitted events (counter value) within a specified time
  - 8) A set of rules further restricting counter verses time where the user shall have the ability to choose the source of sequential events that make up a transaction. Available events are as follows:
    - a) No Restrictions
    - b) Different Cardholders at the Same Device
    - c) Different Cardholders at Different Devices
    - d) Same Cardholder at Different Devices
    - e) Same Cardholder at Same Device
  - 9) A Counter Value Rule that allows the user to configure the counter value as follows:
    - a) Initial Value
    - b) Current Value
    - c) Minimum Counter Value
    - d) Maximum Counter Value
    - e) Enable Negative Counter Values
  - 10) The utility shall allow the user to set the counter value to a certain value at a particular timeframe.

- 11) The utility shall provide the user with the option of allowing the counter value to be reset after each transition.
- 12) The utility shall be capable of saving/retrieving the configuration using standard open, save, and save as commands in the file menu.
- j. Email Report Scheduler: will allow scheduled report generation with direct E-mailing
  - 1) Send Standard or Customized filter reports to anyone, anywhere, anytime, to their assigned workstation.

N. Event Monitor

1. The ACS shall provide an operator friendly event monitoring screen that utilizes navigation bars and icons. From this screen the operator shall have the ability to quickly access the following:
  - a. Monitor
    - 1) The monitor shall be a configurable viewer window capable of displaying of four independent event screens.
    - 2) The monitor view shall be capable of toggling a cardholder image display. When this feature is turned on, a cardholder photo for any reader event displayed in the viewer window will appear.
  - b. Event Viewer Pop-Up Menu
    - 1) The ACS shall give the operator the ability to perform additional functions via a pop-up menu window by right clicking on an event.
    - 2) The menu shall contain the following elements: Sort Ascending by Column Title, Sort Descending by Column Title, View Only Records for Specified Column Title and View All.
  - c. Pending Alarms
    - 1) The ACS shall notify the operator of how many alarm events are pending.
    - 2) The ACS shall activate a Pending Alarm icon/button on the Operator Screen. The button/icon shall indicate the number of alarms pending and shall increment as the ACS receives additional alarms.
    - 3) The ACS shall allow the operator to acknowledge the alarm and remove it once the alarm condition is resolved.
    - 4) The ACS shall allow the operator to acknowledge the alarm and leave it displayed on the screen.
    - 5) The ACS shall allow the operator to override any requirements for comments and remove the alarm from the activity list.
    - 6) The ACS shall allow the operator to enter comments about the alarm. Comments shall be stored in the event history file and be kept available for reports.
    - 7) The ACS shall allow the operator to arrange the alarm activity display in ascending or descending order based on column title.
    - 8) The ACS shall allow the operator to print selected records or all records that appear in the alarm activity window.
    - 9) The ACS shall allow the operator to filter certain alarm characteristics so that only those events with of the same type are displayed.
  - d. Reports Screen

- 1) The Reports Screen shall allow the operator to access built-in reports directly from the Monitor screen. The Reports screen shall display both the name of each report and description of what it includes. Operators shall be allowed to configure reports specifically for devices, events, and cardholders.
- e. System Reminders
  - 1) System Reminders shall notify the operator whether or how many Operator Actions have been performed and will require operator intervention to undo the action. These actions shall include door unlock, output on and input shunt. Reminders shall be configurable and shall be capable of posting once, every [X] hours, once every [X] month.
2. Operator Actions
  - a. Operator Actions shall allow the operator to take actions on devices through the ACS software interface. Actions shall include refreshing controllers, locking and unlocking doors, shunt on/or inputs, and turn on/off outputs.
  - b. Operator should be able to perform Actions from the Event Screen.
3. Scheduling Messages
  - a. The ACS shall have the ability to schedule custom messages to each workstation.
4. The cardholder database screen elements shall provide for but not limited to the following:
  - a. Cardholder name - Fields shall be provided for last name, first name and middle initial.
  - b. Activation date - Shall default to the date the cardholder record was created but shall be capable of being modified if required.
  - c. Expiration date - Shall have a built-in default period of five years but shall be capable of being modified if required.
  - d. Cardholder status - shall allow the operator to effect a cardholder record either active or inactive.
  - e. Class field - shall allow the operator to select a class for each cardholder. The ACS shall include Employee and Visitor as standard classes and shall be capable of creating additional classes.
  - f. Badge field - shall allow the operator to select a badge style and associate it with a cardholder.
  - g. Last admitted event - shall display the last "admitted" card read from a cardholder.
  - h. Display image - shall allow the operator to choose whether a cardholder image is displayed.
  - i. Display signatures - shall allow the operator to choose whether a cardholder signature is displayed.
  - j. Capture images and signatures - shall allow the operator to capture cardholder signatures or images.
  - k. Miscellaneous information - shall display the following pertinent information in a separate window. Examples are:
    - 1) Date Created
    - 2) Created By
    - 3) Last Modified



- 4) Modified By
  - 5) Number of Badges Printed
  - 6) Number of APB Forgiven
- I. Access Levels
- 1) Access levels will allow for assignment to card holders. Access levels are defined as the combination of where the card holder can go (card reader) and when the cardholder can go (time and holiday schedules)
  - 2) Shall have up to 99 access levels assigned to each cardholder. If the number of access levels exceeds 3, in any one controller, the ACS server shall assist cardholders to gain access to the reader/door.
- m. Cards
- 1) The ACS shall allow the cardholders to have more than one card type without the need to create separate cardholder records for each card type. The ACS shall not limit the card types that each user can use and will not limit the number of facility codes within the system at any time. Any ACS that limits the quantity of facility codes in any way will not be acceptable.
  - 2) Shall have lost card/return card buttons in the card information window that will allow the operator to quickly change cardholder status. For audit reasons this feature shall not delete the cardholder record but only the card information itself that has been modified. Any ACS that deletes the card from the card holders record will not be acceptable
  - 3) Shall provide a feature that permits the operator to quickly view a card cardholder's history by clicking a single button. The history shall display on the operator screen and shall show all cards issued to a cardholder along with the disposition of each card.
- n. Custom Fields
- 1) The software shall support an unlimited number of operator-defined custom fields. The custom field feature shall allow the operator to configure each custom field to be either unique text, drop down lists, or calendar fields. Any ACS that cannot meet this flexibility will be considered unacceptable.
- o. Database Partitioning (Option)
- 1) The ACS shall have the capability of partitioning the database by dividing a single system into multiple segments that are each independently operated and managed.
  - 2) The database partitioning shall utilize centralized cardholder administration that will permit the system administration to create cardholders and assign them to one or more partitions as required.
  - 3) The System Administrator shall have full access to all partitions including the ability to modify and delete.
  - 4) Partitions shall be distinct in that information in one partition is concealed from other partitions.
  - 5) A partition shall consist of cardholders, cardholder custom fields, devices, access levels, time zones, holidays, and filters.
  - 6) The ACS shall allow users to share devices across partitions at the ability discretion of the device's owner; owners of a shared device shall have the to control shared devices but not modify or delete.

- 7) Cardholder, custom fields, time zones, holidays, access levels and filters shall be unique to each partition. Partition users shall have the ability to customize this information.
  - 8) The ACS shall selectively limit database access through the use of Permissions and Passwords. User Permissions shall determine which screens can be viewed and which functions the user can carry out.
  - 9) New cardholders shall be assigned a default Access Level for a corresponding partition until subsequently modified by a user for that partition.
- p. Image Library
- 1) The ACS software shall support a feature that allows up to nine images to be associated with one cardholder record.
  - 2) The ACS software shall permit the operator to perform the following functions from the Image Library Menu:
    - a) Capture new photo images
    - b) Display photo images
    - c) Select multiple capture devices
    - d) Load photo image from a file
    - e) Delete the photo image
    - f) Print a badge using a selected image
    - g) Configure the encoder to be used for magnetic stripe encoding
    - h) Select a printer and an encoder
    - i) Edit the image by enhancing the color settings
    - j) Crop the image
    - k) Frame the image in a vignette
    - l) Red eye removal
    - m) Flip image horizontally or vertically
    - n) Launch the badge designer application
  - 3) The ACS software shall have a cardholder search engine that can search on a list of fields in the cardholder database and display the results of the cardholders matching the search criteria. Capabilities shall include searching for a single cardholder or group of cardholders.
  - 4) The ACS software shall have the ability to automatically load the proper cardholder database information into the appropriate intelligent filed controller(s) without any operator intervention.

O. Time Zones and Holidays

1. The ACS shall be equipped with two standard built-in time zones:
  - a. Never - When a new access level is created, all access for the readers in that level is set to never. Access shall be granted only after the operator applies a positive time zone to that reader.
  - b. Always - When a new reader is created, it is configured to always report card transactions for display on the event monitor and inclusion in the event history file.
2. The ACS shall be capable of configuring an unlimited number of time zones, limited only controller restriction, each containing up to eight start and stop intervals.

3. Each time zone shall be capable of crossing midnight as well as including weekdays, weekends, and holidays all within the same time zone.
4. The ACS shall be capable of defining holidays to override the normal operation of time zones and must have a Minimum of 20 available for programming.

P. Output's ALOC and Input ALIC as part of Access Level

1. The ACS shall incorporate Access Level Output Control (ALOC) and Access Level Input Control. This shall provide the ability to control outputs or shunt inputs based on an access level.
2. ALOC shall be capable of sending momentary signals to activate elevator call buttons for so that only authorized cardholders can access certain floors.
3. Access Level Input Control (ALIC) shall be capable of momentarily shunting alarm inputs up to 12 hours, to latch them in a shunted state or to toggle the shunt.

Q. Reporting

1. Report Generator
  - a. Report generation software shall provide the capability to print or view the reports on-screen at operator direction. All reports shall provide the operator with the capability to set up the page, to view the report on-screen prior to printing, or to send the report to a file. Report processing shall not degrade system performance.
2. Standard Reports
  - a. The operator shall have the capability to initiate standard reports for information contained in the database. The operator shall have the ability to select the columns, sort by a selected field and display the report on-screen or at any designated printer. A fixed number of pre-defined reports are required. The system shall allow the operator to determine if cardholders' images will be included in selected reports. The system shall also allow the operator to customize the title of each report that is generated. Finally, the system shall be able to produce cardholder dossiers.
  - b. The system shall allow executables to be placed on the Desktop to run selected reports at a particular time.
  - c. The ACS shall provide the ability to create custom reports that are tailored to exact requirements of the operator.
  - d. The following standard reports shall be available as Standard:
    - 1) Access Level Input Control
    - 2) Access Level Output Control
    - 3) Access Levels
    - 4) Cardholder Summary
    - 5) Cardholder Track
    - 6) Cardholders
    - 7) Event Archive
    - 8) Filters
    - 9) Groups
    - 10) Input/Output Links
    - 11) Last Admitted Event

- 12) Network Configuration
  - 13) Reader Access
  - 14) Reader Track
  - 15) Time Zones
  - 16) APB Zones
  - 17) Alarms
  - 18) Argos Event Archive
  - 19) User Authentication
  - 20) Muster Reports
- e. The ACS shall allow the operator to save a report as a file so that it can be emailed or exported to another computer or saved to media. Shall have the ability to export reports to the following Minimum formats:
- 1) Adobe Acrobat (PDF)
  - 2) Rich Text Format
  - 3) Comma-Separated Values
  - 4) MS Excel 97-2000 (XLS)
  - 5) MS Excel 97-2000 Data Only
  - 6) HTML 3.2, and 4.0
  - 7) ODBC
  - 8) Crystal Reports (RPT)
  - 9) Report Definition
  - 10) Tab-Separated Text, & Plain Text
  - 11) Columns with Space, and without Space
  - 12) MS Word
  - 13) XML
  - 14) Record Style
3. Muster Reporting
- a. The ACS shall have the ability to create a muster report using Last Admitted Event logging –either generated via muster station assembly or via any Admitted event outside the boundary of the evacuation area. This report shall include each Cardholder, the name of the reader generating the event, the Date/Time of the event, and the type of Admitted event. Area groups shall also be supported.
  - b. The system shall have the ability to save a muster report set-up to the desktop for immediate refreshing as needed.
- R. Archive / Backup
- 1. The ACS shall place no limit on the size of the event archive file.
  - 2. The ACS shall incorporate an administrative archive backup tool that enables the operator to manage the size of the event archive file by periodically copying a portion of its contents into backup files and removing it from the live event archive file. This utility shall be able to run daily, weekly, monthly, or annually. This backup utility shall be configurable and provide for a schedule. This shall run in the background and not require operator intervention.
- S. Photo ID Badging System

1. The ACS Photo ID Badging System shall provide the ability to import images from bitmap file formats, digital cameras, TWAIN cameras, scanners, or live video.
2. The system shall provide a complete, integrated photo ID imaging system, which will run on the Microsoft Windows Server 2008 R2, 2012, 2012 R2, 2016, 2019, Windows 8.1 Pro or Windows 10.
3. All system components shall be readily available off-the-shelf items from nationally or internationally recognized vendors. Proprietary hardware elements will not be permitted.
4. The video capture card must be a high resolution, non-proprietary board.
5. The Badging sub-system shall be fully integrated with the host server database; i.e. all badge holder images and all badge holder data are stored on the ACS host server. All enrollment and badge production processes must occur on the client workstation.
6. The imaging system shall utilize a commercially available imaging compression technique, e.g. JPEG using 15-20K per image.
7. The software shall support remote viewing of badge images on ACS terminals utilizing standard Ethernet communications.
8. The badge design and badge production components must provide the capability to:
  - a. Design custom badge formats
  - b. Have a full array of drawing tools
  - c. Define static and dynamic text
  - d. Move text, justify text, use multiple fonts and sizes
  - e. Use custom colors
  - f. Import industry standard graphics for logos and backgrounds
  - g. Capture photos from video board and digital camera
  - h. Capture signatures from signature capture pad
  - i. Use scanners for import of photos or signatures via TWAIN drivers
  - j. Have photo enhancement controls – hue, intensity, brightness, contrast, red eye removal
  - k. Create standard barcodes
  - l. Encode Mag Stripe on badges
  - m. Create and print dual-sided badges
  - n. Preview and print dossier page

T. Visitor Management Interface - Easy Lobby

1. Visitor Management: The ACS shall support real-time integration with a designated visitor management package that shall store and retrieve specific fields of information about the arrival and departure of visitors to the facility. Minimum capability and options shall include:
  - a. Visitor Badging and reporting
  - b. Photo capture
  - c. Pre-registration of visitors and groups
  - d. Multi-tenant building requirements
  - e. Compatible with signature pads, business
  - f. Card scanners and driver's license scanners
  - g. Watch/Lookout List keeps out unwanted visitors

- h. Easy import & update of employee directory, workstations must be able to be on the Network for site with multiple lobbies.
- U. Schlage Wireless Locks – up to 32 Schlage locks per 1700 controller
1. The ACS shall have a direct interface to the Schlage AD series and NDE series locks. Any ACS that requires a third party interface either software or hardware will be considered unacceptable. The interface MUST allow the ACS to communicate and control the locks as follows:
    - a. Cardholder card information
    - b. Access Levels including;
      - 1) Doors the users are allowed to enter
      - 2) Day of the week the users allowed to enter
      - 3) Time of Day the users allowed to enter
      - 4) Holiday/Vacation time associated with the cardholder's rights
    - b. Alarm Information:
      - 1) Door Forced alarms
      - 2) Door Held open too long alarms
    - c. History
      - 1) Report all Valid and Invalid Card reads
      - 2) Report any Alarm active as programmed into the hardware system
      - 3) Report Loss of Communication, Low Battery
      - 4) Scheduled unlocking or locking of Door
      - 5) System operator (Computer User) remotely unlocking or locking of Door.
    - d. Operator Actions
      - 1) Must be able to Lock, Unlock, and Momentarily Unlock a door by an operator
      - 2) Must be able to Block access to a reader
    - e. Schedules
      - 1) Must be able to put Doors on an unlock schedule
      - 2) Must be able to Block access to a reader
    - f. Card Reader types Supported
      - 1) Prox, I Class, Mifare, Desfire, Magstripe, Keypad, NFC. Card or Credential types Supported
      - 2) Prox, I Class, Mifare, Desfire, Magstripe, NFC, FIPS 201
    - g. Lock Toggle while using Access control card, separate toggle card not acceptable
- W. Von Duprin Exit Hardware Interface – RU/RM Interface - Remote dogging ready, undogging and monitoring.
1. The ACS shall have a direct interface to Von Duprin Model 98, 99, 33A and 35A Exit Hardware.
  2. The RU/RM interface MUST allow the ACS to communicate, monitor and control Von Duprin Model 98, 99, 33A and 35A RIM Exit Devices.
  3. The ACS shall support remote undogging for centralized lockdown.
  4. The ACS shall communicate, monitor and report door position status.

5. The ACS shall support remote dogging ready and undogging of the exit device (Electric latch retraction).
  6. The ACS shall monitor and report REX activation from doors fitted with Von Duprin Model 98, 99, 33A and 35A RIM Exit Devices.
- X. Each access controller module shall be installed in either a dedicated enclosure or share an enclosure with other associated access control system modules.
1. Controller Enclosures shall have a dedicated cabinet tamper.
  2. Controller enclosures shall have a dedicated power monitor.
  3. Controller enclosures shall have a dedicated power monitor.
  4. When sharing an enclosure with other associated access control system modules, only one of the modules will be required to monitor cabinet tamper and power.
  5. The access control I/O module shall meet the following physical specifications, excluding the required enclosure.
    - a. Typical Input voltage: 12VDC/VAC.
    - b. Temperature requirements: 0 degrees F to 70 degrees F, operating.
    - c. Relative humidity: 0 percent to 95 percent, non-condensing.
  6. Acceptable Manufacturers:
    - a. Altronix
    - b. Lifesafety
    - c. Or approved equal
- Y. Aegis Video Integration  
(OPTIONAL)
1. Aegis 3 Software
    - a. PN# - AE-KAP-AEGIS-SLX
    - b. PN# - AE-KAP-KLAEGIS-CI
- Z. CLASS (Crisis Lockdown) – SEE SECTION STARTING NEXT PAGE FOR FULL DETAILS
1. Server/Appliance with CLASS Software
    - a. PN# - CL-SLX-300IU Integration Services
    - b. PN# - PS-SLX-CLASS300DS Deployment Services

END OF SECTION

**CRISIS LOCKDOWN  
ALERT STATUS SYSTEM  
[SIELOX™]**

**A/E SPECIFICATION  
SUBJECT TO CHANGE**

**[REMOVE THE BELOW INFORMATION  
AND INSERT THE OWNER AND PROJECT  
INFORMATION]**

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170 East Ninth Avenue  
Runnemede, NJ08078  
856-939-9300 Phone

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## General

### 1. 1. Introduction: Complete System Proposal

- A. This document provides the information necessary to produce a complete proposal for a highly secure, easy-to-use and dependable Crisis Lockdown Alert Status System (CLASS). The CLASS shall provide the speed and flexibility managed by an embedded secure appliance utilizing a Linux operating System with an intuitive graphical operator interface optimized for browser-based and touch devices. The CLASS shall include all computer hardware and software, field controllers, communication boards, power supplies, **[Electric Hardware][Conduit], [Raceways]**, and all other equipment as indicated on the contract drawings and as specified herein. All material shall be the manufacturer's standard catalog products.

### 1. 2. System Description

- A. The CLASS shall be a hardened Linux based appliance with multi-operator and multi-threaded (multi-tasking) capability, allowing independent activities and monitoring to occur simultaneously at different locations.
- B. The Client workstation or mobile device shall consist of any device that can run an HTML5 compliant Web Browser, such as Google Chrome, Internet Explorer, Firefox, Safari, Android, and Apple iOS. The CLASS Appliance shall support a minimum of 250 concurrent connections.
- C. The CLASS shall be simple and economical enough to support a single site, yet powerful and flexible enough to manage multiple-sites, across a WAN, LAN, Wi-Fi, 3G, 4G, 5G, and LTE networks simultaneously.
- D. The CLASS shall not require any additional wiring when installed on the customer's network, using the customer's existing infrastructure.
- E. The CLASS shall not require any hosting, or licensing fees.
- F. The CLASS shall conform to standard networking protocols, including: TCP/IP iP4 and iPv6 Ethernet Protocols.
- G. All core CLASS hardware and application software shall be developed and manufactured by the same manufacturer, and be made and supported in the U.S.A.

### 1. 3. Manuals

- A. The manuals shall contain the following:
  - 1. **Quick start guide:** A simple 1 page document to get the appliance installed and network access to the device.
  - 2. **Installation Guide:** This manual shall identify the operational requirements for the system and explain the operation, design and functionality.

3. **Operator's Guide:** The operator's manual shall fully explain all procedures and instructions for the operation of the system.

#### 1.4. Regulatory Requirements

- A. Systems shall be designed, manufactured, tested and installed in accordance with NFPA 70 (National Electrical Code), state codes, local codes, requirements of authorities having jurisdiction and in particular:
- B. Equipment and materials for which there are UL standard testing requirements, listings, and labels shall be listed and labeled by UL or ETL 294 and 1076, and meet or exceed all appropriate FCC Regulations.

#### 1.5. Warranty

- A. Warranty Period will be one a minimum of [**One**] (**[1]**) year date of Substantial Completion.

#### 1.6. Software Maintenance

- A. The CLASS manufacturer shall provide a minimum of two types of after warranty support:
  1. Standard Software Protection Plan
  2. End-user Support Plan
- B. The CLASS manufacturer shall support the current version of the CLASS software and at least [2] previous full versions.

#### 1.7. Manufacturer:

Sielox, LLC  
170 East Ninth Avenue  
Runnemede, NJ08078  
856-939-9300 Phone

[www.sielox.com](http://www.sielox.com)

#### 1.8. CLASS Software Platform

- A. The software shall be browser based and shall require no installation on client devices.

B. Basic functions of the CLASS software:

1. Shall support the initiation of color status from rooms and/or designated locations.
  - a. Color status icons available via browser on desktop, laptop, smart (white) board, smart phone, tablet or iPad
2. Shall provide real time location status via color coded maps with 8 unique colors and include user programmable descriptions.
3. Shall provide ability to view and manage floor plan graphics from any device.
4. Shall provide ability to open two way chat to initiators, administrators and first responders.
5. Shall provide ability to clear status by individual location, or all locations.
6. Shall provide ability to place in Lockdown, Shelter, Evacuation, or Lock Out Mode.
7. Shall provide ability to re-label Lock Out to comply with local requirements for a community incident – sample labels include but are not limited to Lock Out, Soft Lock, Lock In, Shelter in Place, Community Incident, Containment, etc..
8. Shall provide pop up alarms on Lockdown, Shelter, Evacuation, or Lock Out Alert Level Changes.
9. Shall provide pop up alarms on any location color status change.
10. Shall provide ability to initiate lockdown of access controlled doors.
11. Shall provide ability to individually lock or unlock each location.
12. Shall provide ability to initiate pre-programmed announcements of paging system via input triggers on paging system.
13. Shall provide ability to send email and/or SMS alerts to Initiators, Administrators, and/or First Responders.
14. Shall be able to interface other systems in response to CLASS events via hard wired outputs on CLASS to alarm inputs on other systems.
15. Shall be able to display events in real time on the event viewer.
16. Shall be able to interface with IP Cameras by using action URL's and streaming video to designated responders based on specific location color condition changes.
17. Shall be able to pop –up any instructions or evacuation plans relevant to a specific alert level or color condition change to any or all Initiators, Responders, and Administrators.
18. Responder shall be able to filter events in real-time in Event Viewer by Who, What, When, Where and Chat content in less than 2 seconds.
19. Responder shall be able to filter chat messaging in real-time by Who, What, When, Where and Chat content in less than 2 seconds.

20. Initiator shall be able to use QR codes for quick location changes.
21. Shall be able to give Initiator a permission based Lock Down alert level button on their tool bar.

### **C. Administration and Operating Features**

1. The CLASS shall provide an easy-to-operate graphical interface for security operators while performing complex crisis management, access control, security management and reporting functions.
2. The features below shall be standard without the need for any add-on software.
  - a. The CLASS shall provide interactive on-line help with an extensive on-line manual. The online manual shall be available to allow the operator to browse in to obtain detailed help without having to consult a hard copy manual.
  - b. Appliance must be able to support 3 separate types of user groups for operator permissions. The system shall support; Administrator, Responder, and Initiator levels of system operator.
  - c. The System shall be able to configure custom user groups for operator permissions.
  - d. Each browser session shall have access to all features if operator password level allows. Password levels shall be individually customized to allow or disallow operator access to a program function. Features that are not permitted will not be visible or selectable.
  - e. The operator shall have ability to view and operate multiple browser sessions simultaneously.
  - f. Each workstation shall have the ability to define and filter alarms and events that will be displayed on each event monitor and be unique to each browser session.
  - g. The CLASS shall provide a maintenance port password for technicians accessing the CLASS controllers so that unauthorized persons do not gain direct serial or network (IP) access to the controllers.

### **D. System Management**

1. The CLASS shall provide Administrators with a friendly Graphical User Interface that allows easy navigation from the main dashboard after login to navigate thru set-up screens via icons on the top tool bar that open a left tool bar that are specific for each configuration screen. System shall also provide an easy setup page that provides the recommended order sequence to follow for easy programming.

2. The CLASS shall provide the ability for an Administrator to be able to also manage an event as a responder without having to log out and log back in as a Responder if an incident occurs while they are in any set/configuration pages.
3. The CLASS System shall provide Responders with a friendly Graphical User Interface that allows easy navigation from the main page after login to quickly access the Events Viewer, Floor Plan Graphics, Chat window, Locations Control on the top tool bar as well as quick access to all 5 Alert Levels on the left tool bar.
4. The CLASS appliance shall support up to 1 Million events in the active archive file for quick reports and filtering.
5. The monitor shall be capable of displaying a minimum of ten different browser screens that can be sized to for each Responder to view multipole browser sessions simultaneously and manage the events viewer, the chat screen, the locations control, and multiple floor plans.
6. The floor plan graphics shall be imported as JPEG or PNG file formats.
7. The CLASS shall support the ability to create location/color sizes for display on floor plan graphics.

**E. Event Management**

1. The CLASS System shall support the use of filters to allow the grouping of events based on Who, What, When, and Where.
2. The CLASS filters shall be available for selection in the event viewer, the Responder Chat screen and the Event Archive Reports.

**F. Reports**

1. The CLASS appliance shall support up to 1 Million events in the active archive file for quick easy event filtering for reports.
2. The CLASS shall allow reports to be saved as an Excel spread sheet or CSV file and be able to be sent to a printer.
3. The CLASS system shall allow for the restoral of backed-up archives to include archived data in the reports.
4. Operators shall be allowed to configure reports via browser specifically for devices, events, actions and messages based on Who, What, When, and Where.
5. The CLASS report feature shall allow a range of audit reports with date and time:

- a. Initiator location condition color status change
- b. Initiator changed Lockdown Alert level
- c. Chat messages from initiator or responder
- d. Email/text alerts
- e. Alert level changes
- f. Responder Location Clear
- g. Responder Checked Location
- h. Responder changed to Medical
- i. Responder changed Alert levels
- j. Ability to recreate entire sequence of events (Audit Trail)
- k. Login and Log out for all operators

**G. Database**

1. The Class software shall utilize the MySQL database.
2. The system shall support the ability to import database information from CSV, file type.
3. The system shall have and support a MYSQL database backup.
4. The system shall have and support a MYSQL database restoration.
5. The Systems shall support templates for quick additions of all database tables and include but not be limited to the following:
  - a. Users/Operators
  - b. Cardholders
  - c. Inputs
  - d. Outputs
  - e. Doors
  - f. Readers
  - g. Controllers
  - h. Access Levels
  - i. Time zones

- j. Floor Plans
- k. Locations
- l. Action URL's
- m. Pop-ups
- n. Email/Text Alerts
- o. Entire database

## **H. Networking**

1. Networking capability shall be provided to implement large scale and/or multi-location systems with CLASS devices including intelligent field controllers and/or remote clients while overall control across the network is maintained at a central location.
2. The CLASS system shall be able to communicate simultaneously across Local Area Networks (LAN), Wide Area Networks (WAN), WIFI, 3G, 4G, 5G, and LTE.
3. The CLASS system shall be deployed on site ensuring LAN and WIFI communications even if the remote communications are not available or have gone down.

## **I. CLASS Field Controller- AC1700 - Option for external initiating devices or controlled outputs to other systems. Must be able to support this controller in the future for full integration.**

1. The CLASS AC1700 controllers shall be 100% distributed intelligence architecture. Each controller shall operate independently of one another.
2. The CLASS AC1700 controllers shall provide intelligent interface for status and control of duress alarm devices, hardwired or wireless card reader devices, door locks and gate control mechanisms.
3. The CLASS AC-1700 controllers shall incorporate a 32-bit CPU, using high speed processing for maximum reliability. The design shall allow for a mixture of Readers and I/O support on a single board to facilitate expansion capabilities.
  - a. The AC-1700 controller shall provide support for up to two hardwired card readers, door strikes, door contacts, and request-to-exit devices. All aspects of each input and output shall be configurable. Each controller should support expansion up to 60 Inputs
  - b. Each AC-1700 controller shall have a minimum of 4 auxiliary inputs. Each input shall be able to be independently configured as supervised 4 states or unsupervised 2 states. All aspects of shunting and other timing features shall also be independently configured. Each controller should support expansion up to 60 Outputs.



- c. Each AC-1700 Controller shall have a minimum of 4 auxiliary outputs with the ability to supervise and program each output.
  - d. Relays shall be assignable to activate in the normally open or normally closed positions. The outputs will be assignable to trip on any system event, either alarm type event or on any card holder type event. Each relay shall be provided with a socket on the AC-1700 controller and shall be removable and field replaceable.
4. The CLASS AC1700 Controllers shall incorporate the following basic features as minimums:
- a. Buffered events shall be 10,000.
  - b. Shall utilize equipment and materials for which there are ETL or UL standard testing requirements.
  - c. The AC-1700 CLASS controller shall support a supply voltage range of 11.5 VDC to 18 VDC maximum.
  - d. A secure SD card (standard type) shall be supported for door configuration, database backup and field technician use, as well as remote setup without a network/computer
  - e. The controller shall be provided with LED indicators for the following: RS-485 ports, RS-232 ports, network port, output relays, and the SD card storage device. Any CLASS controller that does not have these field trouble shooting aids will be considered unacceptable.
  - f. An on board Ethernet connection shall be provided, communicating at network speed direct to the controller CPU.
  - g. The AC1700 controller shall provide a browser based onboard port which will allow for remote testing, status reports, rebooting of controller, input and output tests, communication tests as well as the ability to remotely update the operating firmware. This maintenance port shall remain operational even when the controller is communicating through the RS-485 port for day to day operation.

**END OF SECTION**

**SECTION 32 93 10****SYNTHETIC TURF**

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02-116800**

**PART 1 - GENERAL**

## 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

## 1.02 SUMMARY

- A. The Contractor shall provide and install: Rock Base Course as shown on drawings; Synthetic Turf products including adhesives, fasteners and urethane cloth backing strips.

## 1.03 QUALITY ASSURANCE

- A. Installation: Performed only by skilled work people with satisfactory record of performance on synthetic turf projects of comparable size and quality.
- B. Single source responsibility: Provide material produced by a single manufacturer for each product type.

## 1.04 SUBMITTALS

- A. Submit four (4) copies of manufacturer's product data for all material and installation instructions.
- B. Submit four (4) 10" x 10" sections of material in color specified for review. Reviewed and accepted samples will be returned to the Contractor.
- C. Submit material certificates for rock base course.
- D. Submit installer qualifications for review. Installer shall have two years minimum experience of similar size projects and products.

## 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, and lot number. Store materials in original undamaged packages and containers, inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping.

- B. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

#### 1.06 PROJECT CONDITIONS

- A. Review installation procedures and coordinate work with other work affected. Generally, synthetic turf is installed at the same time as project turf installation.
- B. All hard surface paving adjacent to synthetic turf areas, including concrete walks / concrete mowstrips and asphalt paving, must be completed prior to installation.
- C. Cold weather:
  - 1. Do not use frozen materials or materials mixed or coated with ice or frost.
  - 2. Do not build on frozen work or wet, saturated or muddy subgrade.
- D. Protect partially completed synthetic turf installation against damage from other construction traffic when work is in progress, and until final acceptance. Any barricades constructed must still be accessible by emergency and fire equipment during and after installation.
- E. Protect adjacent work from damage during synthetic turf installation.

### **PART 2 - PRODUCTS**

#### 2.01 ACCEPTABLE MANUFACTURES

- A. Basis of Design, Tiger Turf, as distributed by Synthetic Grass Warehouse (800) TURF911, or approved manufacturer.

#### 2.02 MATERIALS

- A. Diamond Pro Spring, possessing the following:
  - 1. Yarn Type  
Monofilament PE with Thatch
  - 2. Color  
Yarn color - Field and Lime green  
Thatch color - Brown
  - 3. Pile Height 1.875"
  - 4. Face Weight  
80 ounces
  - 5. Warranty  
Fifteen year warranty

B. Aggregate Base Rock Base Course: Class II Gravel aggregate base material from local sources commonly used for road base construction.

1. Sources of the material can include either "pit run" or "crusher run". Crusher run material will generally require sharp sand to be added to mixture (40 to 60% by volume) to ensure long term porosity.
2. Rock base material shall be free from organic material and be graded as follows:

Sieve Size	% Passing
1"	100
3/4"	90-100
1/2"	80-100
3/8"	70-100
1/4"	60-90
#4	50-85
#8	30-65
#16	10-50
#30	0-35
#60	0-15
#100	0-8
#200	0-2

C. Decomposed Granite Leveling Course: Gravel fines material from local sources.

1. Gravel fines material shall be free from organic material and graded as follows:

Sieve Size	% Passing
1/4"	75-100
#4	60-90
#8	35-75
#16	10-55
#30	0-40
#60	0-15
#100	0-8
#200	0-2

D. Synthetic Turf Infill Material: 'Quality Infill' material as provided by Tiger Turf. Provide green color infill material.

E. Synthetic Turf Fasteners: 16 penny galvanized nails with galvanized washers.

F. Recycled Plastic Header Board: Provide recycled HDPE plastic header graded by an agency certified to inspect and grade recycled plastic header products. Plastic header shall be plastic lumber made from recycled high density polyethylene.

G. Miscellaneous Material: Manufacturer's standard adhesives, urethane backing cloth and hold down nails as approved by the Landscape Architect.

### PART 3 - EXECUTION

#### SYNTHETIC TURF

### 3.01 INSPECTION

- A. Examine subgrade and base course installed conditions. Do not start installation until unsatisfactory conditions are corrected. Check for improperly compacted trenches, debris, and improper gradients.
- B. Installation constitutes acceptance of installed conditions and responsibility for satisfactory performance. If installed conditions are found unsatisfactory, contact the General Contractor's Project Manager for resolution.

### 3.02 AGGREGATE BASE ROCK BASE PREPARATION

- A. Place rock base course material over prepared subbase to grades shown on plans, in lifts not to exceed two inches (2"), compacting each lift separately to 92 percent relative density. Place gravel fines leveling course and compact to 95 percent relative density. Leave finish grade at level required for synthetic turf material to meet final grade. Provide smooth even plane that meets grading and drainage shown on contract documents. Eliminate all humps and hollows. Ensure base course is smooth with no protrusions or rocks interrupting the profile.

### 3.03 INSTALLATION OF SYNTHETIC TURF SURFACING

- A. Lay out synthetic turf rolls to ensure the least amount of seams. Roll out turf and flatten to remove creases or humps.
- B. Join seams by installing urethane cloth backer twelve inches (12") wide. Place urethane cloth centered directly under seam and apply manufacturer's adhesive at rates indicated. Slowly and simultaneously lay both sides of turf on the adhesive. Avoid overlapping the backing and make sure fibers do not contact with adhesive. Apply weight to seam for a period of one hour. Reinforce seams, field and edges with nail fasteners as recommended by the manufacturer and as approved by the Landscape Architect. Place infill material at two pounds (2) per square foot as recommended by the manufacturer and as approved by the Landscape Architect.

### 3.04 PROTECTION

- A. Synthetic Turf areas must be protected from any traffic, other than emergency vehicles until final acceptance.

### 3.05 CLEANING

- A. Remove and replace segments of turf where damage occurred or turf is blemished, reinstalling as specified, with no evidence of replacement.
- B. Perform cleaning during the installation of work and upon completion of the work.

Remove from site all excess materials, debris, and equipment. Repair any damage to adjacent materials and surfaces resulting from installation of this work.

**END OF SECTION**

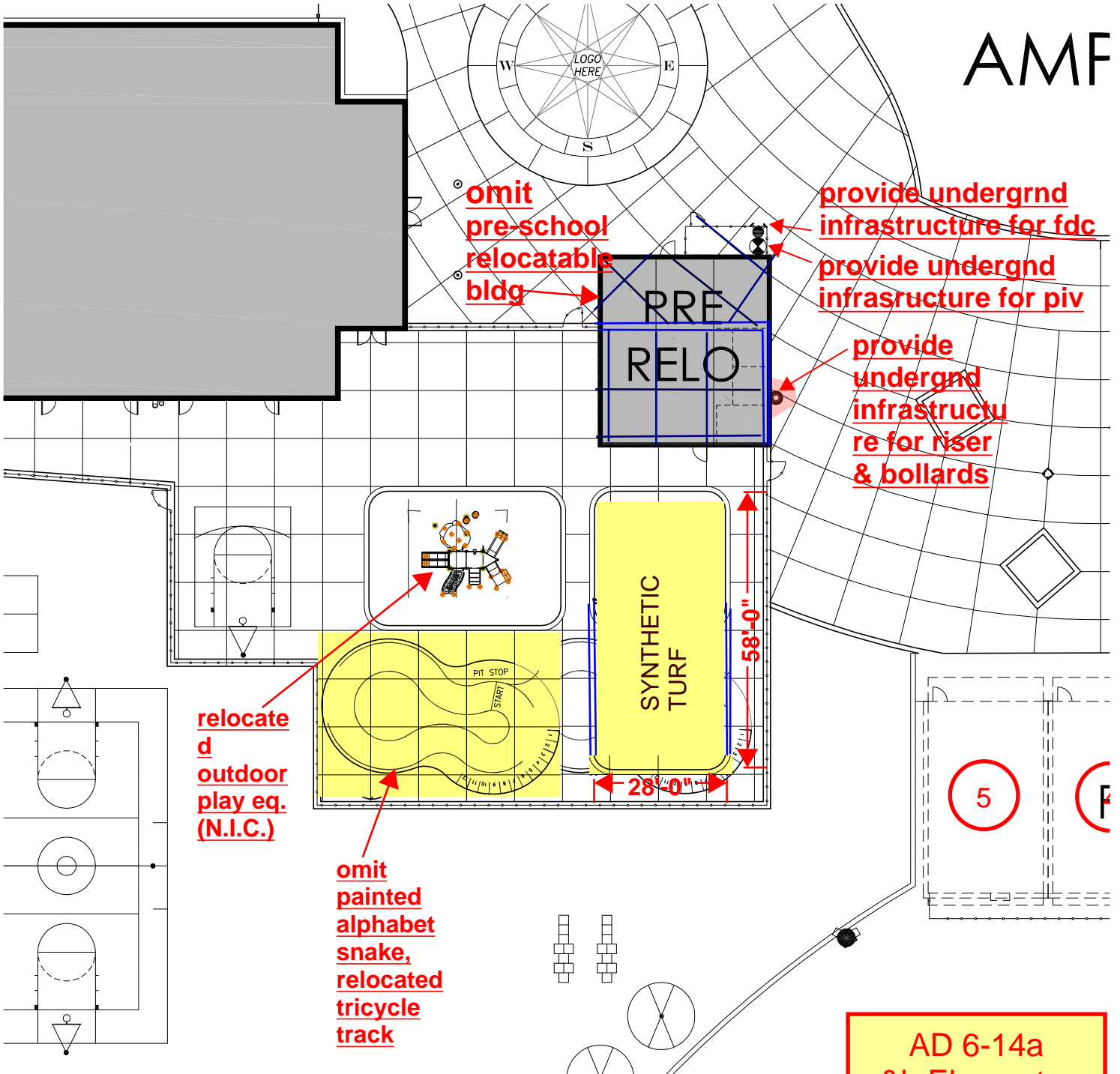
AMF

omit pre-school relocatable bldg

provide undergrnd infrastructure for fdc

provide undergrnd infrastructure for piv

provide undergrnd infrastructure for riser & bollards



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6

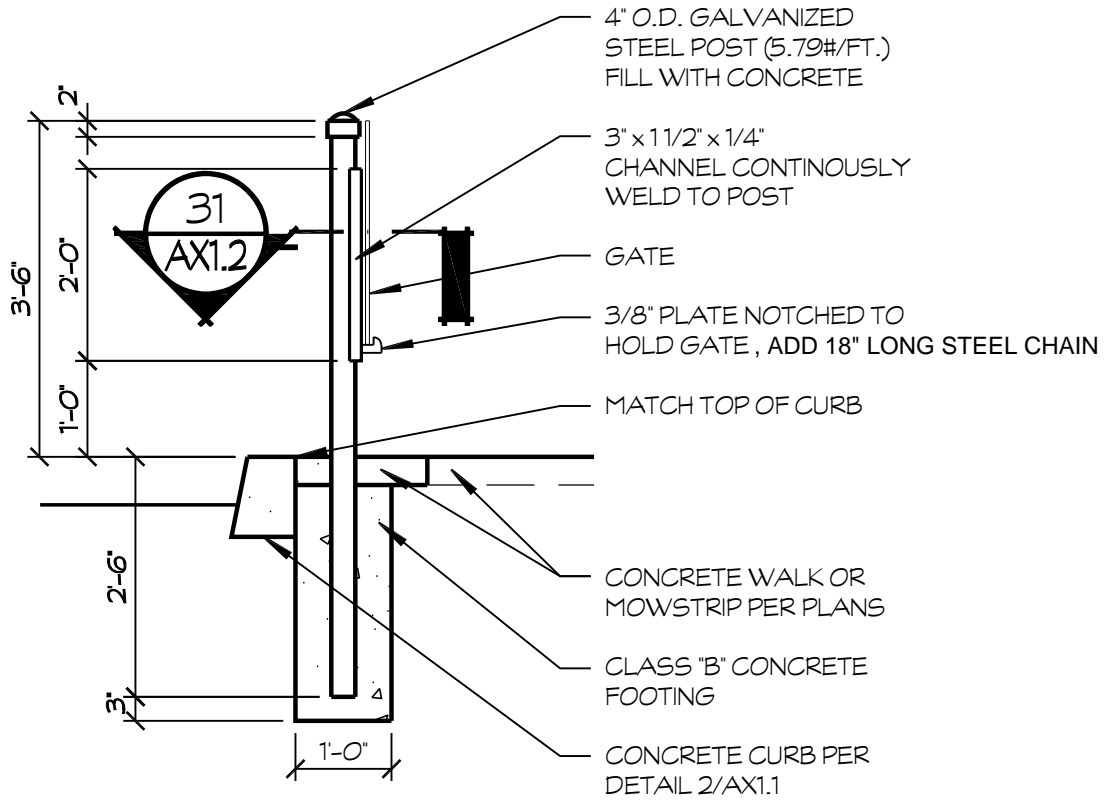
proposed partial site plan

Shields & Brawley PRE-SCHOOL CHANGES



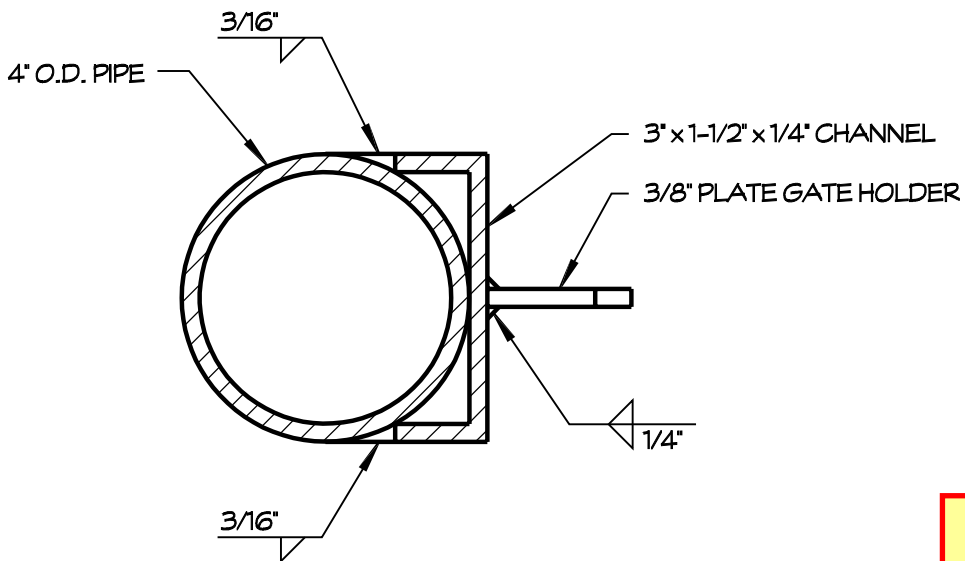
NORTH

n.t.s



**LATCH POST**

SCALE: 1/2" = 1'-0"

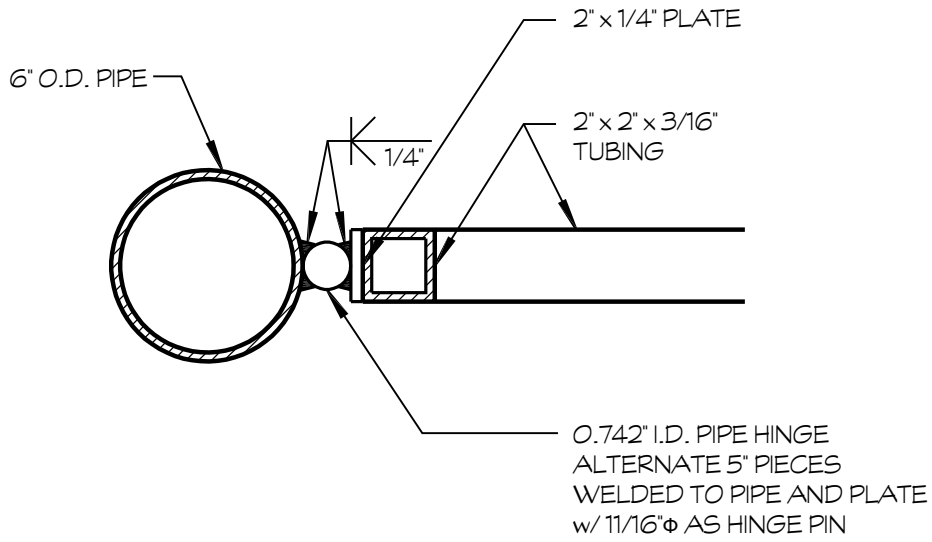


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**LATCH POST SECTION**

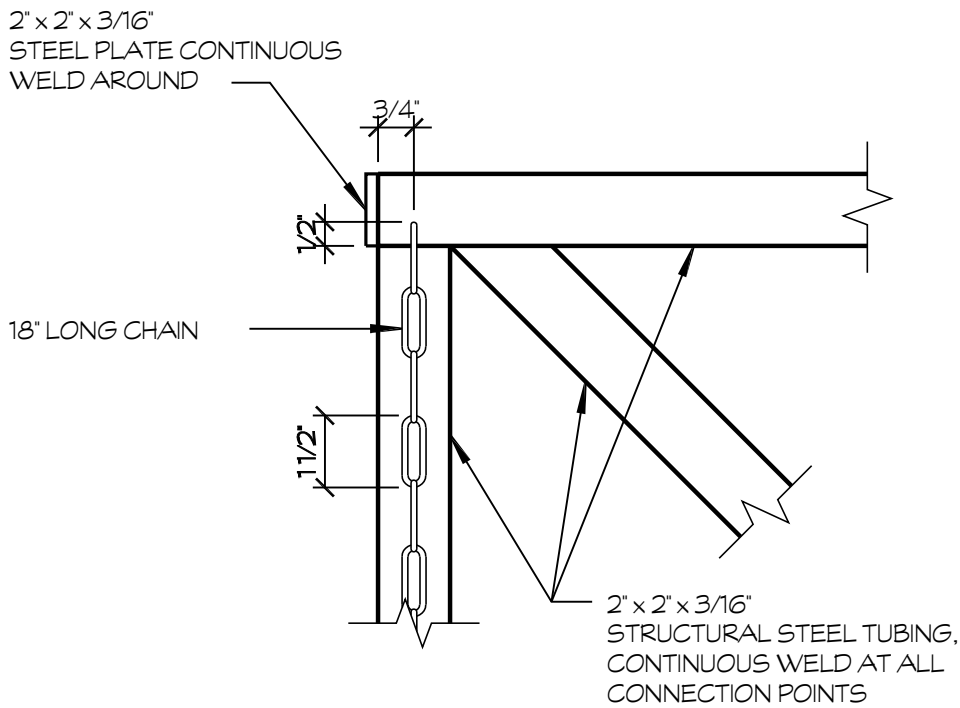
SCALE: 6" = 1'-0"





# HINGE SECTION

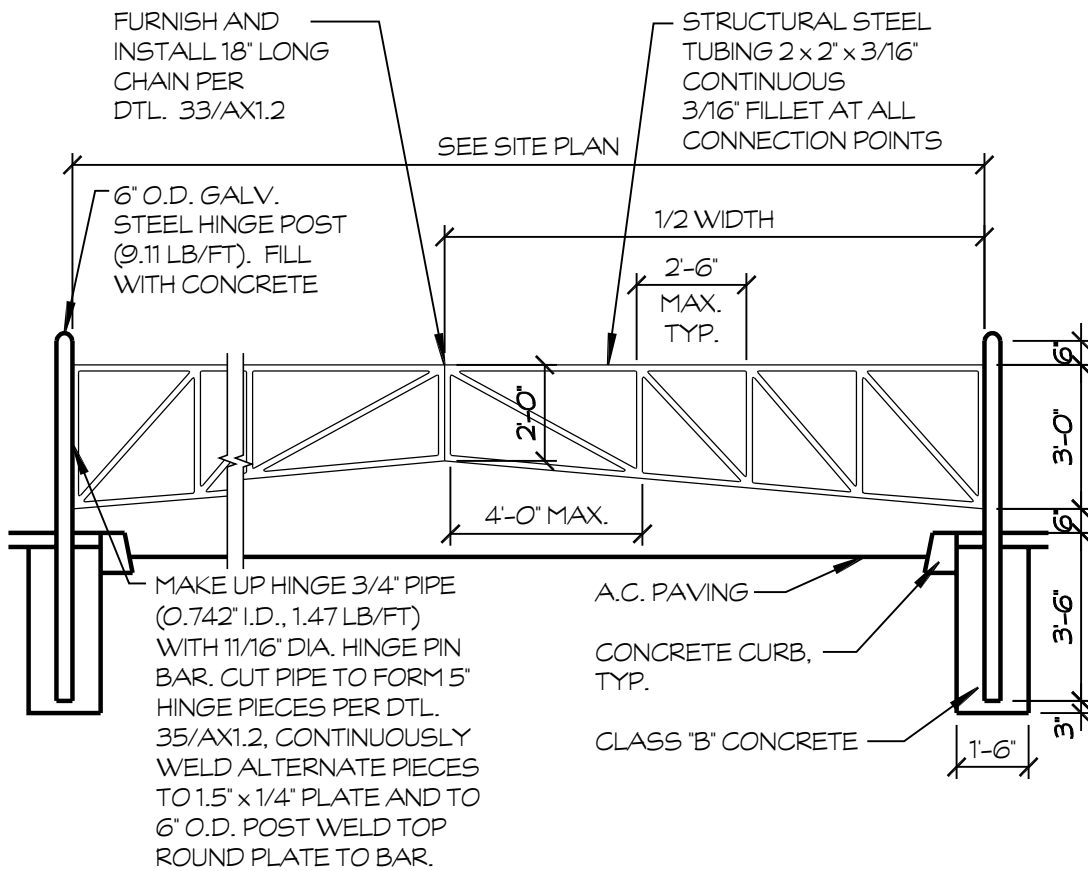
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# 18" LONG CHAIN

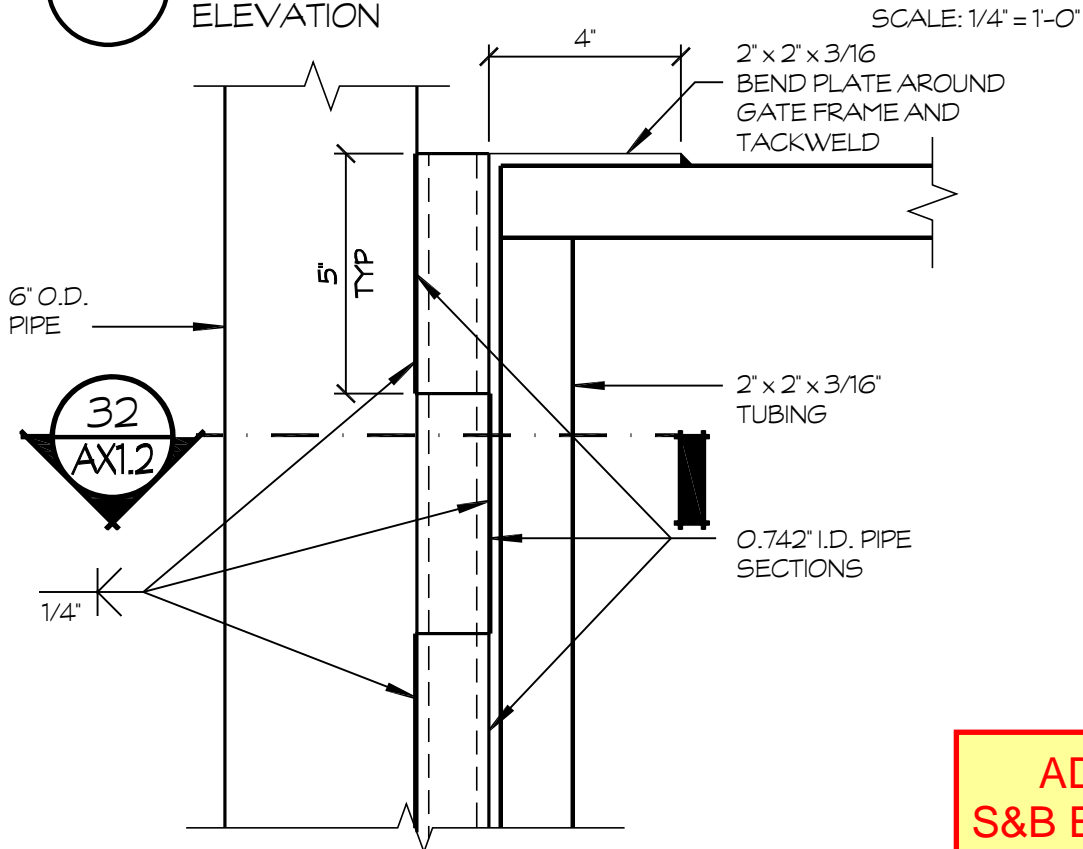
SCALE: N.T.S.

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02-116800



# ACCESS CONTROL GATE

ELEVATION



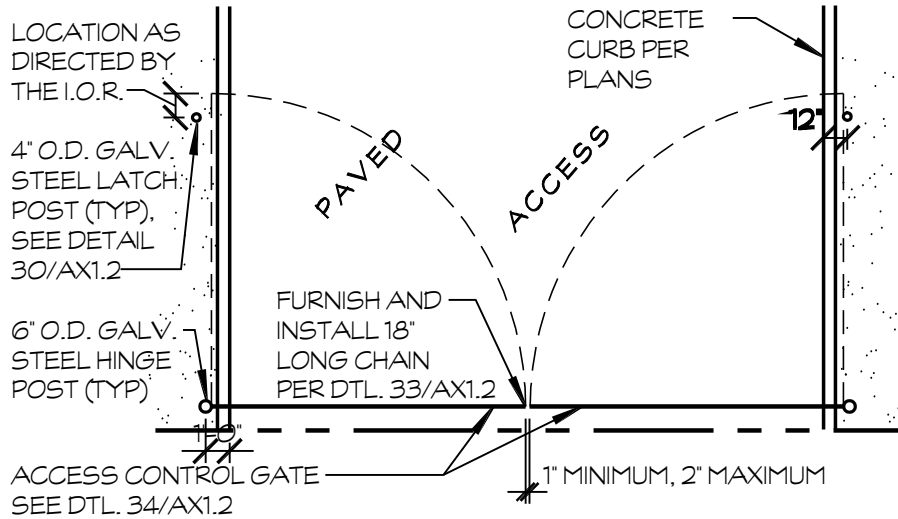
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02-116800

# GATE POST SECTION

SCALE: N.T.S.

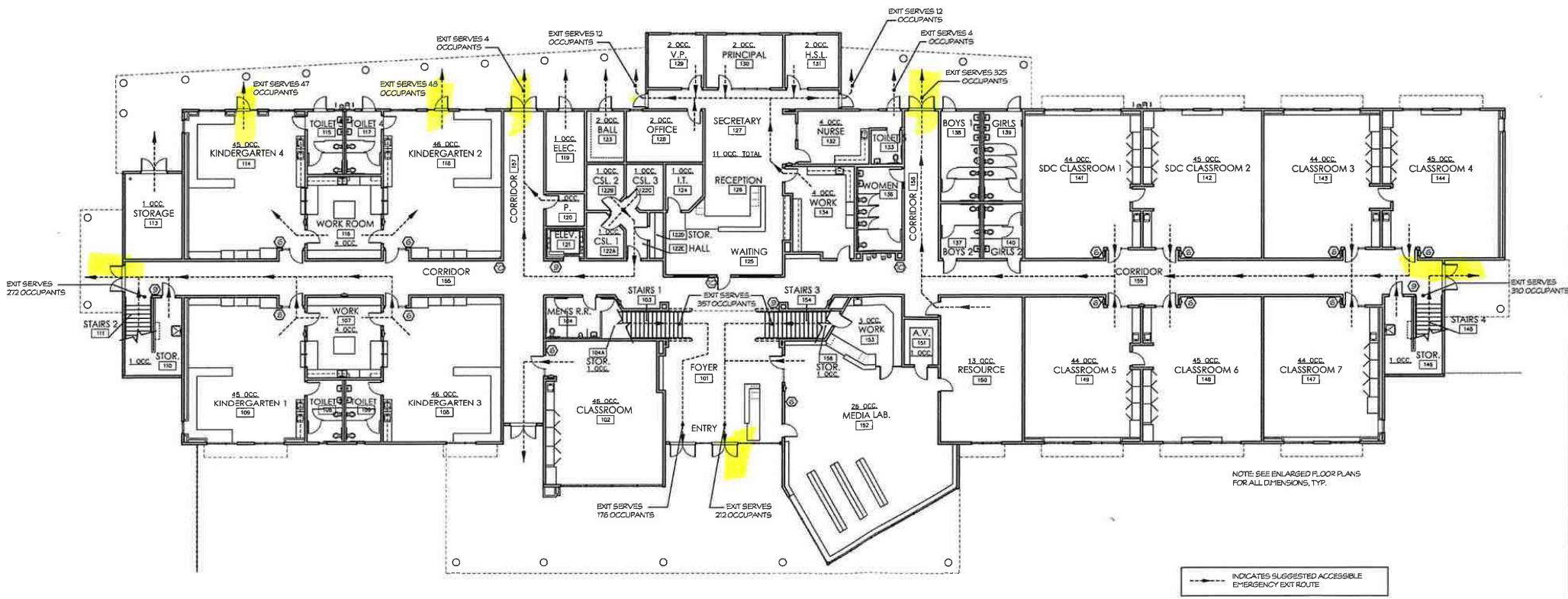
NOTES:

1. COORDINATE WITH DISTRICT TO LOCATE EXISTING UTILITIES AND TO ESTABLISH EXACT GATE LOCATIONS
2. PAINT ALL METAL PARTS WITH 1 COAT METAL PRIMER AND 2 COATS WHITE ENAMEL PAINT COLOR SHALL BE SINCLAIR PURE BRILLIANT WHITE EXTERIOR PAINT OR APPROVED EQUAL



 ACCESS CONTROL GATE  
PLAN VIEW SCALE: 1/8" = 1'-0"

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## proposed intrusion door locations

Shields & Brawley, 1st floor, MAIN Bldg

HLTRON



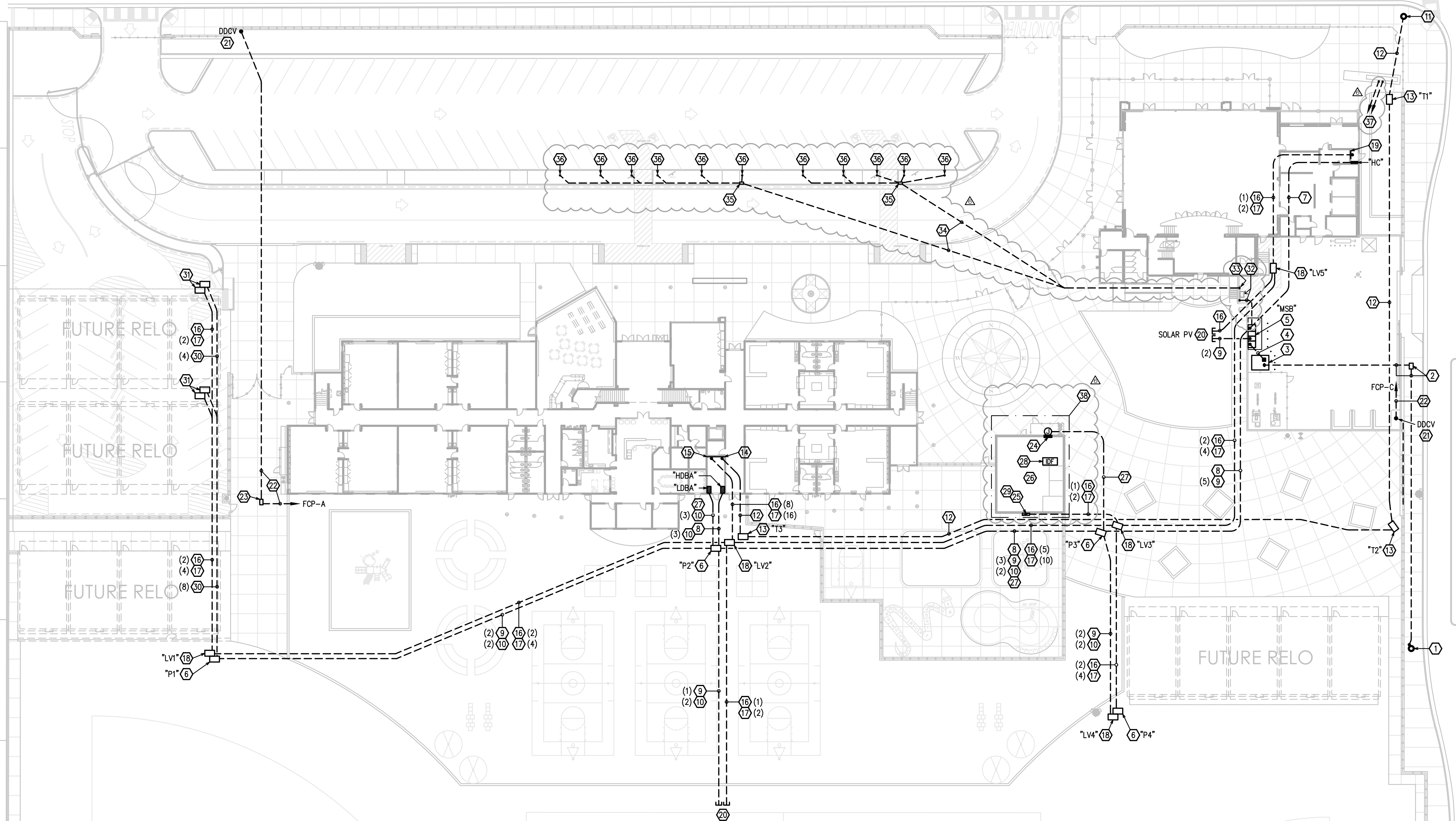
n.t.s

### NOTES:

1. Yellow highlighted doors indicate electronic intrusion system
2. MAIN BLDG door # 101; 104; 106; 109; 110; 115; 118 need contacts, wiring and pathways associated with it.
3. MPR BLDG door # 302; 311; 312 need contacts, wiring and pathways associated with it.

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WEST FOUNTAIN WAY



1 POWER & LOW VOLTAGE SYSTEMS SITE PLAN  
SITE SCALE: 1" = 30'-0"

KEYNOTES

- (E) PG&E DISTRIBUTION POLE: PROPOSED POINT OF CONNECTION. THE CONTRACTOR SHALL OBTAIN A COPY OF THE TITLE 24 DOCUMENTS FOR VERIFICATION, AND INCLUDE IN THE BID THE EXTENSION SHOWN ON THOSE DOCUMENTS.
- 4" C. PRIMARY AND PULL HOLE PER PG&E RULES.
- PRE-CAST CONCRETE TRANSFORMER PAD PER PG&E RULES. PROVIDE (3) REMOVABLE- AND (1) FIXED-BARRIER POSTS.
- (6) 5" C. PER PG&E RULES.
- MAIN SWITCHBOARD 'MSB'. PROVIDE CONCRETE HOUSEKEEPING PAD AND MOUNT EQUIPMENT PER DETAIL 3/EO.4. CONCRETE PAD DIMENSIONS TO INCLUDE 12" WIDER THAN EQUIPMENT ON EACH SIDE, AND 42" MIN. FROM THE FRONT.
- 3 x 5 LOW VOLTAGE VAULT AND EXTENSION WITH TORSION-ASSIST DOUBLE LIDS LABELED "POWER".
- 4" C. POWER FEEDER TO PANEL "HC".
- (3) 5" C. POWER FEEDER TO "HDBA".
- 4" C. FOR FUTURE POWER W/ PULL LINE - QTY. OF CONDUITS INDICATED ON PLANS.
- 2" C. FOR FUTURE POWER W/ PULL LINE - QTY. OF CONDUITS INDICATED ON PLANS.
- (E) AT&T PEDESTAL: PROPOSED POINT OF CONNECTION. THE CONTRACTOR SHALL OBTAIN A SET OF AT&T SERVICE DRAWINGS FOR VERIFICATION, AND INCLUDE IN THE BID THE EXTENSION SHOWN ON THOSE DOCUMENTS.
- (2) 4" C. FOR AT&T.
- 3 x 5 LOW VOLTAGE VAULT AND EXTENSION WITH TORSION-ASSIST DOUBLE LIDS LABELED "AT&T".
- AT&T MPOE LOCATION.
- LOW VOLTAGE SYSTEMS RISER BOARD LOCATION: FIBER AND COPPER SERVICE LOOPS.
- 3" C. FOR FIBER OPTIC CABLES W/ PULL LINES - QTY. OF CONDUITS INDICATED ON PLANS.
- 2" C. FOR COPPER CABLES W/ PULL LINES - QTY. OF CONDUITS INDICATED ON PLANS.
- 3 x 5 LOW VOLTAGE VAULT AND EXTENSION WITH TORSION-ASSIST DOUBLE LIDS LABELED "LOW VOLTAGE".
- PULL CONDUITS UP AT LOW VOLTAGE BOARD. PULL 24-STR SM FIBER OPTIC CABLE FROM MDF TO IDF. PULL (1) 25-PR CAT3 CABLE, (1) DMP INTRUSION CABLE AND TERMINATE AT LVS BOARD.
- STUB CONDUITS 10 FEET PAST EDGE OF HARDSCAPE FOR FUTURE USE.
- CONNECT DOUBLE DETECTOR CHECK VALVE TO FIRE ALARM. SEE FIRE ALARM SHEETS.
- 1 1/4" C. FROM DOUBLE DETECTOR CHECK VALVE TO FCP.
- B1017 PULLBOX WITH BOLT-DOWN STEEL LID LABELED "FIRE ALARM".
- CONNECT POWER TO RELO BUILDING PANELBOARD PRE-INSTALLED BY MANUFACTURER. GROUND PANEL AND BUILDING PER DETAILS 6, 8, 9/EO.6.
- RELO BUILDING SIGNAL T.C.: NEMA 3R HINGED AND LOCKABLE ENCLOSURE AT +66" TO TOP. INSTALL WIRE GUTTER AT ATTIC HEIGHT WITH (3) 2" C. EXTERIOR RISERS AND NIPPLE INTO ACCESSIBLE ATTIC. PAINT TO MATCH BUILDING. INSTALL PATCH PANELS AND MAKE TERMINATIONS AT INTERIOR. SEE DETAIL 7/EO.6.
- ASSEMBLE RELO BUILDING. RECONNECT POWER AND LIGHTING SYSTEMS SEPARATED PRIOR TO TRANSPORT. PROVIDE INTERIOR ELECTRICAL IMPROVEMENTS PER DETAIL 10/EO.6. PROVIDE FIRE ALARM SYSTEM PER FIRE ALARM PLANS.
- 2" C. POWER FEEDER TO RELO BUILDING PANELBOARD.
- PULL 12-STR SM FIBER FROM MDF TO IDF-P.
- PULL 12-PR CAT6 FROM MDF TO T.C. PULL FA CABLING PER FIRE ALARM PLANS.
- 1-1/2" C. SPARES FOR POWER - QTY. OF CONDUITS INDICATED ON PLANS.
- B1017 POWER AND LOW VOLTAGE PULLBOXES.
- 2" C. TO MSB DISTRIBUTION SECTION. STUB UP AT WALL FOR FUTURE PRIMARY DISCONNECT AND 112.5KVA TRANSFORMER.
- STUB UP CONDUITS AT WALL AND CAP FOR FUTURE WALL MOUNTED 400 AMP, 42 CIRCUIT PANELBOARD TO SUPPORT (18) 40 AMP (32FLA) 208V EV CHARGERS.
- 3" C. AND PULL LINE.
- B1324 VAULT.
- 1-1/4" C. FROM VAULT. STUB UP AND CAP 36" FROM FACE OF CURB, CENTERED BETWEEN TWO PARKING SPACES.
- 1" C. TO PANEL LC1 AND 1" C. TO IDF-C FOR FUTURE MARQUEE SIGN.
- DAYCARE RELO IS FUTURE. PROVIDE RACEWAYS ONLY. STUB AND CAP FLUSH IN HARDSCAPE.

6

Hardin-Davidson Engineering  
356 Pollasky Ave., Suite 200  
Clovis, CA 93612  
559.323.4995 tel  
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FRESNO, CALIFORNIA 93711  
T559.448.8400 F559.448.8467  
www.simprk.com

PROJECT:  
**SHIELDS & BRAWLEY ELEMENTARY SCHOOL**



**AD 6-35a**  
**S&B Elementary**  
**02-116800**

JOHN H. SMITH, A.I.A. C15885

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PROJECT DEVELOPMENT

DATE	ISSUED FOR

REVISIONS

No.	DATE	DESCRIPTION

SHEET DESCRIPTION

**POWER & LOW VOLTAGE SYSTEMS SITE PLAN**

PROJECT COORDINATOR JOHN SMITH	SHEET No. <b>E2.2</b>
PROJECT NO. 17-67	DATE 1.27.23
SCALE AS NOTED	

PL01 DATE: 8/17/2023 8:10 AM  
P1W11\_Z:\Clients\1767\1767- Shields & Brawley ES Rebuild\CAD Files\23032 - Elec.dwg

AD 6-36a  
s&b Elementary  
02-116800

**SHIELDS AND BRAWLEY  
ELEMENTARY SCHOOL**

**4108 W. Shields Ave.  
Fresno, CA 93722**

**DSA APPL. # 02-116800**



**FIRE SPRINKLER MATERIAL DATA**

## MATERIAL DATA SHEET INDEX

### Piping Material:

Schedule 10/Schedule 40 Pipe	Bull Moose
Cast Iron Threaded Fittings	Anvil International
Grooved Fittings	Victaulic

### Valves:

Riser Check Valve	Victaulic
Butterfly Valve	Victaulic
Test an Drain	AGF
Angle Valve	United Brass Works
Globe Valve	United Brass Works

### Fire Sprinkler Heads:

Microfast Quick Response Upright	Viking
Microfast Quick Response Pendent	Viking
Sprinkler Wrenches and Cabinets	Viking

### Monitoring Equipment:

10" Electric Bell	Potter
Flowswitch	Potter

### Seismic Bracing:

Sway Brace Fitting Model E 001/020	Afcon
Attachment Fitting Locking 077	Afcon
Sway Brace Fitting Model 410	Afcon

### Hanger Material:

Reversible Beam Clamp 105	Afcon
Ring Hanger Model 300	Afcon
All Thread Rod	Afcon
Universal Restraining Strap	Afcon

### Metraflex Fire Loop

### Backflow Preventer:

350DA	Wilkins
-------	---------

# SCHEDULE 10 & 40



**Always ready to protect your most valuable assets.**

As the leading supplier of steel sprinkler pipe, we understand that there are no second chances in fire suppression. You need products of enduring quality and exceptional strength—plus reliable service. You need Bull Moose.

## Bull Moose Fire Sprinkler Pipe Product Information

Nominal Pipe Size (Inches)		1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"	6"	8"			NPS (In.)	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	4"
<b>SCHEDULE 10</b>	O.D. (in)	1.315	1.660	1.900	2.375	2.875	3.500	4.500	6.625	8.625				1.315	1.660	1.900	2.375	2.875	3.500	4.500
	I.D. (in)	1.097	1.442	1.682	2.157	2.635	3.260	4.260	6.357	8.249				1.049	1.380	1.610	2.067	2.469	3.068	4.026
	Empty Weight (lb/ft)	1.410	1.810	2.090	2.640	3.530	4.340	5.620	9.290	16.940				1.680	2.270	2.720	3.660	5.800	7.580	10.800
	Water Filled Weight (lb/ft)	1.820	2.518	3.053	4.223	5.893	7.957	11.796	23.038	40.086				2.055	2.918	3.602	5.114	7.875	10.783	16.316
	C.R.R.	15.27	9.91	7.76	6.27	4.92	3.54	2.50	1.158	1.805				1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Pieces per Lift	91	61	61	37	30	19	19	10	7				70	51	44	30	30	19	19
	Lift Weight (lbs) 21' lengths	2,695	2,319	2,677	2,051	2,224	1,732	2,242	1,951	2,490				2,470	2,431	2,513	2,306	3,654	3,024	4,309
	Lift Weight (lbs) 24' lengths	3,079	2,650	3,060	2,344	2,542	1,979	2,563	2,230	2,848				2,822	2,778	2,872	2,635	4,176	3,456	4,925
	Lift Weight (lbs) 25' lengths	3,208	2,760	3,187	2,442	2,648	2,062	2,670						2,940	2,894	2,992	2,745	4,350	3,601	5,130
	<b>SCHEDULE 40</b>																			

### SCHEDULE 10 & 40 ADVANTAGES:

- UL listed (US & Canada) and FM approved
- ASTM A135 and A795 Type E, Grade A Certified
- Complies with NFPA-13, 13R and 14
- Industry-leading hydraulic characteristics
- CRR of 1.0 and greater
- All pipe NDT weld tested

### OTHER BENEFITS/SERVICES:

- We have the most stocking locations in the industry, for best delivery and availability
- Plain end or roll groove
- Eddy Guard II™ bacterial-resistant internal coating
- Custom length options
- Hot dipped galvanization
- Reddi-Pipe® red or black pipe eliminates field painting
- Compatible for use in wet, dry, preaction and deluge sprinkler systems
- The only maker with EPDs (to help earn LEED points).

**Exclusive maker of Reddi-Pipe®**  
RED OR BLACK PAINTED PIPE.



cULUS LISTED



**BULL MOOSE**  
TUBE

800.325.4467  
sales@BullMooseIndustries.com  
BullMooseTube.com





This packet contains engineering and product information specific to the following project:

## Project Info

<b>Project Name:</b> Voorhies	<b>Project Address:</b> 6001 Pioneer Drive
<b>Architect:</b>	<b>Engineer:</b>
<b>Contractor:</b>	<b>Submittal Date:</b> 3/10/2017

## Approver Instructions

**Review product specifications:** Please review the product specifications and technical information for each product to ensure suitability of application and use.

**Review product options:** If applicable, please review the selected product options on each product page to ensure suitability of application and use.

**Approve or reject individual products:** Please complete the approval stamp section for each product.

**OPTIONAL STAINLESS STEEL BOLTS & NUTS:**  
Stainless steel bolts and nuts are also available. Contact a Gruvlok Representative for more information.

**HOUSING:**  
Ductile Iron conforming to ASTM A536, Grade 65-45-12, or Malleable Iron conforming to ASTM A47, Grade 32510.

**OPTIONAL COATINGS:**

- Rust inhibiting lead-free paint Color: ORANGE (standard)
- Hot Dipped Zinc Galvanized (optional)
- Other Colors Available (IE: RAL3000 and RAL9000): \_\_\_\_\_

For other Coating requirements contact a Gruvlok Representative.

Approval Stamp
<input type="checkbox"/> <b>Approved</b>
<input type="checkbox"/> <b>Approved as noted</b>
<input type="checkbox"/> <b>Not approved</b>
<b>Remarks:</b>

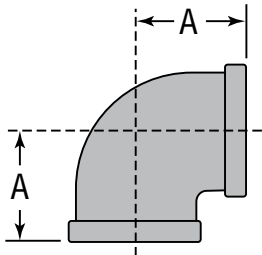
## Product Index

The following products are included in this submittal:

- |                                 |  |
|---------------------------------|--|
| 3201 90° Elbow (pg. 2)          | 3202 45° Elbow (pg. 3)                       |
| 3205R Reducing Tee (pg. 4)      | 3207 Cross (pg. 6)                           |
| 3207R Reducing Cross (pg. 7)    | 3221 Coupling (pg. 8)                        |
| 3221R Reducing Coupling (pg. 9) | 3224 Cap (pg. 10)                            |
| 3283 Bushing (pg. 11)           | 7000* Lightweight Flexible Coupling (pg. 12) |
| 7010 Reducing Coupling (pg. 14) | 7012* Flange (pg. 16)                        |
| 7050S* Standard Elbow (pg. 19)  | 7051* Standard 45° Elbow (pg. 20)            |
| 7060S* Standard Tee (pg. 21)    | 7068 Cross (pg. 22)                          |
| 7074* Cap (pg. 23)              |  |

## FIG. 3201

### 90° Elbow



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

#### FIGURE 3201 - 90° ELBOW

Nominal Size	Maximum Working Pressure <sup>▲</sup>	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1 20	500 3450	1.50 38.10	0.62 0.28
1¼ 32	500 3450	1.75 44.45	0.90 0.41
1½ 40	500 3450	1.94 49.276	1.20 0.54
2 50	500 3450	2.25 57.15	1.85 0.84

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

#### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

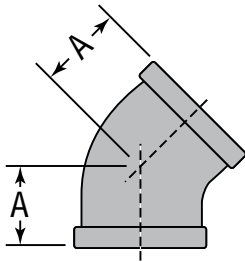
#### PROJECT INFORMATION

#### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

## FIG. 3202

### 45° Elbow



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

#### FIGURE 3202 - 45° ELBOW

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1	500	1.12	0.46
25	3450	28.44	0.21
1¼	500	1.29	0.73
32	3450	32.76	0.33
1½	500	1.43	0.92
40	3450	36.32	0.42
2	500	1.68	1.50
50	3450	42.67	0.68

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

#### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

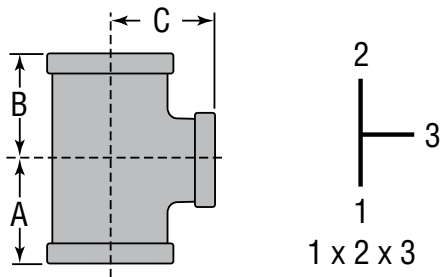
#### PROJECT INFORMATION

#### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

## FIG. 3205R

### Reducing Tee



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

#### FIGURE 3205R - REDUCING TEE

Nominal Size	Max. Working Pressure▲	Dimensions			Approx. Wt. Each
		A	B	C	
<b>1 x 2 x 3</b>					
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>In. (mm)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1 x 1/2 x 1 25 x 15 x 25	500 3450	1.50 38.10	1.36 34.54	1.50 38.10	0.64 0.29
1 x 3/4 x 1 25 x 20 x 25	500 3450	1.50 38.10	1.45 36.83	1.50 38.10	0.73 0.33
1 x 1 x 1/2 25 x 25 x 15	500 3450	1.26 32.00	1.26 32.00	1.36 34.54	0.71 0.32
1 x 1 x 3/4 25 x 25 x 20	500 3450	1.37 34.80	1.37 34.80	1.45 36.83	0.76 0.34
1 x 1 x 1/4* 25 x 25 x 32	500 3450	1.67 42.41	1.67 42.41	1.58 40.13	0.98 0.44
1 x 1 x 1 1/2* 25 x 25 x 40	500 3450	1.80 45.72	1.80 45.72	1.65 41.91	1.16 0.53
1 1/4 x 1 x 1/2* 32 x 25 x 15	500 3450	1.34 34.04	1.26 32.00	1.53 38.86	0.82 0.37
1 1/4 x 1 x 3/4 32 x 25 x 20	500 3450	1.45 36.83	1.37 34.80	1.62 41.15	0.90 0.41
1 1/4 x 1 x 1 32 x 25 x 25	500 3450	1.58 40.13	1.50 38.10	1.67 42.42	1.00 0.45
1 1/4 x 1 x 1 1/4 32 x 25 x 32	500 3450	1.75 44.45	1.67 42.42	1.75 44.45	1.08 0.49
1 1/4 x 1 x 1 1/2 32 x 25 x 40	500 3450	1.88 47.75	1.80 45.72	1.82 46.22	1.42 0.64
1 1/4 x 1 1/4 x 1/2 32 x 32 x 15	500 3450	1.34 34.04	1.34 34.04	1.53 38.86	0.86 0.39

▲ Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

\* Part supplied as "Bull Head Tee".

#### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

#### FIGURE 3205R - REDUCING TEE

Nominal Size	Max. Working Pressure▲	Dimensions			Approx. Wt. Each
		A	B	C	
<b>1 x 2 x 3</b>					
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>In. (mm)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1 1/4 x 1 1/4 x 3/4 32 x 32 x 20	500 3450	1.45 36.83	1.45 36.83	1.62 41.15	0.92 0.42
1 1/4 x 1 1/4 x 1 32 x 32 x 25	500 3450	1.58 40.13	1.58 40.13	1.67 42.42	0.95 0.43
1 1/4 x 1 1/4 x 1 1/2* 32 x 32 x 40	500 3450	1.88 47.75	1.88 47.75	1.82 46.22	1.45 0.66

#### PROJECT INFORMATION

#### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

## FIG. 3205R

### Reducing Tee

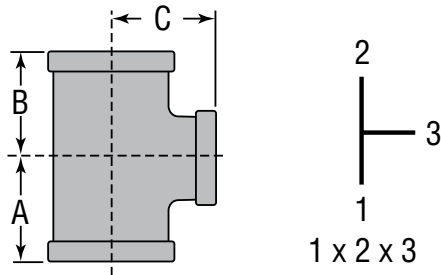


FIGURE 3205R - REDUCING TEE					
Nominal Size	Max. Working Pressure▲	Dimensions			Approx. Wt. Each
1 x 2 x 3		A	B	C	
In. (mm)	PSI (kPa)	In. (mm)	In. (mm)	In. (mm)	Lbs. (kg)
1¼ x 1¼ x 2*	500 3450	2.10 53.34	2.10 53.34	1.90 48.26	1.75 0.79
32 x 32 x 50					
1½ x 1 x ½	500 3450	1.41 35.81	1.34 34.04	1.66 42.16	0.95 0.43
40 x 25 x 15					
1½ x 1 x ¾	500 3450	1.52 38.61	1.37 34.80	1.75 44.45	1.14 0.52
40 x 25 x 20					
1½ x 1 x 1	500 3450	1.65 41.91	1.50 38.10	1.80 45.72	1.17 0.53
40 x 25 x 25					
1½ x 1 x 1¼	500 3450	1.82 46.23	1.67 42.42	1.88 47.75	1.34 0.61
40 x 25 x 32					
1½ x 1 x 1½	500 3450	1.94 49.28	1.80 45.72	1.94 49.28	1.45 0.66
40 x 25 x 40					
1½ x 1¼ x ½	500 3450	1.41 35.81	1.34 34.04	1.66 42.16	1.05 0.48
40 x 32 x 15					
1½ x 1¼ x ¾	500 3450	1.52 38.61	1.45 36.83	1.75 44.45	1.15 0.5
40 x 32 x 20					
1½ x 1¼ x 1	500 3450	1.65 41.91	1.58 40.13	1.80 45.72	1.25 0.57
40 x 32 x 25					
1½ x 1¼ x 2*	500 3450	2.16 54.86	2.10 53.34	2.02 51.30	1.90 0.86
40 x 32 x 50					
1½ x 1½ x ½	500 3450	1.41 35.81	1.41 35.81	1.16 29.46	1.15 0.52
40 x 40 x 15					
1½ x 1½ x ¾	500 3450	1.52 38.61	1.52 38.61	1.75 44.45	1.24 0.56
40 x 40 x 20					
1½ x 1½ x 1	500 3450	1.65 41.91	1.65 41.91	1.80 45.72	1.30 0.59
40 x 40 x 25					
1½ x 1½ x 1¼	500 3450	1.82 46.23	1.82 46.23	1.88 47.75	1.48 0.67
40 x 40 x 32					

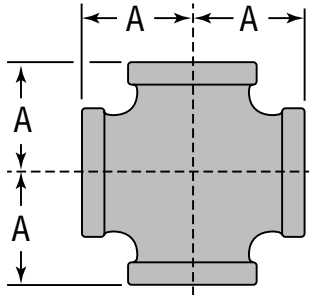
FIGURE 3205R - REDUCING TEE					
Nominal Size	Max. Working Pressure▲	Dimensions			Approx. Wt. Each
1 x 2 x 3		A	B	C	
In. (mm)	PSI (kPa)	In. (mm)	In. (mm)	In. (mm)	Lbs. (kg)
1½ x 1½ x 2*	500 3450	2.16 54.86	2.16 54.86	2.02 51.30	1.98 0.90
40 x 40 x 50					
2 x 1 x 2	500 3450	2.25 57.15	2.02 51.31	2.25 57.15	2.15 0.98
50 x 25 x 50					
2 x 1¼ x 2	500 3450	2.25 57.15	2.10 53.34	2.25 57.15	2.30 1.04
50 x 32 x 50					
2 x 1½ x ½	500 3450	1.49 37.85	1.41 35.81	1.88 47.75	1.50 0.68
50 x 40 x 15					
2 x 1½ x ¾	500 3450	1.60 40.64	1.52 38.61	1.97 50.04	1.62 0.73
50 x 40 x 20					
2 x 1½ x 1	500 3450	1.73 43.94	1.65 41.91	2.02 51.31	1.64 0.74
50 x 40 x 25					
2 x 1½ x 1¼	500 3450	1.90 48.26	1.82 46.23	2.10 53.34	1.80 0.82
50 x 40 x 32					
2 x 1½ x 1½	500 3450	2.02 51.31	1.94 49.28	2.16 54.86	2.00 0.91
50 x 40 x 40					
2 x 1½ x 2	500 3450	2.25 57.15	2.16 54.86	2.25 57.15	2.35 1.07
50 x 40 x 50					
2 x 2 x ½	500 3450	1.49 37.85	1.49 37.85	1.88 47.75	1.60 0.73
50 x 50 x 15					
2 x 2 x ¾	500 3450	1.60 40.64	1.60 40.64	1.97 50.04	1.68 0.76
50 x 50 x 20					
2 x 2 x 1	500 3450	1.73 43.94	1.73 43.94	2.02 51.31	1.85 0.84
50 x 50 x 25					
2 x 2 x 1¼	500 3450	1.90 48.26	1.90 48.26	2.10 53.34	2.04 0.93
50 x 50 x 32					
2 x 2 x 1½	500 3450	2.02 51.31	2.02 51.31	2.16 54.86	2.18 0.99
50 x 50 x 40					

▲ Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

\* Part supplied as "Bull Head Tee".

## FIG. 3207

Cross



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

### FIGURE 3207 - CROSS

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1 25	500 3450	1.50 38.10	0.98 0.44
1¼ 32	500 3450	1.75 44.45	1.50 0.68
1½ 40	500 3450	1.94 49.27	1.90 0.86
2 50	500 3450	2.25 57.15	2.95 1.34

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

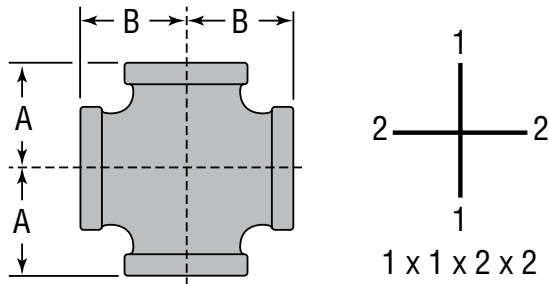
### PROJECT INFORMATION

### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

## FIG. 3207R

### Reducing Cross



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

#### FIGURE 3207R - REDUCING CROSS

Nominal Size 1 x 1 x 2 x 2	Max. Working Pressure <sup>▲</sup>	Dimensions		Approx. Wt. Each
		A	B	
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1 1/4 x 1 1/4 x 1 x 1 <i>32 x 32 x 25 x 25</i>	500 <i>3450</i>	1.58 <i>40.13</i>	1.67 <i>42.41</i>	1.27 <i>0.58</i>
1 1/2 x 1 1/2 x 1 x 1 <i>40 x 40 x 25 x 25</i>	500 <i>3450</i>	1.65 <i>41.91</i>	1.80 <i>45.72</i>	1.48 <i>0.67</i>
2 x 2 x 1 x 1 <i>50 x 50 x 25 x 25</i>	500 <i>3450</i>	1.73 <i>43.94</i>	2.02 <i>51.30</i>	2.10 <i>0.95</i>

▲ - Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

#### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

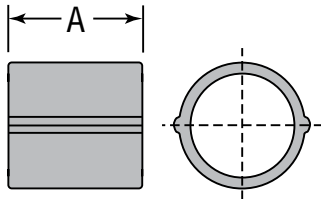
#### PROJECT INFORMATION

#### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

## FIG. 3221

### Coupling



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

### FIGURE 3221 - COUPLING

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1	500	1.67	0.40
25	3450	42.42	0.18
1¼	500	1.93	0.57
32	3450	49.02	0.26
1½	500	2.15	0.75
40	3450	54.61	0.34
2	500	2.53	1.15
50	3450	64.26	0.52

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

### PROJECT INFORMATION

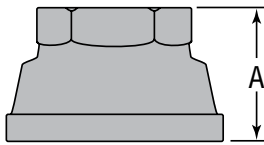
### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	



## FIG. 3221R

### Reducing Coupling



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

#### FIGURE 3221R - REDUCING COUPLING

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1 x 1/2 25 x 15	500 3450	1.69 42.92	0.39 0.18
1 x 3/4 25 x 20	500 3450	1.69 42.92	0.53 0.24

▲ - Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

#### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

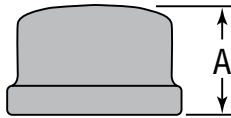
#### PROJECT INFORMATION

#### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

## FIG. 3224

### Cap



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

#### FIGURE 3224 - CAP

Nominal Size	Maximum Working Pressure▲	Dimension A	Approx. Wt. Each
<i>In. (mm)</i>	<i>PSI (kPa)</i>	<i>In. (mm)</i>	<i>Lbs. (kg)</i>
1 25	500 3450	1.16 29.46	0.32 0.15
1¼ 32	500 3450	1.28 32.51	0.43 0.20
1½ 40	500 3450	1.33 33.78	0.60 0.27
2 50	500 3450	1.45 36.83	0.91 0.41

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

#### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.3

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

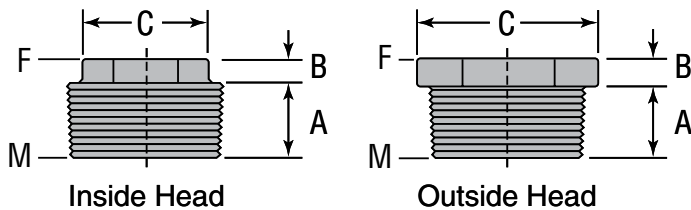
#### PROJECT INFORMATION

#### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

## FIG. 3283

### Bushings



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

### FIGURE 3283 - BUSHINGS

Nominal Size Male (M) x Female (F)	Max. Working Pressure▲ PSI (kPa)	Dimensions			Style	Approx. Wt. Each Lbs. (kg)
		A In. (mm)	B In. (mm)	C In. (mm)		
1 x 1/2 25 x 15	500 3450	0.75 19.05	0.25 6.35	1.42 36.06	Outside	0.22 0.10
1 x 3/4 25 x 20	500 3450	0.75 19.05	0.25 6.35	1.42 36.06	Outside	0.17 0.08
1 1/4 x 1 32 x 25	500 3450	0.80 20.32	0.28 7.11	1.76 44.70	Outside	0.28 0.13
1 1/2 x 1 40 x 25	500 3450	0.83 21.08	0.31 7.874	2.00 50.80	Outside	0.45 0.20
1 1/2 x 1 1/4 40 x 32	500 3450	0.83 21.08	0.31 7.874	2.00 50.80	Outside	0.30 0.14
2 x 1 50 x 25	500 3450	0.88 22.35	0.41 10.414	1.95 49.53	Inside	0.67 0.30
2 x 1 1/4 50 x 32	500 3450	0.88 22.35	0.34 8.636	2.48 62.99	Outside	0.73 0.33
2 x 1 1/2 50 x 40	500 3450	0.88 22.35	0.34 8.636	2.48 62.99	Outside	0.61 0.28

▲ - Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, and FM pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

### MATERIAL SPECIFICATIONS

Dimensions: ASME B16.14

Material: ASTM A536 Grade 65-45-12

Finish: Black

Threads: NPT per ASME B1.20.1

Agency Approvals: All ductile iron threaded fittings are UL/ULC Listed and FM Approved.

**NOTICE:** Ductile iron fittings have higher tensile strength than that of steel pipe. Therefore, over tightening can cause damage to pipe threads which may cause leakage. Ductile iron fittings should be tightened approximately three turns beyond hand tight, but no more than four turns.

### PROJECT INFORMATION

### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

# FIG. 7000\*

# Lightweight Flexible Coupling



The Gruvlok® Figure 7000 Lightweight Coupling is designed for applications where system flexibility is desired.

The Figure 7000 Lightweight Coupling is approximately 30% lighter in weight than the Figure 7001 Coupling. Working pressure ratings shown are for reference only and are based on Schedule 40 pipe. For the latest UL/ULC listed, LPCB, VdS and FM Approved pressure ratings versus pipe schedule, see [www.anvilintl.com](http://www.anvilintl.com) or contact your local Anvil Representative.

The Figure 7000 Lightweight Coupling with a Pre-Lubricated Grade "E" EPDM, Type "A" gasket (coupling is easily identified by purple nuts) is intended for use in fire protection systems installed in accordance with NFPA Standard 13 "Sprinkler Systems".



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

- Available galvanized.

\* When ordering, refer to product as FP7000.

## MATERIAL SPECIFICATIONS

### HOUSING:

Ductile Iron conforming to ASTM A-536, Grade 65-45-12

### ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval-neck track head bolts conforming to ASTM A-183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A-563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

### METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard)
  - Hot Dipped Zinc Galvanized (optional)
  - Other available options: Example: RAL3000 or RAL9000 Series
- For other coating requirements contact an Anvil Representative.

### LUBRICATION:

- Standard Gruvlok
- Gruvlok Xtreme™ required for dry pipe systems and freezer applications.

### GASKETS: Materials

Properties as designated in accordance with ASTM D-2000.

- Pre-Lubricated Grade "E" EPDM, Type A Gasket (Violet color code)  
-40°F to 150°F (Service Temperature Range)(-40°C to 66°C)  
Recommended for wet and dry (oil free air) pipe fire protection sprinkler systems. For dry pipe systems and freezer applications, Gruvlok Xtreme™ Lubricant is required.
- Grade "EP" EPDM (Green and Red color code)  
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)  
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.  
NOT FOR USE IN PETROLEUM APPLICATIONS.

### GASKET TYPE:

- Standard C Style
- Flush Gap

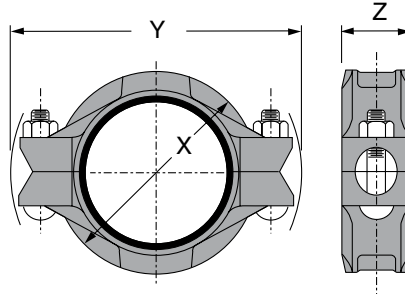
## PROJECT INFORMATION

## APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

# FIG. 7000\*

## Lightweight Flexible Coupling



### FIGURE 7000 LIGHTWEIGHT COUPLING

Nominal Size	Pipe O.D.	Max. Working Pressure ▲	Max. End Load	Range of Pipe End Separation	Deflection From $\mathcal{C}$		Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
					Per Coupling	Pipe	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	PSI/bar	Lbs./kN	In./mm	Degrees	In./ft.	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs./N-m	Lbs./Kg	
1¼ 32	1.660 42.2	600 41.4	1,299 5.78	0-½/32 0-0.79	1° 5'	0.23 18.8	2¾ 70	4¾ 111	1¼ 44	2	¾ x 2¼ M10 x 57	30 40	45 60	1.4 0.6
1½ 40	1.900 48.3	600 41.4	1,701 7.57	0-½/32 0-0.79	0° 57'	0.20 16.5	3 76	4¾ 117	1¼ 44	2	¾ x 2¼ M10 x 57	30 40	45 60	1.5 0.7
2 50	2.375 60.3	600 41.4	2,658 11.82	0-½/32 0-0.79	0° 45'	0.16 13.1	3½ 89	5½ 140	1¼ 44	2	¾ x 2¼ M10 x 57	30 40	45 60	1.7 0.8
2½ 65	2.875 73.0	600 41.4	3,895 17.33	0-½/32 0-0.79	0° 37'	0.13 10.9	4 102	5¾ 146	1¼ 44	2	¾ x 2¼ M10 x 57	30 40	45 60	1.9 0.9
3 O.D. 76.1	2.996 76.1	600 41.4	4,230 18.82	0-½/32 0-0.79	0° 36'	0.13 10.4	4 102	6½ 156	1¼ 44	2	— M10 x 57	30 40	45 60	2.3 1.0
3 80	3.500 88.9	600 41.4	5,773 25.68	0-½/32 0-0.79	0° 31'	0.11 8.9	4½ 117	6¾ 171	1¼ 44	2	½ x 2¾ M12 x 70	80 110	100 150	2.9 1.3
4¼ O.D. 108.0	4.250 108.0	600 41.4	8,512 37.86	0-¾/32 0-2.38	1° 16'	0.70 58.7	5½ 140	7¾ 197	2 51	2	½ x 3 M12 x 76	80 110	100 150	4.0 1.8
4 100	4.500 114.3	600 41.4	9,543 42.45	0-¾/32 0-2.38	1° 12'	0.67 55.5	5½ 149	8½ 206	2 51	2	½ x 3 M12 x 76	80 110	100 150	4.6 2.1
5¼ O.D. 133.0	5.236 133.0	500 34.5	10,766 47.89	0-¾/32 0-2.38	1° 2'	0.57 47.7	6½ 165	9½ 232	2 51	2	¾ x 3½ M16 x 85	100 135	130 175	5.7 2.6
5½ O.D. 139.7	5.500 139.7	500 34.5	11,879 52.84	0-¾/32 0-2.38	0° 59'	0.54 45.4	6¾ 171	9¾ 238	2 51	2	— M16 x 85	100 135	130 175	6 2.7
5 125	5.563 141.3	500 34.5	12,153 54.06	0-¾/32 0-2.38	0° 58'	0.54 45.1	7 178	9¾ 244	2 51	2	¾ x 3½ M16 x 85	100 135	130 175	6.1 2.8
6¼ O.D. 159.0	6.259 159.0	500 34.5	15,384 68.43	0-¾/32 0-2.38	0° 51'	0.48 39.8	7½ 191	10½ 264	2 51	2	¾ x 3½ M16 x 85	100 135	130 175	6.7 3.0
6½ O.D. 165.1	6.500 165.1	500 34.5	16,592 73.80	0-¾/32 0-2.38	0° 50'	0.46 34.8	7¾ 197	10¾ 273	2 51	2	— M16 x 85	100 135	130 175	7.0 3.2
6 150	6.625 168.3	500 34.5	17,236 76.67	0-¾/32 0-2.38	0° 49'	0.45 37.8	8 203	11 279	2 51	2	¾ x 3½ M16 x 85	100 135	130 175	8.1 3.7
8 200	8.625 219.1	500 34.5	29,213 129.95	0-¾/32 0-2.38	0° 37'	0.35 29.1	10 264	13¼ 337	2½ 60	2	¾ x 4½ M20 x 110	130 175	180 245	14.2 6.4

Not for use in copper system.

Range of Pipe End Separation and Angular Deflection values are for roll grooved pipe and may be doubled for cut groove pipe.

§ – For additional Bolt Torque information see Technical Data Section.

▲ – Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, FM, VdS and LPCB pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

Other sizes available, see Gruvlok Catalog or contact an Anvil Representative.

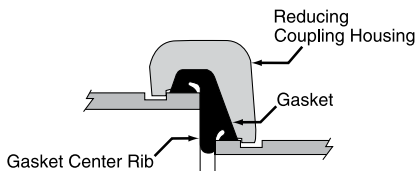


**WARNING**  
For dry pipe systems and freezer applications  
lubrication of the gasket is required,  
Gruvlok® Xtreme™ Lubricant is required.

# FIG. 7010 Reducing Coupling



The Gruvlok® Figure 7010 Reducing Coupling makes it possible to directly connect two different pipe sizes, eliminating the need for two couplings and a reducing fitting. The specially designed reducing coupling gasket with a center rib assures proper positioning of the gasket and prevents the smaller pipe from telescoping into the larger during assembly. Working pressure ratings shown are for reference only and are based on Schedule 40 pipe. For the latest UL/ULC listed, LPCB, VdS and FM Approved pressure ratings versus pipe schedule, see [www.anvilintl.com](http://www.anvilintl.com) or contact your local Anvil Representative.



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

- Available galvanized.

## MATERIAL SPECIFICATIONS

### HOUSING:

Ductile Iron conforming to ASTM A-536, Grade 65-45-12

### ANSI BOLTS & HEAVY HEX NUTS:

Heat treated, oval-neck track head bolts conforming to ASTM A-183 Grade 2 with a minimum tensile strength of 110,000 psi and heavy hex nuts of carbon steel conforming to ASTM A-563 Grade A or Grade B, or J995 Grade 2. Bolts and nuts are provided zinc electroplated as standard.

### METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard)
  - Hot Dipped Zinc Galvanized (optional)
  - Other available options: Example: RAL3000 or RAL9000 Series
- For other coating requirements contact an Anvil Representative.

### LUBRICATION:

- Standard Gruvlok
- Gruvlok Xtreme™ required for dry pipe systems and freezer applications.

### GASKETS: Materials

Properties as designated in accordance with ASTM D-2000.

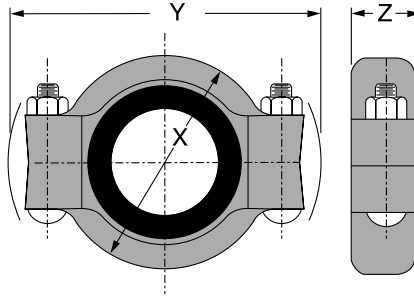
- Grade "E" EPDM (Green color code)
  - 40°F to 230°F (Service Temperature Range)(-40°C to 110°C)
  - Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.
  - NOT FOR USE IN PETROLEUM APPLICATIONS.
- Grade "EP" EPDM (Green and Red color code)
  - 40°F to 250°F (Service Temperature Range)(-40°C to 121°C)
  - Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.
  - NOT FOR USE IN PETROLEUM APPLICATIONS.

## PROJECT INFORMATION

## APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

# FIG. 7010 Reducing Coupling



## FIGURE 7010 REDUCING COUPLING

Nominal Size	Larger O.D.	Smaller O.D.	Max. Working Pressure ▲	Max. End Load	Range of Pipe End Separation	Deflection From $\mathcal{C}$		Coupling Dimensions			Coupling Bolts		Specified Torque §		Approx. Wt. Ea.
						Per Coupling	Pipe	X	Y	Z	Qty.	Size	Min.	Max.	
In./DN(mm)	In./mm	In./mm	PSI/bar	Lbs./kN	In./mm	Degrees	In./Ft. - mm/m	In./mm	In./mm	In./mm		In./mm	Ft.-Lbs./N-m	Lbs./Kg	
2 x 1½ 50 x 40	2.375 60.3	1.900 48.3	500 34.5	2,215 9.85	0-½ 0-0.79	0° 45'	0.16 13.1	3⅞ 92	5⅞ 149	1⅞ 48	2	½ x 2¾ M12 x 76	80 110	100 150	2.0 0.9
2½ x 2 65 x 50	2.875 73.0	2.375 60.3	500 34.5	3,246 14.44	0-½ 0-0.79	0° 37'	0.13 10.9	4¼ 108	6⅞ 162	1⅞ 48	2	½ x 2¾ M12 x 76	80 110	100 150	3.5 1.6
3 O.D. x 2 76.1 x 60.3	2.858 72	2.262 57	500 34.5	2,115 9.41	0-½ 0-3.2	0° 36'	0.12 9.9	4¼ 108	5⅞ 149	1⅞ 48	2	½ x 2¾ M12 x 76	80 110	100 150	3.4 1.5
3 x 2 80 x 50	3.500 88.9	2.375 60.3	500 34.5	4,811 21.40	0-½ 0-0.79	0° 31'	0.11 8.9	4⅞ 124	7⅞ 181	1⅞ 48	2	½ x 2¾ M12 x 76	80 110	100 150	4.4 2.0
3 x 2½ 80 x 65	3.500 88.9	2.875 73.0	500 34.5	4,811 21.40	0-½ 0-0.79	0° 31'	0.11 8.9	4⅞ 124	7⅞ 181	1⅞ 48	2	½ x 2¾ M12 x 76	80 110	100 150	4.1 1.9
3 x 3 O.D. 88.9 x 76.1	3.356 85	2.858 73	500 34.5	2,886 12.84	0-½ 0-3.2	0° 31'	0.11 8.9	4¼ 120	6⅞ 169	1⅞ 48	2	½ x 2¾ M12 x 76	80 110	110 150	3.7 1.7
4 x 2 100 x 50	4.500 114.3	2.375 60.3	500 34.5	7,952 35.37	0-¾ 0-2.38	1° 12'	0.25 20.8	6¼ 159	8⅞ 225	2 51	2	⅝ x 3½ M16 x 95	100 135	130 175	8.9 4.0
4 x 2½ 100 x 65	4.500 114.3	2.875 73.0	500 34.5	7,952 35.37	0-¾ 0-2.38	1° 12'	0.25 20.8	6¼ 159	8⅞ 225	2 51	2	⅝ x 3½ M16 x 95	100 135	130 175	7.9 3.6
4 x 3 O.D. 114.3 x 76.1	4.350 110	2.858 73	500 34.5	4,771 21.22	0-¾ 0-4.8	1° 12'	0.25 20.8	6 152	8 203	2 51	2	⅝ x 3½ M16 x 95	100 135	130 175	6.7 3.0
4 x 3 100 x 80	4.500 114.3	3.500 88.9	500 34.5	7,952 35.37	0-¾ 0-2.38	1° 12'	0.25 20.8	6¼ 159	8⅞ 225	2 51	2	⅝ x 3½ M16 x 95	100 135	130 175	6.7 3.0
5½ O.D. x 4 139.7 x 114.3	5.350 136	4.350 110	500 34.5	7,128 31.71	0-¾ 0-4.8	1° 58'	0.20 10.8	7⅞ 181	9⅞ 245	2 51	2	¾ x 4½ M20 x 115	130 175	180 245	9.8 4.4
5 x 3 125 x 80	5.563 141.3	3.500 88.9	500 34.5	7,292 32.44	0-¾ 0-6.4	1° 58'	0.20 16.8	7¼ 184	10⅞ 270	2⅞ 54	2	¾ x 4½ M20 x 115	130 175	180 245	9.5 4.3
5 x 4 125 x 100	5.563 141.3	4.500 114.3	500 34.5	12,153 54.06	0-¾ 0-2.38	1° 58'	0.20 16.8	7¼ 184	10⅞ 270	2⅞ 54	2	¾ x 4½ M20 x 115	130 175	180 245	11.4 5.2
6½ O.D. x 3 165.1 x 88.9	6.352 161	3.356 85	500 34.5	9,955 44.28	0-¾ 0-6.4	1° 20'	0.26 18.2	8¼ 210	10⅞ 275	2 51	2	¾ x 4½ M20 x 115	130 175	180 245	11.5 5.2
6½ O.D. x 4 165.1 x 114.3	6.352 161	4.350 110	500 34.5	9,955 44.28	0-¾ 0-6.4	1° 20'	0.26 18.2	8¼ 210	10⅞ 275	2 51	2	¾ x 4½ M20 x 115	130 175	180 245	11.3 5.1
6 x 4 150 x 100	6.625 168.3	4.500 114.3	500 34.5	17,236 76.67	0-¾ 0-2.38	0° 49'	0.17 14.1	8¼ 210	11⅞ 295	2⅞ 54	2	¾ x 4½ M20 x 115	130 175	180 245	13.4 6.1
6 x 5 150 x 125	6.625 168.3	5.562 141.3	500 34.5	17,236 76.67	0-¾ 0-2.38	0° 49'	0.17 14.1	8½ 216	11⅞ 295	2⅞ 54	2	¾ x 4½ M20 x 115	130 175	180 245	13.5 6.1
8 x 6 200 x 150	8.625 219.1	6.625 168.3	500 34.5	29,213 129.95	0-¾ 0-2.38	0° 37'	0.13 10.9	10½ 267	14 356	2¼ 57	2	¾ x 4½ M20 x 115	130 175	180 245	17.7 8.0
8 x 6½ O.D. 219.1 x 165.1	8.462 245	6.336 161	500 34.5	17,528 77.97	0-¾ 0-6.4	0° 37'	0.13 10.9	10⅞ 275	13⅞ 333	2¼ 57	2	¾ x 4½ M20 x 115	130 175	180 245	17.0 7.7

Not for use in copper system.

Range of Pipe End Separation and Angular Deflection values are for roll grooved pipe and may be doubled for cut groove pipe.

§ - For additional Bolt Torque information see Technical Data Section.

▲ - Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, FM, VdS and LPCB pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

Other sizes available, see Gruvlok Catalog or contact an Anvil Representative.



**For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok Xtreme™ Lubricant is required.**

# FIG. 7012\*

# Gruvlok Flange



The Gruvlok® Fig. 7012 Flange allows direct connection of Class 125 or Class 150 flanged components to a grooved piping system. The two interlocking halves of the 2" thru 12" sizes of the Gruvlok Flange are hinged for ease of handling, and are drawn together by a latch bolt which eases assembly on the pipe. Precision machined bolt holes, key and mating surfaces assure concentricity and flatness to provide exact fit-up with flanged, lug, and wafer styles of pipe system equipment. A specially designed gasket provides a leak-tight seal on both the pipe and the mating flange face.



Working pressure ratings shown are for reference only and are based on Schedule 40 pipe. For the latest UL/ULC listed, LPCB, VdS and FM Approved pressure ratings versus pipe schedule, see [www.anvilintl.com](http://www.anvilintl.com) or contact your local Anvil Representative.



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

The Gruvlok Fig. 7012 Flange requires the use of a steel adapter insert when used against rubber faced surfaces, wafer/lug design valves and serrated or irregular sealing surfaces. In copper systems a phenolic adapter insert is required, in place of the steel adapter insert. (See Installation and Assembly Instructions Section or contact your Anvil Rep. for details.)

- Available galvanized.

\* When ordering, refer to product as FP7012.

## MATERIAL SPECIFICATIONS

### HOUSING:

Ductile Iron conforming to ASTM A-536, Grade 65-45-12

### LATCH BOLT/NUT (2"-12"):

Heat treated, zinc electroplated, carbon steel oval neck track bolts conforming to ASTM A-183 and zinc electroplated heavy hex nuts of carbon steel conforming to ASTM A-563 Grade A or Grade B, or J995 Grade 2.

### METRIC BOLTS & HEAVY HEX NUTS:

Heat treated, zinc electroplated oval-neck track head bolts made of carbon steel with mechanical properties per ISO 898-1 Class 8.8. Hex nuts and bolts are zinc electroplated followed by a yellow chromate dip.

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard)
  - Hot Dipped Zinc Galvanized (optional)
  - Other available options: Example: RAL3000 or RAL9000 Series
- For other coating requirements contact an Anvil Representative.

### LUBRICATION:

- Standard Gruvlok
- Gruvlok Xtreme™ required for dry pipe systems and freezer applications.

### GASKETS: Materials

Properties as designated in accordance with ASTM D-2000.

- Grade "E" EPDM (Green color code)  
-40°F to 230°F (Service Temperature Range)(-40°C to 110°C)  
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many chemical services.  
NOT FOR USE IN PETROLEUM APPLICATIONS.
- Grade "EP" EPDM (Green and Red color code)  
-40°F to 250°F (Service Temperature Range)(-40°C to 121°C)  
Recommended for water service, diluted acids, alkalies solutions, oil-free air and many other chemical services.  
NOT FOR USE IN PETROLEUM APPLICATIONS.

## PROJECT INFORMATION

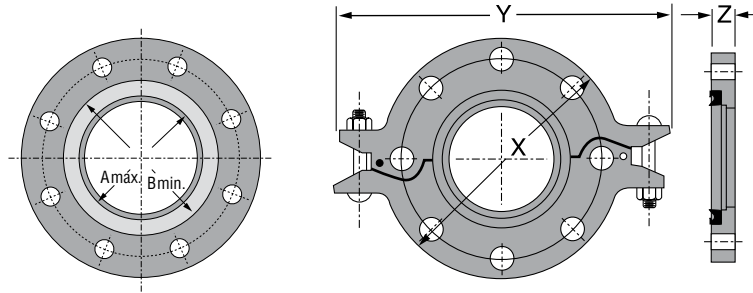
## APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	



# FIG. 7012\*

# Gruvlok Flange



### FIGURE 7012 FLANGE: ANSI CLASS 125 & 150

Nominal Size	Pipe O.D.	Max. Working Pressure ▲	Max. End Load ▲	Latch Bolt			Dimensions			Sealing Surface		Mating Flange Bolts				Approx. Wt. Ea.
				Latch Bolt Size*	Specified Torque §		X	Y	Z	A Max.	B Min.	Mating Flange Bolts		Specified Torque §		
					Min.	Max.						Qty.	Size (ANSI)	Min.	Max.	
2	2.375	300	1,329	3/8 x 2 3/4	30	45	6 1/4	8 3/8	3/4	2 3/8	3 1/16	4	5/8 x 2 3/4	110	140	4.2
50	60.3	20.7	5.91	M10 x 70	40	60	159	213	19	60	87	4	M16 x 70	149	190	1.9
2 1/2	2.875	300	1,948	3/8 x 2 3/4	30	45	7	9 1/2	3/4	2 7/8	4	4	5/8 x 2 3/4	110	140	4.6
65	73.0	20.7	8.66	M10 x 70	40	60	178	241	19	73	102	-	M16 x 70	149	190	2.1
3 O.D.	2.996	300	2,115	-	30	45	7 1/4	9 3/4	3/4	3	4 1/8	-	-	110	140	4.8
76.1	76.1	20.7	9.41	M10 x 70	40	60	184	248	19	76	105	4	M16 x 70	149	190	2.2
3	3.500	300	2,886	3/8 x 2 3/4	30	45	7 7/8	10 1/2	3/4	3 1/2	4 3/16	4	5/8 x 2 3/4	110	140	6.0
88.9	88.9	20.7	12.84	M10 x 70	40	60	200	267	19	89	116	8	M16 x 70	149	190	2.7
4	4.500	300	4,771	3/8 x 2 3/4	30	45	9	11 1/2	3/4	4 1/2	5 1/16	8	5/8 x 2 3/4	110	140	6.3
100	114.3	20.7	21.22	M10 x 70	40	60	229	292	19	114	141	8	M16 x 70	149	190	2.9
5 1/2 O.D.	5.500	300	7,127	-	30	45	9 7/8	12 7/8	7/8	5 1/16	6 3/4	-	-	220	250	15.6
139.7	139.7	20.7	31.70	M10 x 70	40	60	251	327	22	141	171	8	M16 x 75	298	339	7.1
5	5.563	300	7,292	3/8 x 2 3/4	30	45	10	12 1/2	7/8	5 9/16	6 3/4	8	3/4 x 2 7/8	220	250	8.8
125	141.3	20.7	32.44	M10 x 70	40	60	254	318	22	141	171	-	-	298	339	4.0
6 1/2 O.D.	6.500	300	9,955	-	30	45	11 1/4	14	7/8	6 5/8	7 13/16	-	-	220	250	9.7
165.1	165.1	20.7	44.28	M10 x 70	40	60	286	356	22	168	198	8	M20 x 80	298	339	4.4
6	6.625	300	10,341	3/8 x 2 3/4	30	45	11	14	7/8	6 5/8	7 13/16	8	3/4 x 3 3/8	220	250	9.6
150	168.3	20.7	46.00	M10 x 70	40	60	279	356	22	168	198	8	M20 x 80	298	339	4.4
8	8.625	300	17,528	3/8 x 2 3/4	30	45	13 1/2	16 1/2	1	8 5/8	10	8	3/4 x 3 3/4	220	250	15.6
200	219.1	20.7	77.97	M10 x 70	40	60	343	419	25	219	254	8 (12)	M20 x 80	298	339	7.1
10	10.750	300	27,229	3/8 x 2 3/4	30	45	16	19	1	10 3/4	12 1/8	12	7/8 x 3 1/2	320	400	18.2
250	273.1	20.7	121.12	M10 x 70	40	60	406	483	25	273	308	12	M20 x 90	439	542	8.3
12	12.750	300	38,303	3/8 x 2 3/4	30	45	19	21 3/4	1 1/4	12 3/4	14 1/8	12	7/8 x 3 3/4	320	400	29.9
300	323.9	20.7	170.38	M10 x 70	40	60	483	552	32	324	359	12	-	439	542	13.6
12 (PN)	12.750	300	38,303	-	30	45	18 1/8	21 1/4	1	12 3/4	14 1/8	12	-	320	400	20.9
300	323.9	20.7	170.38	M10 x 70	40	60	460	540	25	324	359	12	M20 x 90	439	542	9.5

+ PN 16 uses M24 x 90 (PN) Dimensions for bolt circle PN 10 & 16 Flange.

\* Available in ANSI or metric bolt sizes only as indicated.

▲ - Working Pressure Ratings are for reference only and based on Sch. 40 pipe. For the latest UL/ULC, FM, VdS and LPCB pressure ratings versus pipe schedule, please visit [anvilintl.com](http://anvilintl.com) or contact your local Anvil Representative.

§ - For additional Bolt Torque information, see Technical Data Section.

The Gruvlok Flange bolt hole pattern conforms to ANSI Class 150 and Class 125 flanges.

To avoid interference issues, flanges cannot be assembled directly to Series 7700 butterfly valve. Flange can be assembled to one side of series 7500 and 7600 valve only.

Mating flange bolts must be at least Intermediate Strength Bolting per ASME B16.5. Bolts with material properties equal or greater than SAE J429 Grade 5 are acceptable.

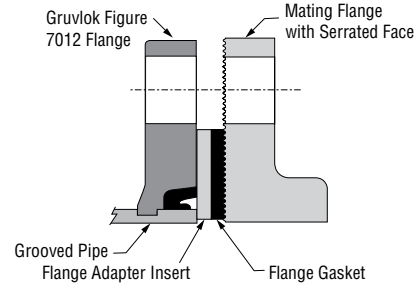
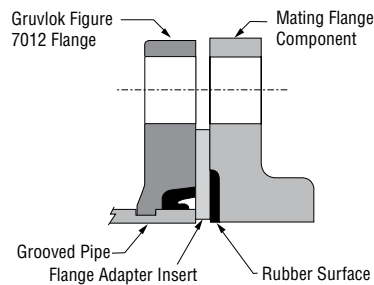
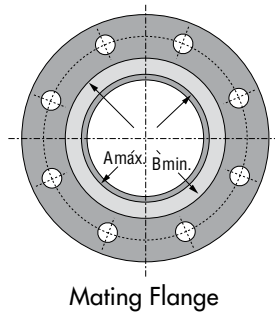
Refer to the Gruvlok Product Catalog or Anvil's web site for more information on installing this flange.

300 Lb Flange is available, Fig. 7013, see Gruvlok Catalog or contact your Anvil Rep. for more information.

Other sizes available, contact an Anvil Representative.



**For dry pipe systems and freezer applications lubrication of the gasket is required, Gruvlok® Xtreme™ Lubricant is required.**



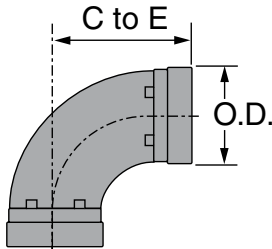
- A. The sealing surfaces A Max. to B Min. of the mating flange must be free from gouges, undulations and deformities of any type to ensure proper sealing of the gasket.
- B. Gruvlok Flanges are to be assembled on butterfly valves so as not to interfere with actuator or handle operation.
- C. Do not use Gruvlok Flanges within 90 degrees of one another on standard fittings because the outside dimensions may cause interference.
- D. Gruvlok Flanges should not be used as anchor points for tie-rods across non-restrained joints.
- E. Fig. 7012 Gruvlok Flange sealing gaskets require a hard flat surface for adequate sealing. The use of a Gruvlok Flange Adapter Insert is required for applications against rubber faced valves or other equipment. The Gruvlok Flange Adapter Insert is installed between the Gruvlok Flange sealing gasket and the mating flange or surface to provide a good sealing surface area.
- F. Gruvlok Flanges are not recommended for use against formed rubber flanges.
- G. An additional bolt is recommended for the hinge side of the 2" - 12" Figure 7012 when connecting to lug valves.
- H. Contact an Anvil Representative for Di-Electric Flange connections.

**Applications which require a Gruvlok Flange Adapter Insert:**

1. When mating to a wafer valve (lug valve), if the valve is rubber faced in the area designated by the sealing surface dimensions (A Max. to B Min.), place the Gruvlok Flange Adapter Insert between the valve and the Gruvlok flange.
2. When mating to a rubber-faced metal flange, the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the rubber-faced flange.
3. When mating to a serrated flange surface, a standard full-faced flange gasket is installed against the serrated flange face and the Gruvlok Flange Adapter Insert is placed between the Gruvlok Flange and the standard Flange gasket.
4. When mating to valves or other component equipment where the flange face has an insert, use procedure described in note 3.

# FIG. 7050S\*

# Standard 90° Elbow for Fire Protection



These fittings are designed to provide minimal pressure drop and uniform strength.



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.



- Available galvanized.

\* When ordering, refer to product as FP7050S.

## FIGURE 7050S\* STANDARD 90° ELBOW

Nominal Size	O.D.	Max. Rated Pressure	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	PSI/bar	In./mm	Lbs./Kg
1 25	1.315 33.4	300 20.7	2¼ 57	0.6 0.3
1¼ 32	1.660 42.2	300 20.7	2¾ 70	1.0 0.5
1½ 40	1.900 48.3	300 20.7	2¾ 70	1.2 0.5
2 50	2.375 60.3	300 20.7	3¼ 83	1.7 0.8
2½ 65	2.875 73.0	300 20.7	3¾ 95	2.6 1.2
3 O.D. 76.1	2.996 76.1	300 20.7	4 102	3.6 1.6
3 80	3.500 88.9	300 20.7	4¼ 108	4.0 1.8
4 100	4.500 114.3	300 20.7	5 127	7.7 3.5
5½ O.D. 139.7	5.500 139.7	300 20.7	5¼ 133	10.9 4.9
5 125	5.563 141.3	300 20.7	5½ 140	11.1 5.0
6½ O.D. 165.1	6.500 165.1	300 20.7	6½ 165	17.4 7.9
6 150	6.625 168.3	300 20.7	6½ 165	16.5 7.5
8 200	8.625 219.1	300 20.7	7¾ 197	30.6 13.9
10 250	10.750 273.1	300 20.7	9 229	53.5 24.3
12 300	12.750 323.9	300 20.7	10 254	82 37.2

For additional sizes, see Fig. 7050 in the Gruvlok Catalog or contact an Anvil Representative.

## MATERIAL SPECIFICATIONS

### CAST FITTINGS:

Ductile Iron conforming to ASTM A-536

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series

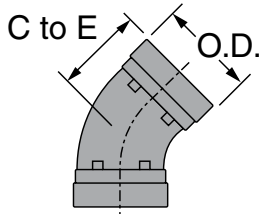
## PROJECT INFORMATION

## APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

# FIG. 7051\*

## Standard 45° Elbow for Fire Protection



### FIGURE 7051\* STANDARD 45° ELBOW

Nominal Size	O.D.	Max. Rated Pressure	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	PSI/bar	In./mm	Lbs./Kg
1¼ 32	1.660 42.2	300 20.7	1¾ 44	0.7 0.3
1½ 40	1.900 48.3	300 20.7	1¾ 44	0.9 0.4
2 50	2.375 60.3	300 20.7	2 51	1.5 0.7
2½ 65	2.875 73.0	300 20.7	2¼ 57	1.9 0.9
3 80	3.500 88.9	300 20.7	2½ 64	3.3 1.5
4 100	4.500 114.3	300 20.7	3 76	5.4 2.4
5 125	5.563 141.3	300 20.7	3¼ 83	9.0 4.1
6 150	6.625 168.3	300 20.7	3½ 89	11.2 5.1
8 200	8.625 219.1	300 20.7	4¼ 108	19.8 9.0

Additional sizes available, see Gruvlok Catalog or contact an Anvil Representative.

These fittings are designed to provide minimal pressure drop and uniform strength.



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

Available as a fabricated fitting.

- Available galvanized.

\* When ordering, refer to product as FP7051.

### MATERIAL SPECIFICATIONS

#### CAST FITTINGS:

Ductile Iron conforming to ASTM A-536

#### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series

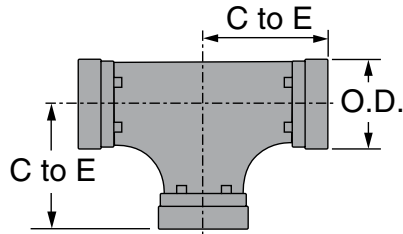
### PROJECT INFORMATION

### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

# FIG. 7060S\*

## Standard Tee for Fire Protection



**FIGURE 7060S\* STANDARD TEE**

Nominal Size	O.D.	Max. Rated Pressure	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	PSI/bar	In./mm	Lbs./Kg
1	1.315	300	2¼	0.9
25	33.4	20.7	57	0.4
1¼	1.660	300	2¾	1.5
32	42.2	20.7	70	0.7
1½	1.900	300	2¾	1.8
40	48.3	20.7	70	0.8
2	2.375	300	3¼	2.4
50	60.3	20.7	83	1.1
2½	2.875	300	3¾	4.0
65	73.0	20.7	95	1.8
3 O.D.	2.996	300	4	4.6
76.1	76.1	20.7	101	2.1
3	3.500	300	4¼	5.8
80	88.9	20.7	108	2.6
4	4.500	300	5	10.3
100	114.3	20.7	127	4.7
5½ O.D.	5.500	300	5½	16.1
139.7	139.7	20.7	140	7.3
5	5.563	300	5½	16.2
125	141.3	20.7	140	7.3
6½ O.D.	6.500	300	6½	24.4
165.1	165.1	20.7	165	11.1
6	6.625	300	6½	25.7
150	168.3	20.7	165	11.7
8	8.625	300	7¾	41.1
200	219.1	20.7	197	18.6
10	10.750	300	9	74.5
250	273.1	20.7	229	33.8
12	12.750	300	10	94.7
300	323.9	20.7	254	43.0

Additional sizes available, see Gruvlok Catalog or contact an Anvil Representative.

These fittings are designed to provide minimal pressure drop and uniform strength.



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

- Available galvanized.

\* When ordering, refer to product as FP7060S.

### MATERIAL SPECIFICATIONS

#### CAST FITTINGS:

Ductile Iron conforming to ASTM A-536

#### COATINGS:

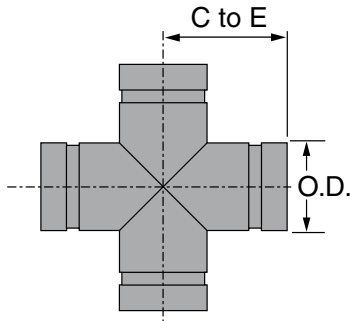
- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series

### PROJECT INFORMATION

### APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

# FIG. 7068 Cross



**FIGURE 7068 CROSS**

Nominal Size	O.D.	Center to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1 25	1.315 33.4	2¼ 57	1.3 0.6
1¼ 32	1.660 42.2	2¾ 70	2.1 1.0
1½ 40	1.900 48.3	2¾ 70	2.5 1.1
2 50	2.375 60.3	3¼ 83	2.9 1.3
2½ 65	2.875 73.0	3¾ 95	5.2 2.4
3 80	3.500 88.9	4¼ 108	7.5 3.4
4 100	4.500 114.3	5 127	12.2 5.5
5 125	5.563 141.3	5½ 140	17.6 8.0
6 150	6.625 168.3	6½ 165	28.3 12.8
8 200	8.625 219.1	7¾ 197	48.0 21.8
10 250	10.750 273.1	9 229	70.0 31.8
12 300	12.750 323.9	10 254	110 49.9

Additional sizes available, see Gruvlok Catalog or contact an Anvil Representative.

These fittings are designed to provide minimal pressure drop and uniform strength.



For Listings/Approval Details and Limitations, visit our website at [www.anvilintl.com](http://www.anvilintl.com) or contact an Anvil® Sales Representative.

 - Available galvanized.

## MATERIAL SPECIFICATIONS

### FABRICATED FITTINGS:

**1"-10"** Carbon Steel, Schedule 40, conforming to ASTM A-53, Grade B

**12" and above** Carbon Steel, Standard Wall, conforming to ASTM A-53, Grade B

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series

## PROJECT INFORMATION

## APPROVAL STAMP

**Project:** Voorhies

**Address:** 6001 Pioneer Drive

**Contractor:** Phone:

**Engineer:** Phone:

**Submittal Date:** 3/10/2017

**Notes 1:** Threaded Fittings

**Notes 2:**

Approved

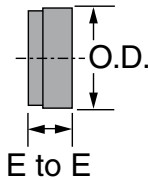
Approved as noted

Not approved

**Remarks:**

# FIG. 7074\*

Cap



## FIGURE 7074 CAP

Nominal Size	O.D.	End to End	Approx. Wt. Ea.
In./DN(mm)	In./mm	In./mm	Lbs./Kg
1	1.315	1¼	0.3
25	33.4	32	0.1
1¼	1.660	1¼	0.4
32	42.2	32	0.2
1½	1.900	1¼	0.5
40	48.3	32	0.2
2	2.375	1	0.5
50	60.3	25	0.2
2½	2.875	1	0.7
65	73.0	25	0.3
3 O.D.	2.996	1	0.8
76.1	76.1	25	0.4
3	3.500	1	1.1
80	88.9	25	0.5
4	4.500	1½	2.8
100	114.3	29	1.3
5½ O.D.	5.500	1⅞	4.0
139.7	139.7	29	1.8
5	5.563	1⅞	4.0
125	141.3	29	1.8
6½ O.D.	6.500	1⅞	6.0
165.1	165.1	29	2.7
6	6.625	1¾	6.0
150	168.3	33	2.7
8	8.625	1½	12.5
200	219.1	38	5.7
10	10.750	1½	21.9
250	273.1	38	9.9
12	12.750	1½	33.8
300	323.9	38	15.3

Additional sizes available, see Gruvlok Catalog or contact an Anvil Representative.



For Listings/Approval Details and Limitations, visit our website at [www.anviltntl.com](http://www.anviltntl.com) or contact an Anvil® Sales Representative.



- Available galvanized.

\* When ordering, refer to product as FP7074.

## MATERIAL SPECIFICATIONS

### CAST FITTINGS:

Ductile Iron conforming to ASTM A-536

### COATINGS:

- Rust inhibiting paint Color: ORANGE (standard) or
- Hot Dipped Zinc Galvanized conforming to ASTM A-153 (optional)
- Other available options: Example: RAL3000 or RAL9000 Series

## PROJECT INFORMATION

## APPROVAL STAMP

<b>Project:</b> Voorhies	<input type="checkbox"/> Approved
<b>Address:</b> 6001 Pioneer Drive	<input type="checkbox"/> Approved as noted
<b>Contractor:</b> Phone:	<input type="checkbox"/> Not approved
<b>Engineer:</b> Phone:	<b>Remarks:</b>
<b>Submittal Date:</b> 3/10/2017	
<b>Notes 1:</b> Threaded Fittings	
<b>Notes 2:</b>	

# FireLock® Check Valves

**SERIES 717HR HIGH PRESSURE - cULus, FM**  
**SERIES 717R - cULus, FM**

The Series 717R and Series 717HR FireLock High Pressure check valves are CAD-designed for hydrodynamic efficiency and available in 2 – 3”/50 – 80mm (Series 717HR) and 4 – 8”/100 – 200mm (Series 717R) sizes.

Series 717HR valves are cULus Listed and FM Approved for service up to the pressures shown on the chart below.

In the Series 717HR High Pressure Check Valve, the stainless steel disc is seated against the O-ring seal which is installed in the electroless nickel-plated end face. The Series 717R check valve features an elastomer encapsulated disc and a welded in nickel seat for superior corrosion resistance. Both valves feature a spring-assisted, single disc design which provides a leak-free seal with as little as 5 ft/1.5 m of head. Either valve can be installed in horizontal or vertical positions.

In both valve designs, the single disc mechanism incorporates a spring-assisted feature for non-slamming operation. Each valve is factory tested to the rated working pressure. For systems not requiring a Riser Check option refer to publication 10.08. Both valve designs include upstream and downstream pressure taps.

The drain valves supplied with the Victaulic Riser Kit are cULus and FM Approved for services up to 300 psi/2068 kPa. Grooved ends allow fast, easy installation with just two Victaulic couplings or the valve may be mounted to flanged (ANSI CL.150) equipment using Victaulic Style 741 Vic-Flange® or Style 744 FireLock flange adapters on either end.

The Victaulic riser check kit for the 2”/60.3mm S717HR has a ¾” drain valve and the kit for the 2-½ to 3”/65-80mm S717HR includes a 1¼” drain valve. The kit for the 4-8”/100-200mm S717R valve includes a 2” drain valve. All kits also include gauges (2), gauge isolation valves (2), pipe nipples and pipe plugs. In both models, the riser check kit must be specified when ordered.



SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS



**SERIES 717HR - SHOWN WITH THE VICTAULIC RISER CHECK KIT (2 – 3”/50 – 80 mm)**



**SERIES 717R - SHOWN WITH THE VICTAULIC RISER CHECK KIT (4 – 8”/100 – 200 mm)**

Size	Approval/Listing Service Pressures			
	Series 717HR (bare valve)		Series 717R	
	cULus*	FM*	cULus	FM
2”/50mm	up to 365psi/2517 kPa	up to 365psi/2517 kPa	n/a	n/a
2 ½”/65mm	up to 365psi/2517 kPa	up to 365psi/2517 kPa	n/a	n/a
76.1mm	up to 365psi/2517 kPa	up to 365psi/2517 kPa	n/a	n/a
3”/80mm	up to 365psi/2517 kPa	up to 365psi/2517 kPa	n/a	n/a
4”/100mm	n/a	n/a	up to 365psi/2517kPa	up to 365psi/2517kPa
5”/125mm	n/a	n/a	up to 365psi/2517kPa	up to 365psi/2517kPa
6”/150mm	n/a	n/a	up to 365psi/2517kPa	up to 365psi/2517kPa
8”/200mm	n/a	n/a	up to 365psi/2517kPa	up to 365psi/2517kPa

\* Note: When supplied with the Victaulic Riser Check Kit, the Series 717HR can be used for services up to 300psi/2068kPa.

**JOB OWNER**

System No. \_\_\_\_\_  
 Location \_\_\_\_\_

**CONTRACTOR**

Submitted By \_\_\_\_\_  
 Date \_\_\_\_\_

**ENGINEER**

Spec Sect \_\_\_\_\_ Para \_\_\_\_\_  
 Approved \_\_\_\_\_  
 Date \_\_\_\_\_

www.victaulic.com

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REV\_H





## FireLock® Check Valves



SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

SERIES 717HR HIGH PRESSURE - cULus, FM  
 SERIES 717R - cULus, FM

### MATERIAL SPECIFICATIONS

**Body:** Ductile iron conforming to ASTM A-536, grade 65-45-12. Ductile iron conforming to ASTM A-395, grade 65-45-15, is available upon special request.

**Body Coating:** Series 717HR and Series 717R: painted black enamel.

**Body Seat:** Series 717HR (2 - 3"/50 - 80mm) machined surfaces electroless nickel plated. Series 717R (4 - 8"/100 - 200mm) welded-in nickel seat.

#### Disc Seal or Coating:

- **Grade "T" Nitrile (Series 717HR ONLY)**

Nitrile (Orange color code). Temperature range -20°F to +180°F/-29°C to +82°C. Recommended for petroleum products, air with oil vapors, vegetable and mineral oils within the specified temperature range; except hot, dry air over +140°F/+60°C and water over +150°F/+66°C. NOT RECOMMENDED FOR HOT WATER SERVICES.

- **Grade "E" EPDM (Series 717R ONLY)**

EPDM (Green color code). Temperature range -30°F to +230°F/-34°C to +110°C. Recommended for cold and hot water service within the specified temperature range plus a variety of dilute acids, oil-free air and many chemical services. UL classified in accordance with ANSI/NSF 61 for cold +86°F/+30°C and hot +180°F/+82°C potable water service. NOT RECOMMENDED FOR PETROLEUM SERVICES.

\* Services listed are General Service Recommendations only. It should be noted that there are services for which these gaskets are not recommended. Reference should always be made to the latest Victaulic Gasket Selection Guide for specific gasket service recommendations and for a listing of services which are not recommended.

#### Discs:

- Series 717HR (2 - 3"/50 - 80mm): 300 Series Stainless Steel
- Series 717R valves (4 - 12"/100 - 300mm) Elastomer-coated ductile iron

#### Shaft:

- Series 717HR: Brass
- Series 717R: Type 316 stainless steel

**Spring:** All sizes Type 302/304 stainless

#### Shaft Plug:

- Series 717HR: Type 416 Stainless Steel
- Series 717R: Zinc-plated carbon steel

**Pipe Plug:** Zinc-plated carbon steel

# FireLock® Check Valves

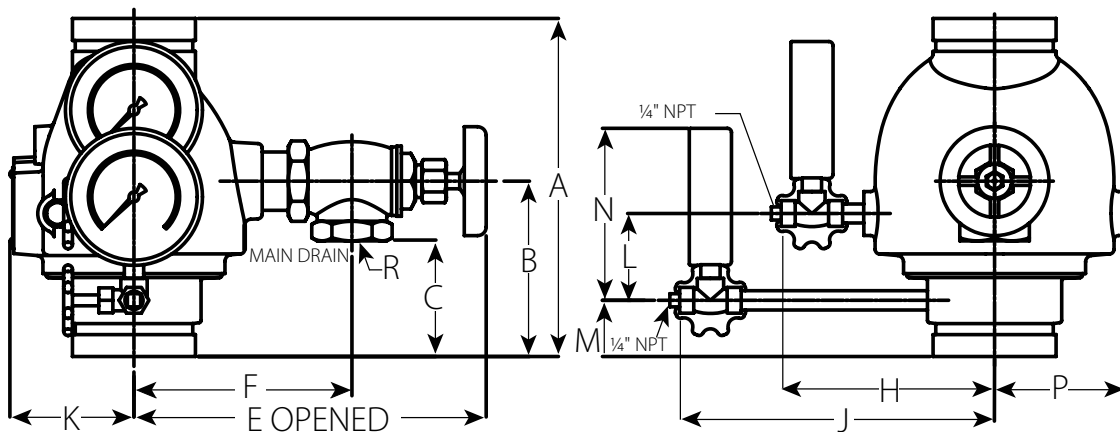


SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

SERIES 717HR HIGH PRESSURE - cULus, FM  
 SERIES 717R - cULus, FM

## DIMENSIONS 717HR

Size	Dimensions – Inches/mm														Approx. Wgt. Each
Nominal Size Inches/mm	A	B	C	D	E (OPENED)	F	H	J	K	L	M	N	P	R	Lbs. kg
2 60.3	8.66 219.8	4.40 111.9	3.16 80.1	–	8.50 215.9	4.74 120.4	5.57 141.5	8.50 216.0	3.23 82.0	2.10 53.3	1.58 40.3	4.90 124.3	3.23 82.0	3/4" NPT	15.0 6.8
2 1/2 73	9.37 238.0	4.99 126.7	3.29 83.6	–	10.50 266.7	5.87 149.0	5.82 147.8	8.71 221.2	3.31 84.1	2.37 60.2	1.60 40.7	4.90 124.3	3.47 88.1	1 1/4" NPT	19.5 8.8
76.1 mm	9.37 238.0	4.99 126.7	3.29 83.6	–	10.50 266.7	5.87 149.0	5.82 147.8	8.71 221.2	3.31 84.1	2.37 60.2	1.60 40.7	4.90 124.3	3.47 88.1	1 1/4" NPT	19.5 8.8
3 88.9	9.62 244.3	4.99 126.7	3.31 84.2	–	10.78 273.8	6.20 157.6	6.07 154.2	8.96 227.6	3.53 89.7	2.47 62.7	1.60 40.6	4.90 124.3	3.72 94.5	1 1/4" NPT	25.5 11.6



2"/60.3 mm – 3"/88.9 mm  
 SERIES 717 HR

# FireLock® Check Valves

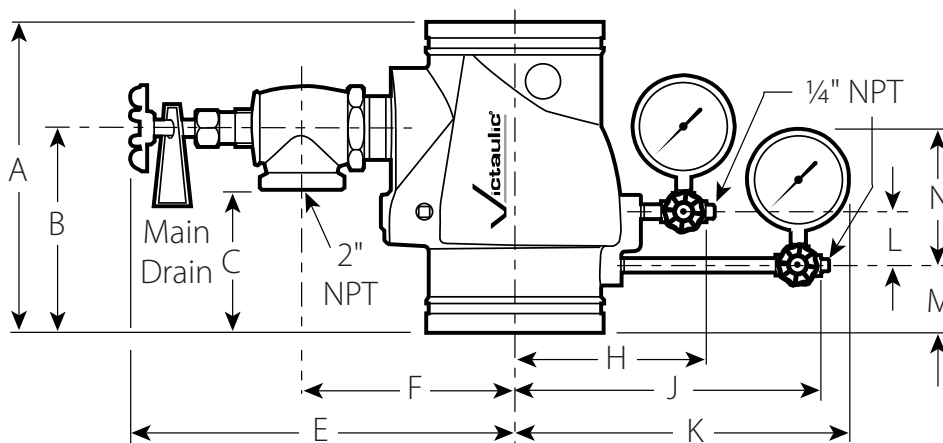


SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

SERIES 717HR HIGH PRESSURE - cULus, FM  
 SERIES 717R - cULus, FM

## DIMENSIONS 717R

Size		Dimensions – Inches/mm													Approx. Wgt. Each
Nominal Size Inches/mm	Actual Outside Diameter Inches/mm	E-E A	B	C	D	E	F	H	J	K	L	M	N	Lbs. kg	
4 100	4.500 114.3	9.63 245	6.25 159	4.00 102	3.75 95	14.25 362	6.88 175	6.70 170	10.45 265	11.25 286	2.00 51	2.00 51	5.25 133	28.0 12.7	
5 125	5.563 141.3	10.50 267	6.50 165	4.25 108	3.75 95	14.75 375	7.38 188	7.37 187	11.87 302	12.75 324	2.15 55	1.88 48	5.25 133	35.0 15.9	
139.7 mm	5.500 139.7	10.50 267	6.50 165	4.25 108	3.75 95	14.75 375	7.38 188	7.37 187	11.87 302	12.75 324	2.15 55	1.88 48	5.25 133	35.0 15.9	
6 150	6.625 168.3	11.50 292	7.63 194	5.38 137	3.75 95	15.50 394	8.03 204	7.70 196	12.20 310	13.00 330	2.38 61	2.13 54	5.25 133	46.0 20.9	
165.1 mm	6.500 165.1	11.50 292	7.63 194	5.38 137	3.75 95	15.50 394	8.03 204	7.70 196	12.20 310	13.00 330	2.38 61	2.13 54	5.25 133	46.0 20.9	
8 200	8.625 219.1	14.00 356	8.25 210	6.00 152	3.75 95	16.38 416	9.00 229	8.85 225	12.75 324	13.50 343	2.15 55	2.88 73	5.25 133	72.0 32.7	



# FireLock® Check Valves

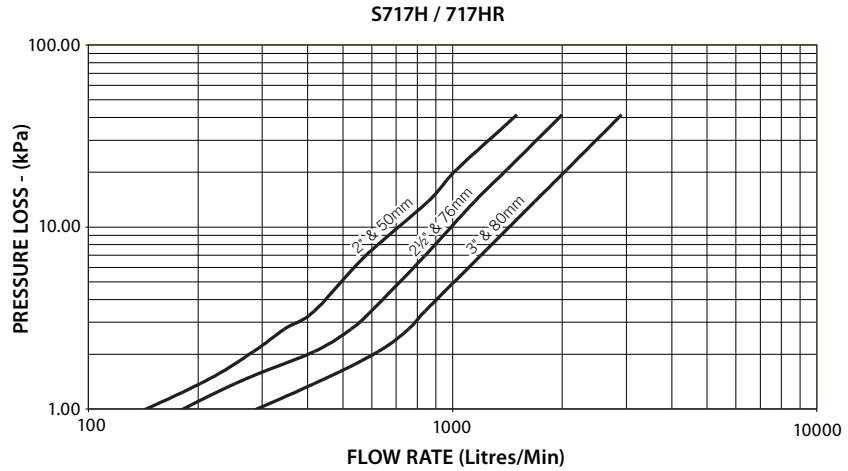
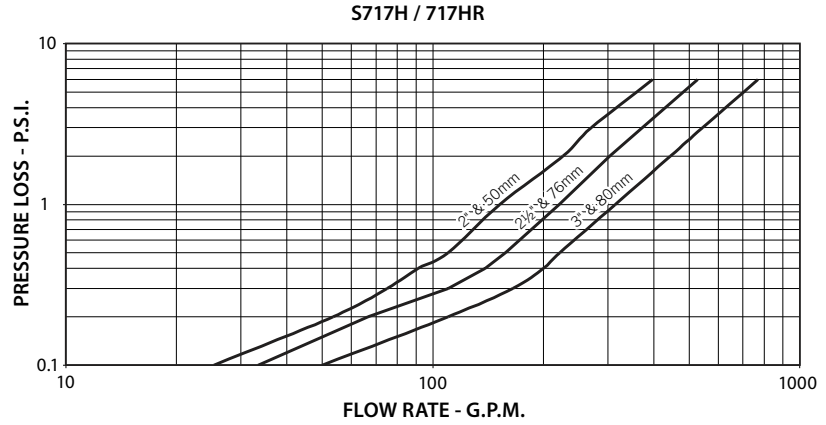
SERIES 717HR HIGH PRESSURE - cULus, FM  
 SERIES 717R - cULus, FM



SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

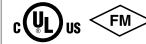
## FLOW CHARACTERISTICS

The charts below express the flow of water at 60°F/16°C through valve.



# FireLock® Check Valves

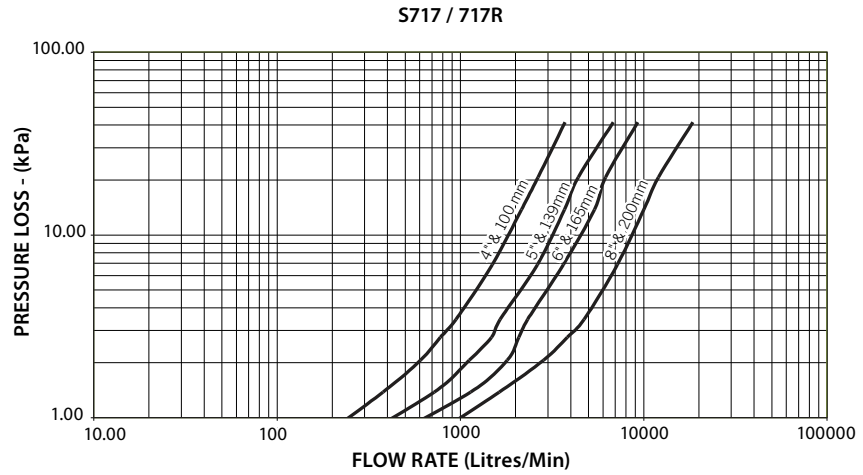
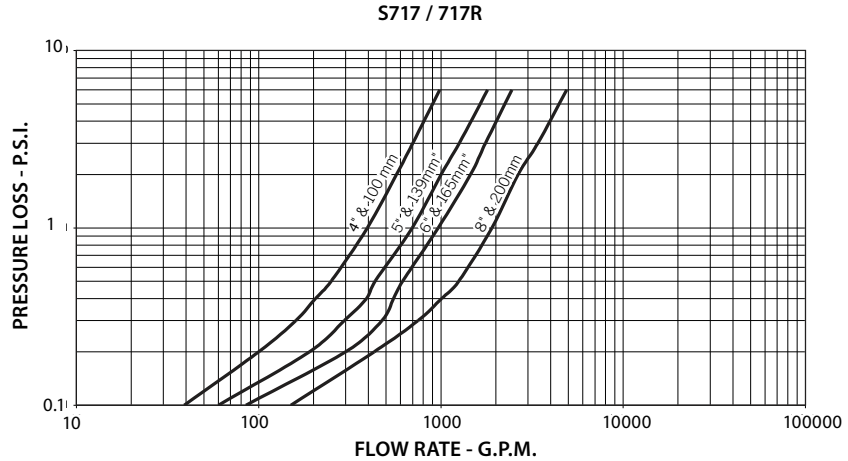
SERIES 717HR HIGH PRESSURE - cULus, FM  
 SERIES 717R - cULus, FM



SEE VICTAULIC PUBLICATION 10.01 FOR DETAILS

## FLOW CHARACTERISTICS

The charts below express the flow of water at 60°F/16°C through valve.



## WARRANTY

Refer to the Warranty section of the current Price List or contact Victaulic for details.

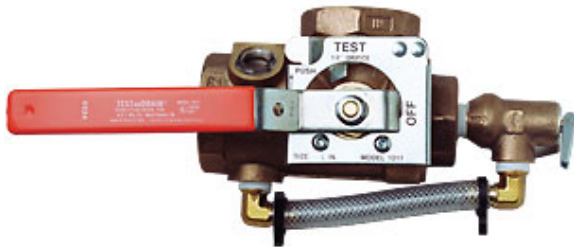
## NOTE

This product shall be manufactured by Victaulic or to Victaulic specifications. All products to be installed in accordance with current Victaulic installation/assembly instructions. Victaulic reserves the right to change product specifications, designs and standard equipment without notice and without incurring obligations.




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## MODEL 1011A TEST<sub>AND</sub>DRAIN<sup>®</sup>



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Similar to the Model 1000, the Model 1011A TEST<sub>AND</sub>DRAIN<sup>®</sup> is a 300 PSI rated single handle ball valve specifically designed to provide both the test function and the express drain function required for a wet fire sprinkler system and features a tamper resistant test orifice and integral tamper resistant sight glasses. The Model 1011A has the added feature of a Model 7000 Pressure Relief Valve with drainage piping. It is designed to relieve excess pressure caused by surges or temperature changes while solving the difficult problem of providing the relief valve with a drainage-piping outlet. The Model 1011A complies with the requirements of NFPA 13 which stipulate a pressure relief valve be installed on all gridded systems and downstream of all pressure reducing valves. Available in 3/4" through 2" sizes in both NPT and BSPT with all specifiable orifice sizes: 3/8" (2.8K), 7/16" (4.2K), 1/2" (5.6K), 17/32" (8.0K), 5/8" (11.2K, ELO), 3/4" (14.0K, ESFR), and K25.

Repair Kits are available for all TEST<sub>AND</sub>DRAIN<sup>®</sup> valves. For more information, visit the "[Support](#)" page.

[Locate a Distributor](#)

M1011A	Item ID	Orifice Size	Size	Connection
	200A	3/8" Orifice	3/4"	Thread X Thread
	201A	7/16" Orifice		
	202A	1/2" Orifice		
	203A	17/32" Orifice		
	204A	5/8" ELO Orifice		
	210A	3/8" Orifice	1"	Thread X Thread
	211A	7/16" Orifice		
	212A	1/2" Orifice		
	213A	17/32" Orifice		
	214A	5/8" ELO Orifice		

	220A	3/8" Orifice	1 1/4"	Thread X Thread
	221A	7/16" Orifice		
	222A	1/2" Orifice		
	223A	17/32" Orifice		
	224A	5/8" ELO Orifice		
	225A	3/4" ESFR Orifice		
	230A	3/8" Orifice	1 1/2"	Thread X Thread
	231A	7/16" Orifice		
	232A	1/2" Orifice		
	233A	17/32" Orifice		
	234A	5/8" ELO Orifice		
	235A	3/4" ESFR Orifice		
	236A	K25 Orifice		
	240A	3/8" Orifice	2"	Thread X Thread
	241A	7/16" Orifice		
	242A	1/2" Orifice		
	243A	17/32" Orifice		
	244A	5/8" ELO Orifice		
	245A	3/4" ESFR Orifice		
	246A	K25 Orifice		

OTHER TESTANDRAIN® VALVES



MODEL 1000



MODEL 1011T



MODEL 2511A



MODEL 2511T

*Reliability, Versatility, Code Compatibility*



# UNITED BRASS WORKS, INC.

714 S. Main St., Randleman, NC 27317

Tel: 800-334-3035 Fax: 800-498-4696 www.ubw.com



## Model 126SUL Angle Valve Soft Disc



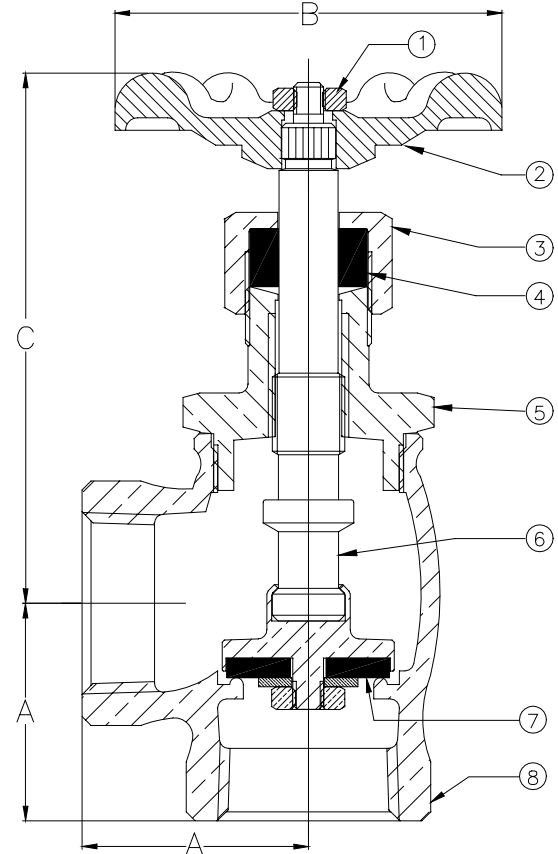
UL Listed for Fire Sprinkler Service at 250 WOG

200 WOG @ 180 ° Max

100% Pressure Tested

Threaded Ends

Rising Stem • Integral Seat



### MATERIAL LIST

NO.	DESCRIPTION	MATERIAL
1	Hex Nut	Steel
2	Hand Wheel	Aluminum
3	Packing Nut	Brass
4	Packing	Graphite Non-Asbestos
5	Bonnet (1/2" - 1") Bonnet (1 1/4" - 2")	Brass Bronze
6	Stem & Seat Assembly	Brass
7	Disc	Buna N
8	Body	Bronze

Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
A	1.03	1.22	1.47	1.75	2.00	2.34
B	2.03	2.38	2.75	3.00	3.72	3.72
C (closed)	3.13	3.25	4.38	4.50	5.25	5.63
Ship Wt. (lbs.)	0.69	0.94	1.76	2.50	3.26	5.32
Qty. Unit Pack	12	6	6	4	2	2
Qty. Per Case	72	60	36	24	12	12





# UNITED BRASS WORKS, INC.

714 S. Main St., Randleman, NC 27317

Tel: 800-334-3035 Fax: 800-498-4696 www.ubw.com

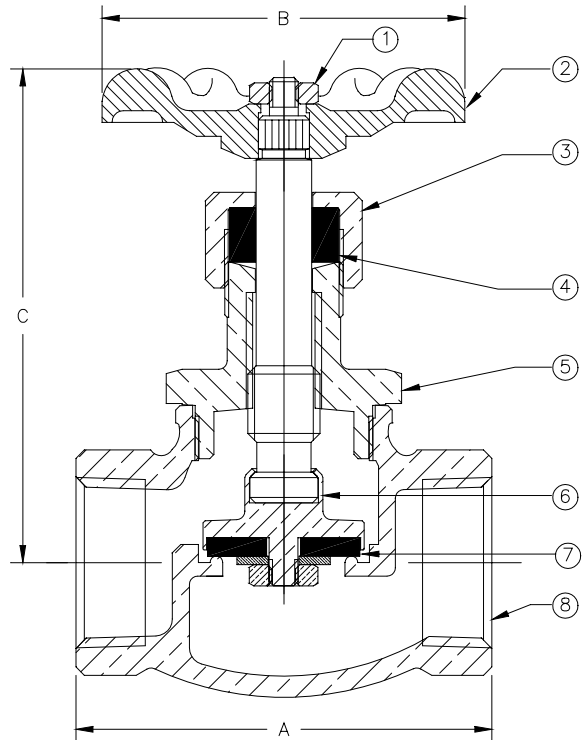


## Model 125SUL Globe Valve

Soft Disc



**UL** **US** UL Listed for Fire Sprinkler Service at 250 WOG  
**200 WOG @ 180 ° Max**  
**100% Pressure Tested**  
**Threaded Ends • Integral Seat**  
**Rising Stem**  
**Swivel Disc Holder**



### MATERIAL LIST

NO.	DESCRIPTION	MATERIAL
1	Hex Nut	Steel
2	Hand Wheel	Aluminum
3	Packing Nut	Brass
4	Packing	Graphite Non-Asb.
5	Bonnet (1/2" - 1") Bonnet (1/4" - 2")	Brass Bronze
6	Stem & Disc Assm.	Brass
7	Disc	Buna N
8	Body	Bronze

Size	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
A	2.22	2.47	2.97	3.56	4.06	4.69
B	2.03	2.38	2.75	3.00	3.72	3.72
C (closed)	3.38	3.50	4.25	4.75	5.50	5.50
Ship Wt. (lbs.)	0.69	0.94	1.76	2.50	3.26	5.32
Qty. Unit Pack	12	6	6	4	2	2
Qty. Per Case	72	60	36	24	12	12



## TECHNICAL DATA

### MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

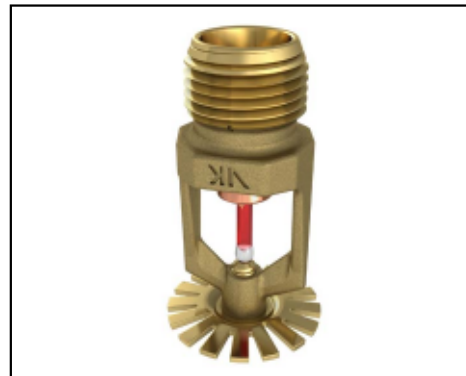
The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

### 1. DESCRIPTION

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is a small thermo-sensitive glass bulb spray sprinkler available with various finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM Global approves ENT finish as corrosion resistant.** FM Global has no approval classification for Polyester coatings as corrosion resistant.)



### 2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV



FM Approved: Class Series 2000



VdS Approved: Certificates G414009 and G414010



LPCB Approved



CE Certified: Standard EN 12259-1:1999, A3:2006 Certificate of Constancy of Performance 0832-CPR-S0021



CCC Approved: Approved by the China Certification Center for Fire Products (CCC)

Refer to Approval Chart 1 and Design Criteria cULus Listing requirements, and refer to Approval Chart 2 and Design Criteria for FM Approval requirements that must be followed.

### 3. TECHNICAL DATA

#### Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)  
 Rated to 175 psi (12 bar) water working pressure  
 Factory tested hydrostatically to 500 psi (34.5 bar)  
 Thread size: 1/2" NPT, 15 mm BSP  
 Nominal K-Factor: 5.6 U.S. (80.6 metric\*\*)  
 Glass-bulb fluid temperature rated to -65 °F (-55 °C)  
 Overall Length: 2-1/4" (58 mm)

\*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

#### Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass  
 Deflector: Phosphor Bronze UNS-C51000 or Copper UNS-C19500  
 Bulb: Glass, nominal 3 mm diameter  
 Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape  
 Screw: Brass UNS-C36000  
 Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400  
For Polyester Coated Sprinklers: Belleville Spring-Exposed  
For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated.

#### Ordering Information: (Also refer to the current Viking price list.)

Order Quick Response Pendent Sprinklers by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN  
 Temperature Suffix: 135 °F (57 °C) = A, 155 °F (68 °C) = B, 175 °F (79 °C) = D, 200 °F (93 °C) = E, 286 °F (141 °C) = G  
 For example, sprinkler VK302 with a Brass finish and a 155 °F (68 °C) temperature rating = Part No. 12979AB

**Available Finishes And Temperature Ratings:** Refer to Table 1.

**Accessories:** (Also refer to the current Viking price list.)



## TECHNICAL DATA

### MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: [www.vikinggroupinc.com](http://www.vikinggroupinc.com)

#### Sprinkler Wrenches:

- A. Standard Wrench: Part No. 10896WB (available since 2000).
- B. Wrench for Recessed Pendent Sprinklers: Part No. 13655WB\*\* (available since 2006)
- C. Optional Protective Sprinkler Cap Remover/Escutcheon Installer Tool\*\*\* Part No. 15915 (available since 2010)

\*\*A ½" ratchet is required (not available from Viking).

\*\*\*Allows use from the floor by attaching a length of 1" diameter CPVC tubing to the tool. Ideal for sprinkler cabinets. Refer to Bulletin F\_051808.

#### Sprinkler Cabinets:

- A. Six-head capacity: Part No. 01724A (available since 1971)
- B. Twelve-head capacity: Part No. 01725A (available since 1971)

#### 4. INSTALLATION

Refer to appropriate NFPA Installation Standards.

#### 5. OPERATION

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

#### 6. INSPECTIONS, TESTS AND MAINTENANCE

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

#### 7. AVAILABILITY

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

#### 8. GUARANTEE

For details of warranty, refer to Viking's current list price schedule or contact Viking directly.

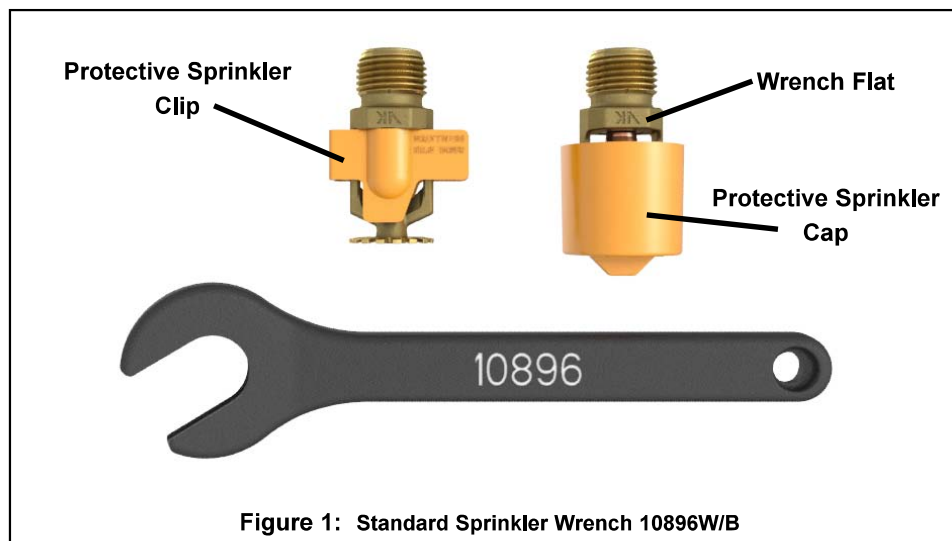


Figure 1: Standard Sprinkler Wrench 10896WB



**TECHNICAL DATA**

**MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com  
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

**TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES**

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating <sup>1</sup>	Maximum Ambient Ceiling Temperature <sup>2</sup>	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

**Sprinkler Finishes:** Brass, Chrome, White Polyester, Black Polyester, and ENT

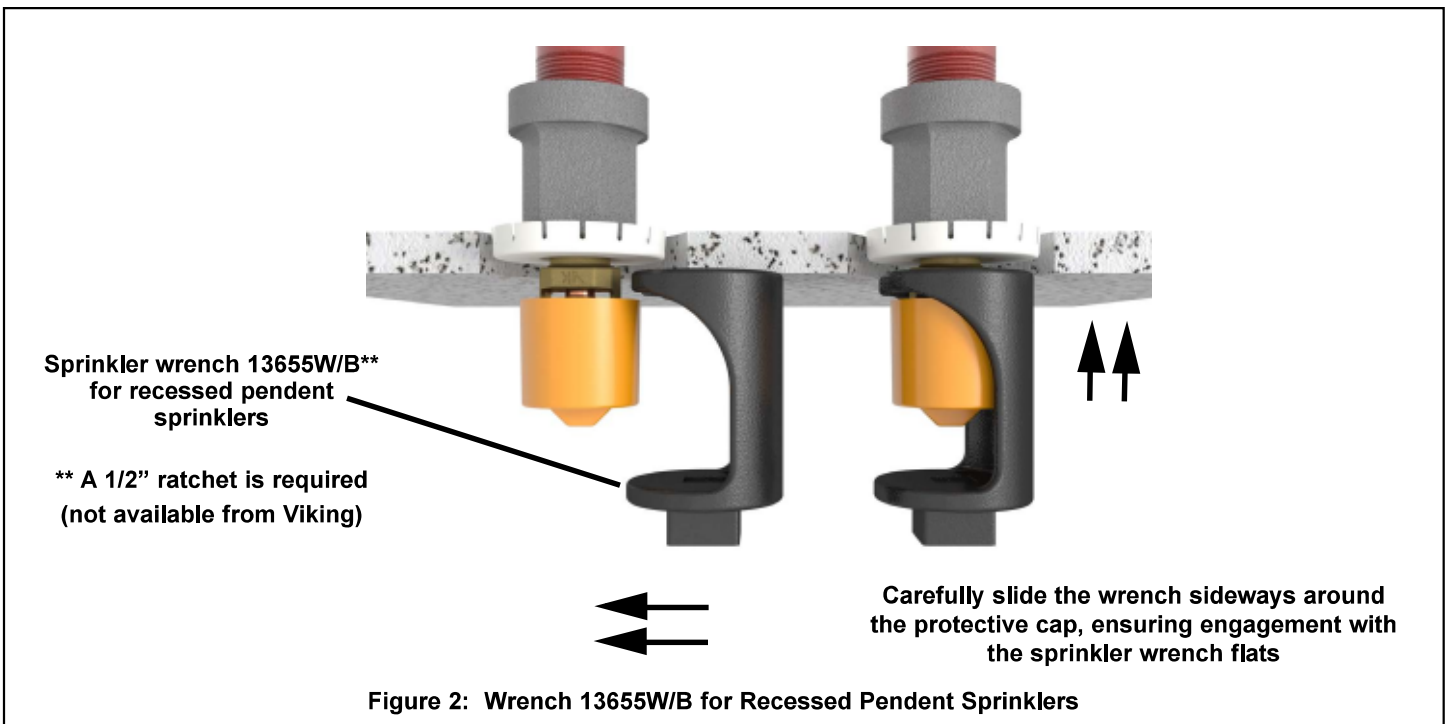
**Corrosion-Resistant Coatings<sup>3</sup>:** White Polyester, and Black Polyester. ENT in all temperature ratings except 135 °F (57 °C)

**Footnotes**

<sup>1</sup> The sprinkler temperature rating is stamped on the deflector.

<sup>2</sup> Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

<sup>3</sup> The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester and ENT coatings. For ENT coated automatic sprinklers, the waterway is coated.



**Figure 2: Wrench 13655W/B for Recessed Pendent Sprinklers**

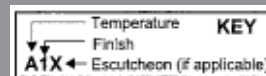


## TECHNICAL DATA

## MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com  
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

### Approval Chart 1 (UL) The Viking Microfast® Quick Response Pendent Sprinkler VK302 Maximum 175 PSI (12 Bar) WWP



Base Part Number <sup>1</sup>	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals <sup>3</sup> (Refer also to Design Criteria.)					
			NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	cULus <sup>4</sup>	VdS	LPCB	CE <sup>7</sup>	⚙️	CCC
12979	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2, C2X	A1	A1Z, B1Y	D1Z, C1Y	--	--
19780	VK302	Pendent	1/2"	--	5.6	80.6	2-1/4	58	--	--	--	--	--	D3
21354	VK302	Pendent	--	15 mm	5.6	80.6	2-1/4	58	--	--	--	--	--	D3

#### NOTICE - Product Below - Limited Availability (Contact Local Viking Office)

06662B	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2, C2X	--	--	--	--	--
18021	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1X, B1Y	A1	A1X, B1Y	D1X, C1Y <sup>8</sup>	D1X, C1Y <sup>9</sup>	--

#### Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)  
 B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)  
 C - 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C)  
 D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C)

#### Approved Finishes

1 - Brass, Chrome, White Polyester<sup>5,6</sup>, Black Polyester<sup>5,6</sup>  
 2 - ENT<sup>5</sup>  
 3 - Chrome

#### Approved Escutcheons

X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon  
 Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1, E-2, or E-3 Recessed Escutcheon  
 Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon

#### Footnotes

- <sup>1</sup> Base part number shown. For complete part number, refer to Viking's current price schedule.
- <sup>2</sup> Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.
- <sup>3</sup> This table shows the listings and approvals available at the time of printing. Other approvals may be in process.
- <sup>4</sup> Listed by Underwriters Laboratories Inc. for use in the U.S. and Canada.
- <sup>5</sup> cULus Listed as corrosion-resistant.
- <sup>6</sup> Other colors are available on request with the same Listings and Approvals as the standard colors.
- <sup>7</sup> CE Certified, Standard EN 12259-1, EC-certificate of conformity 0832-CPD-2001.
- <sup>8</sup> CE Certified, Standard EN 12259-1, EC-certificates of conformity 0832-CPD-2001 and 0832-CPD-2003.
- <sup>9</sup> MED Certified, Standard EN 12259-1, EC-certificates of conformity 0832-MED-1003 and 0832-MED-1008.

### DESIGN CRITERIA - UL (Also refer to Approval Chart 1 above.)

#### cULus Listing Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is cULus Listed as indicated in the Approval Chart for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray pendent sprinklers must be followed.

**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to Form No. F\_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.**

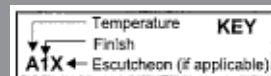


## TECHNICAL DATA

## MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com  
 Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com

<b>Approval Chart 2 (FM)</b> The Viking Microfast® Quick Response Pendent Sprinkler VK302 Maximum 175 PSI (12 Bar) WWP									
Base Part Number <sup>1</sup>	SIN	Sprinkler Style	Thread Size		Nominal K-Factor		Overall Length		FM Approvals <sup>3</sup> (Refer also to Design Criteria.)
			NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	
12979	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2X, C2
<b>NOTICE - Product Below - Limited Availability (Contact Local Viking Office)</b>									
06662B	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y, D2X, C2
18021	VK302	Pendent	1/2"	15 mm	5.6	80.6	2-1/4	58	A1Z, B1Y
<b>Approved Temperature Ratings</b> A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C) B - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), and 200 °F (93 °C) C - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), 286 °F (141 °C) D - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C)				<b>Approved Finishes</b> 1 - Brass, Chrome, White Polyester <sup>4</sup> , and Black Polyester <sup>4</sup> 2 - ENT <sup>5</sup>			<b>Approved Escutcheons</b> X - Standard surface-mounted escutcheon or the Viking Micromatic® Model E-1 Recessed Escutcheon Y - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon, or recessed with the Viking Micromatic® Model E-1 or E-2 Recessed Escutcheon Z - Standard surface-mounted escutcheon or the Viking Microfast® Model F-1 Adjustable Escutcheon		
<b>Footnotes</b>									
<sup>1</sup> Base part number shown. For complete part number, refer to Viking's current price schedule. <sup>2</sup> Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0. <sup>3</sup> This table shows the FM Approvals available at the time of printing. Other approvals may be in process. <sup>4</sup> Other colors are available on request with the same Approvals as the standard colors. <sup>5</sup> FM approved as corrosion resistant.									



## DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

### FM Approval Requirements:

The Viking Microfast® Quick Response Pendent Sprinkler VK302 is FM Approved as quick response **Non-storage** pendent sprinklers as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

**NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.**

**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to page F\_080614 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.**



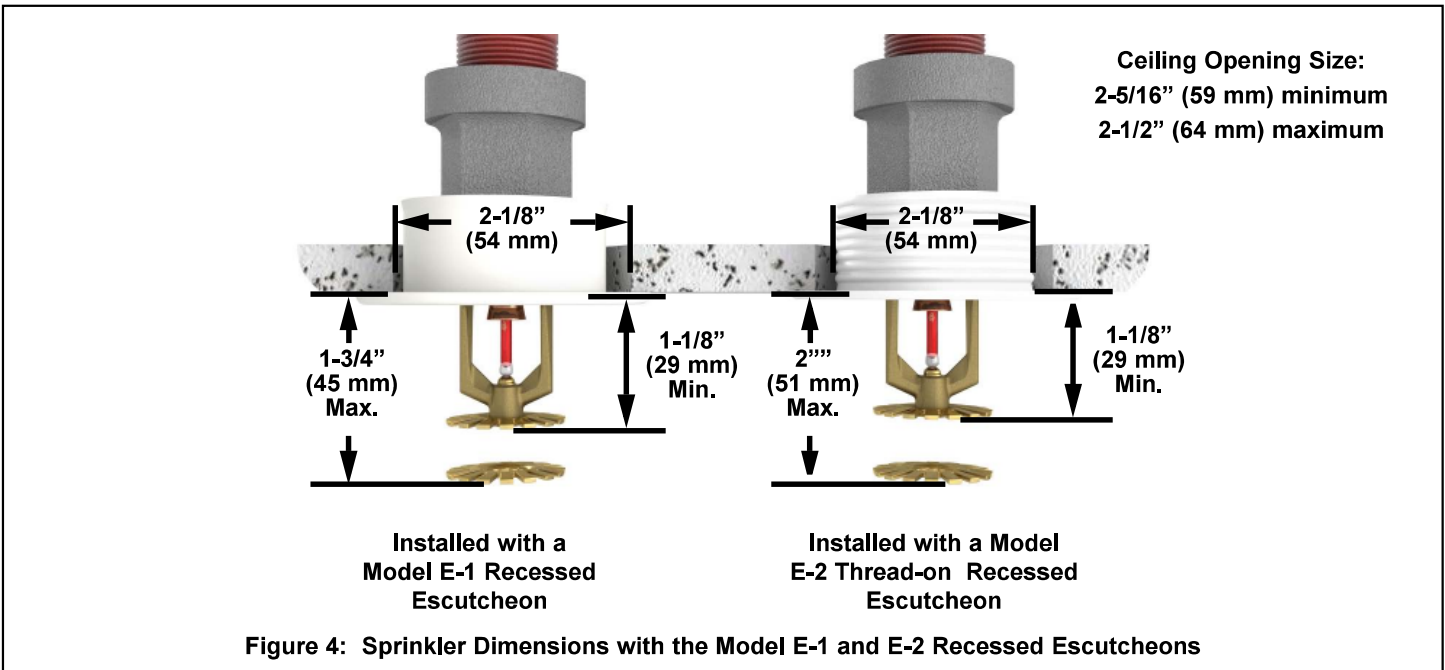
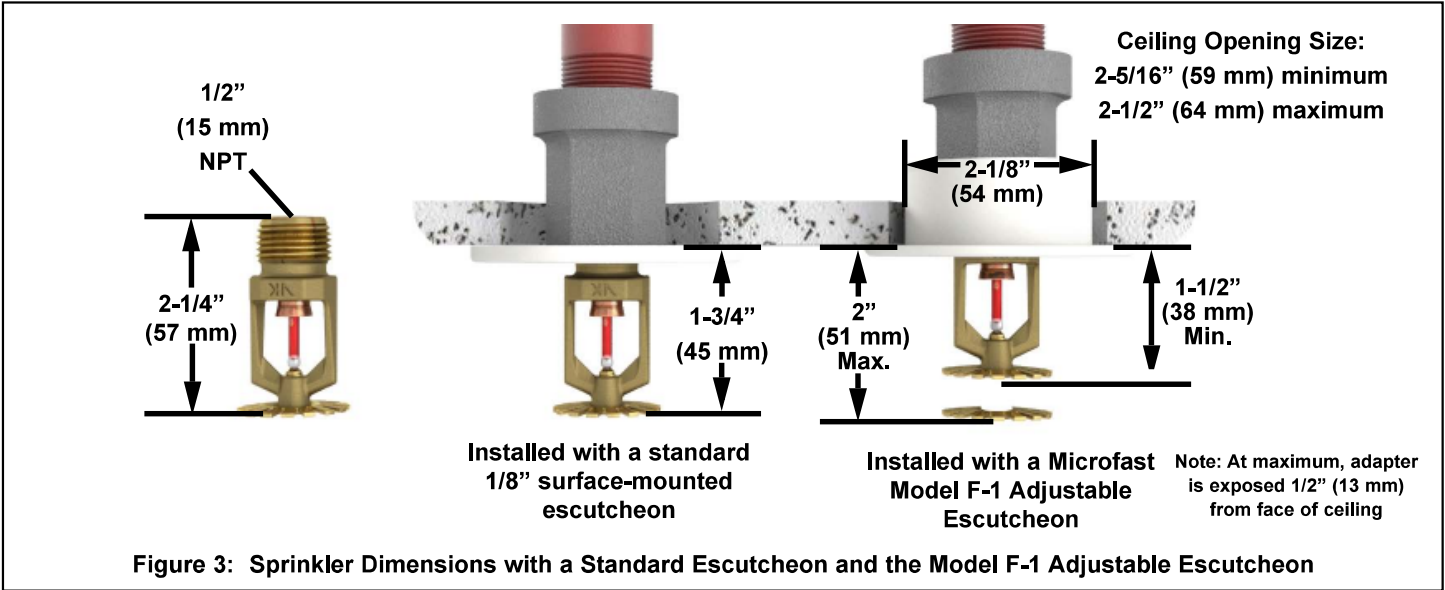
**TECHNICAL DATA**

**MICROFAST® QUICK RESPONSE PENDENT SPRINKLER VK302 (K5.6)**

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

Visit the Viking website for the latest edition of this technical data page: www.vikinggroupinc.com





## TECHNICAL DATA

### MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058

Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

#### 1. DESCRIPTION

The Viking Microfast® Quick Response Upright Sprinkler VK300 is a small, thermosensitive, glass-bulb spray sprinkler available in several different finishes and temperature ratings to meet design requirements. The special Polyester and Electroless Nickel PTFE (ENT) coatings can be used in decorative applications where colors are desired. In addition, these coatings have been investigated for installation in corrosive atmospheres and are listed/approved as corrosion resistant as indicated in the Approval Charts. (Note: **FM global approves the ENT coating as corrosion resistant.** FM Global has no approval classification Polyester coatings as corrosion resistant.)



#### 2. LISTINGS AND APPROVALS



cULus Listed: Category VNIV

FM Approved: Classes 2002 and 2020

Refer to Approval Chart 1 and Design Criteria on for cULus Listing requirements and refer to Approval Chart 2 and Design Criteria FM Approval requirements that must be followed.

#### 3. TECHNICAL DATA

##### Specifications:

Minimum Operating Pressure: 7 psi (0.5 bar)\*  
 Maximum Working Pressure: 175 psi (12 bar) wwp.  
 Factory tested hydrostatically to 500 psi (34.5 bar)  
 Testing: U.S.A. Patent No. 4,831,870  
 Thread size: 1/2" NPT, 15 mm BSP  
 Nominal K-Factor: 5.6 U.S. (80.6 metric\*\*)  
 Glass-bulb fluid temperature rated to -65 °F (-55 °C)  
 Overall Length: 2-3/16" (56 mm)

\*cULus Listing, FM Approval, and NFPA 13 installs require a minimum of 7 psi (0.5 bar). The minimum operating pressure for LPCB and CE Approvals ONLY is 5 psi (0.35 bar).

##### Material Standards:

Frame Casting: Brass UNS-C84400 or QM Brass  
 Deflector: Brass UNS-C23000 or Copper UNS-C19500  
 Bulb: Glass, nominal 3 mm diameter  
 Belleville Spring Sealing Assembly: Nickel Alloy, coated on both sides with PTFE Tape  
 Screw: Brass UNS-C36000  
 Pip Cap and Insert Assembly: Copper UNS-C11000 and Stainless Steel UNS-S30400

For Polyester Coated Sprinklers: Belleville Spring-Exposed

For ENT Coated Sprinklers: Belleville Spring-Exposed, Screw and Pipcap - ENT plated

**Ordering Information:** (Also refer to the current Viking price list.)

Order Viking Microfast® Quick Response Upright Sprinkler VK300 by first adding the appropriate suffix for the sprinkler finish and then the appropriate suffix for the temperature rating to the sprinkler base part number.

Finish Suffix: Brass = A, Chrome = F, White Polyester = M-/W, Black Polyester = M-/B, and ENT = JN  
 Temperature Suffix (°F/°C): 135°/57° = A, 155°/68° = B, 175°/79° = D, 200°/93° = E, and 286°/141° = G

For example, sprinkler VK300 with a 1/2" NPT thread, Brass finish and a 155 °F/68 °C temperature rating = Part No. 12978AB

**Available Finishes And Temperature Ratings:** Refer to Table 1.

**Accessories:** (Also refer to the "Sprinkler Accessories" section of the Viking data book.)

**Sprinkler Wrench:** Standard Wrench: Part No. 10896W/B (available since 2000)

##### Sprinkler Cabinets:

A. Six-head capacity: Part No. 01724A (available since 1971)  
 B. Twelve-head capacity: Part No. 01725A (available since 1971)

Viking Technical Data may be found on  
 The Viking Corporation's Web site at  
<http://www.vikinggroupinc.com>.  
 The Web site may include a more recent  
 edition of this Technical Data Page.

#### 4. INSTALLATION

Refer to appropriate NFPA Installation Standards.



	<b>TECHNICAL DATA</b>	<b>MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)</b>
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The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

**5. OPERATION**

During fire conditions, the heat-sensitive liquid in the glass bulb expands, causing the glass to shatter, releasing the pip cap and sealing spring assembly. Water flowing through the sprinkler orifice strikes the sprinkler deflector, forming a uniform spray pattern to extinguish or control the fire.

**6. INSPECTIONS, TESTS AND MAINTENANCE**

Refer to NFPA 25 for Inspection, Testing and Maintenance requirements.

**7. AVAILABILITY**

The Viking Microfast® Quick Response Upright Sprinkler VK300 is available through a network of domestic and international distributors. See The Viking Corporation web site for the closest distributor or contact The Viking Corporation.

**8. GUARANTEE**

For details of warranty, refer to Viking’s current list price schedule or contact Viking directly.

**TABLE 1: AVAILABLE SPRINKLER TEMPERATURE RATINGS AND FINISHES**

Sprinkler Temperature Classification	Sprinkler Nominal Temperature Rating <sup>1</sup>	Maximum Ambient Ceiling Temperature <sup>2</sup>	Bulb Color
Ordinary	135 °F (57 °C)	100 °F (38 °C)	Orange
Ordinary	155 °F (68 °C)	100 °F (38 °C)	Red
Intermediate	175 °F (79 °C)	150 °F (65 °C)	Yellow
Intermediate	200 °F (93 °C)	150 °F (65 °C)	Green
High	286 °F (141 °C)	225 °F (107 °C)	Blue

**Sprinkler Finishes:** Brass, Chrome, White Polyester, Black Polyester, and ENT

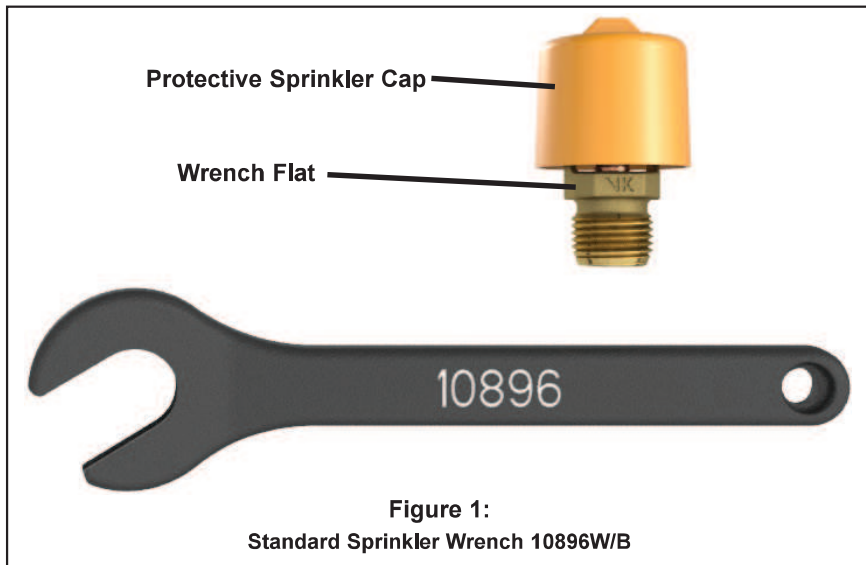
**Corrosion-Resistant Coatings<sup>3</sup>:** White Polyester, Black Polyester, and Black PTFE. ENT in all temperature ratings except 135 °F (57 °C)

**Footnotes**

<sup>1</sup> The sprinkler temperature rating is stamped on the deflector.

<sup>2</sup> Based on NFPA-13. Other limits may apply, depending on fire loading, sprinkler location, and other requirements of the Authority Having Jurisdiction. Refer to specific installation standards.

<sup>3</sup> The corrosion-resistant coatings have passed the standard corrosion test required by the approving agencies indicated in the Approval Charts. These tests cannot and do not represent all possible corrosive environments. Prior to installation, verify through the end-user that the coatings are compatible with or suitable for the proposed environment. For automatic sprinklers, the coatings indicated are applied to the exposed exterior surfaces only. Note that the spring is exposed on sprinklers with Polyester, ENT, and PTFE coatings. For ENT coated automatic sprinklers, the waterway is coated.



**Figure 1:  
Standard Sprinkler Wrench 10896WB**



## TECHNICAL DATA

## MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

### Approval Chart 1 (UL)

Microfast® Quick Response  
 Upright Sprinkler VK300  
 Maximum 175 PSI (12 bar) WWP

KEY	
Temperature	↓
Finish	←
A1X ← Escutcheon (if applicable)	

Base Part Number <sup>1</sup>	SIN	Thread Size		Nominal K-Factor		Overall Length		Listings and Approvals <sup>3</sup>				
		NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	cULus	VdS	LPCB	NYC <sup>8</sup>	CE
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2	--	--	See footnote 7.	--

**NOTICE - Product Below - Limited Availability (Contact Local Viking Office)**

06661B	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2	--	--	See footnote 7.	--
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#### Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

#### Approved Finishes

1 - Brass, Chrome, White Polyester<sup>5,6</sup>, and Black Polyester<sup>5,6</sup>  
 2 - ENT<sup>6</sup>

#### Footnotes

<sup>1</sup> Base part number is shown. For complete part number, refer to Viking's current price schedule.

<sup>2</sup> Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.

<sup>3</sup> This table shows the listings and approvals available at the time of printing. Check with the manufacturer for any additional approvals.

<sup>4</sup> Listed by Underwriters Laboratories Inc. for us in the U.S. and Canada

<sup>5</sup> Other colors are available on request with the same Listings and Approvals as the standard colors.

<sup>6</sup> cULus Listed as corrosion resistant.

<sup>7</sup> Meets New York City requirements, effective July 1, 2008

<sup>8</sup> Accepted for use, City of New York Board of Standards and Appeals, Calendar Number 219-76-SA and City of New York Department of Buildings, MEA 89-92-E, Vol. 16.

### DESIGN CRITERIA - UL

(Also refer to Approval Chart 1 above.)

#### cULus Listing Requirements:

The Viking Microfast® Quick Response Upright Sprinkler VK300 is cULus Listed as indicated in Approval Chart 1 for installation in accordance with the latest edition of NFPA 13 for standard spray sprinklers.

- Designed for use in Light and Ordinary Hazard occupancies.
- The sprinkler installation rules contained in NFPA 13 for standard spray upright sprinklers must be followed.

**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.**



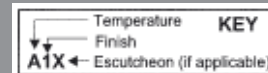
## TECHNICAL DATA

## MICROFAST® QUICK RESPONSE UPRIGHT SPRINKLER VK300 (K5.6)

The Viking Corporation, 210 N Industrial Park Drive, Hastings MI 49058  
 Telephone: 269-945-9501 Technical Services: 877-384-5464 Fax: 269-818-1680 Email: techsvcs@vikingcorp.com

### Approval Chart 2 (FM)

Microfast® Quick Response  
 Upright Sprinkler VK300  
 Maximum 175 PSI (12 bar) WWP



Base Part Number <sup>1</sup>	SIN	Thread Size		Nominal K-Factor		Overall Length		FM Approvals <sup>3</sup> (Refer also to Design Criteria below.)
		NPT	BSP	U.S.	metric <sup>2</sup>	Inches	mm	
12978	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2

**NOTICE - Product Below - Limited Availability (Contact Local Viking Office)**

06661B	VK300	1/2"	15 mm	5.6	80.6	2-3/16	56	A1, B2
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#### Approved Temperature Ratings

A - 135 °F (57 °C), 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)  
 B - 155 °F (68 °C), 175 °F (79 °C), 200 °F (93 °C), and 286 °F (141 °C)

#### Approved Finishes

1 - Brass, Chrome, White Polyester<sup>5</sup>, and Black Polyester<sup>5</sup>  
 2 - ENT<sup>6</sup>

#### Footnotes

- <sup>1</sup> Base part number is shown. For complete part number, refer to Viking's current price schedule.  
<sup>2</sup> Metric K-factor measurement shown is when pressure is measured in Bar. When pressure is measured in kPa, divide the metric K-factor shown by 10.0.  
<sup>3</sup> This table shows the FM Approvals available at the time of printing. Check with the manufacturer for any additional approvals.  
<sup>5</sup> Other colors are available on request with the same Approvals as the standard colors.  
<sup>6</sup> FM approved as corrosion resistant.

### DESIGN CRITERIA - FM

(Also refer to Approval Chart 2 above.)

#### FM Approval Requirements:

The Microfast® Quick Response Upright Sprinkler VK300 is FM Approved as a quick response **Non-Storage** upright sprinkler as indicated in the FM Approval Guide. For specific application and installation requirements, reference the latest applicable FM Loss Prevention Data Sheets (including Data Sheet 2-0). FM Global Loss Prevention Data Sheets contain guidelines relating to, but not limited to: minimum water supply requirements, hydraulic design, ceiling slope and obstructions, minimum and maximum allowable spacing, and deflector distance below the ceiling.

**NOTE: The FM installation guidelines may differ from cULus and/or NFPA criteria.**

**IMPORTANT: Always refer to Bulletin Form No. F\_091699 - Care and Handling of Sprinklers. Also refer to page QR1-3 for general care, installation, and maintenance information. Viking sprinklers are to be installed in accordance with the latest edition of Viking technical data, the appropriate standards of NFPA, FM Global, LPCB, APSAD, VdS or other similar organizations, and also with the provisions of governmental codes, ordinances, and standards, whenever applicable.**



**UL, ULC, and FM Approved**

**Sizes Available:** 6" (150mm), 8" (200mm) and 10" (250mm)

**Voltages Available:** 24VAC  
120VAC  
12VDC (10.2 to 15.6) Polarized  
24VDC (20.4 to 31.2) Polarized

**Service Use:** Fire Alarm  
General Signaling  
Burglar Alarm

**Environment:** Indoor or outdoor use (See Note 1)  
-40° to 150°F (-40° to 66°C)  
(Outdoor use requires weatherproof backbox.)

**Termination:** AC Bells - 4 No. 18 AWG stranded wires  
DC Bells - Terminal strip

**Finish:** Red powder coating

**Optional:** Model BBK-1 weatherproof backbox  
Model BBX-1 deep weatherproof backbox

These vibrating type bells are designed for use as fire, burglar or general signaling devices. They have low power consumption and high decibel ratings. The unit mounts on a standard 4" (101mm) square electrical box for indoor use or on a model BBK-1 weatherproof backbox or BBX-1 deep weatherproof backbox for outdoor applications. Weatherproof backbox model BBK-1, Stock No. 1500001.

**Notes:**

1. Minimum dB ratings are calculated from integrated sound pressure measurements made at Underwriters Laboratories as specified in UL Standard 464. UL temperature range is -30° to 150°F (-34° to 66°C).
2. Typical dB ratings are calculated from measurements made with a conventional sound level meter and are indicative of output levels in an actual installation.
3. ULC only applies to MBA DC bells.

Size inches (mm)	Voltage	Model Number	Stock Number	Current (Max.)	Typical dB at 10 ft. (3m) (2)	Minimum dB at 10 ft. (3m) (1)
6 (150)	12VDC	MBA-6-12	1750070	.12A	85	76
8 (200)	12VDC	MBA-8-12	1750080	.12A	90	77
10 (250)	12VDC	MBA-10-12	1750060	.12A	92	78
6 (150)	24VDC	MBA-6-24	1750100	.06A	87	77
8 (200)	24VDC	MBA-8-24	1750110	.06A	91	79
10 (250)	24VDC	MBA-10-24	1750090	.06A	94	80
6 (150)	24VAC	PBA246	1806024*	.17A	91	78
8 (200)	24VAC	PBA248	1808024*	.17A	94	77
10 (250)	24VAC	PBA2410	1810024*	.17A	94	78
6 (150)	120VAC	PBA1206	1806120*	.05A	92	83
8 (200)	120VAC	PBA1208	1808120*	.05A	99	84
10 (250)	120VAC	PBA12010	1810120*	.05A	99	86

All DC bells are polarized and have built-in transient protection.

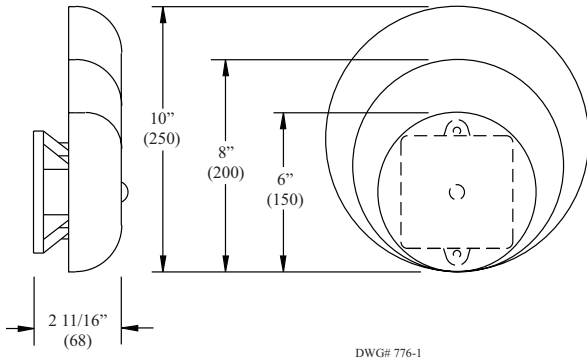
\* Does not have ULC listing.

**WARNING**

In outdoor or wet installations, bell must be mounted with weatherproof backbox, BBK-1 or BBX-1. Standard electrical boxes will not provide a weatherproof enclosure. If the bell and/or assembly is exposed to moisture, it may fail or create an electrical hazard.

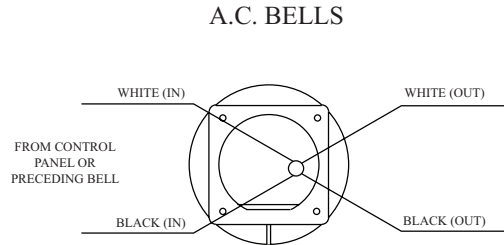
**Bells Dimensions Inches (mm)**

Fig. 1



**Wiring (rear view)**

Fig. 3



**CAUTION:**  
WHEN ELECTRICAL SUPERVISION IS REQUIRED USE IN AND OUT LEADS AS SHOWN.

**NOTES:**

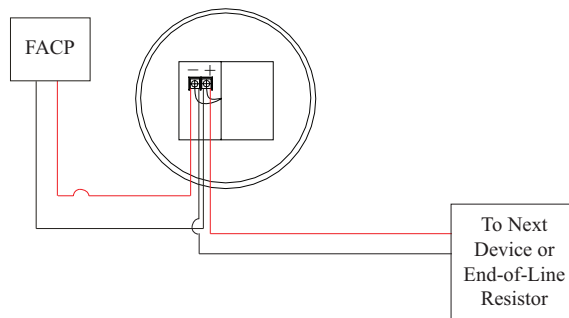
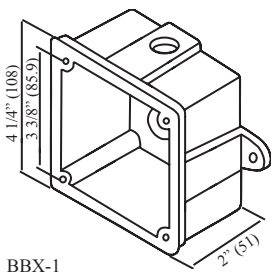
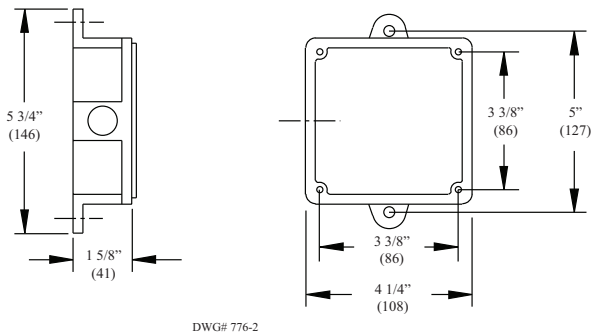
1. WHEN USING AC BELLS, TERMINATE EACH EXTRA WIRE SEPARATELY AFTER LAST BELL.
2. END-OF-LINE RESISTOR IS NOT REQUIRED ON AC BELLS.

DWG# 776-3

**Weatherproof Backbox Dimensions Inches (mm)**

Fig. 2

Box has one threaded 1/2" conduit entrance



**Installation**

1. The bell shall be installed in accordance with NFPA 13, 72, or local AHJ. The top of the device shall be no less than 90" AFF and not less than 6" below the ceiling.
2. Remove the gong.
3. Connect wiring (see Fig. 3).
4. Mount bell mechanism to backbox (bell mechanism must be mounted with the striker pointing down).
5. Reinstall the gong (be sure that the gong positioning pin, in the mechanism housing, is in the hole in the gong).
6. Test all bells for proper operation and observe that they can be heard where required (bells must be heard in all areas as designated by the authority having jurisdiction).

**⚠ WARNING**

Failure to install striker down will prevent bell from operating.

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION  
OFFICE OF THE STATE FIRE MARSHAL  
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM



# LISTING SERVICE

**LISTING No.** 7135-0328:0119

**CATEGORY:** 7135 -- AUDIBLE DEVICES

**LISTEE:** Potter Electric Signal Co 1609 Park 370 Place, Hazelwood, 63042 United States  
Contact: Bill Witherspoon (314) 595-6900 Fax (314) 595-6999  
Email: BillW@pottersignal.com

**DESIGN:** Models SB624-153075, SB624-75110, PBA246, PBA248, PBA2410, PBA1206, PBA1208, PBA12010, \*PBD-126, \*PBD-128, \*PBD-1210, \*PBD-246, \*PBD-248, \* PBD-2410 vibrating bells. Suitable for outdoor use when used with Model BBK-1 backbox. Models are AC or DC powered and available in 6", 8" and 10". Models MBA-6, -8 and -10 bells, suitable for outdoor use when used with Model BBX-1 backbox. Refer to listee's data sheet for detailed product description and operational considerations.

**RATING:** PBA-246, -248, -2410: 24 VAC  
PBA-1206, -1208, -12010: 120 VAC  
MBA-6, -8, -10: 12 or 24 VDC  
\*PBD-126, -128, -1210: 12VDC, .12A  
\*PBD-246, -248, -2410: 24VDC, .06A

**INSTALLATION:** In accordance with listee's printed installation instruction, applicable codes & ordinances, and in a manner acceptable to the authority having jurisdiction.

**MARKING:** Listee's name, model number and UL label.

**APPROVAL:** Listed as audible devices for use with separately listed compatible fire alarm control units. If this appliance is required to produce a distinctive three-pulse Temporal Pattern Fire Alarm Evacuation Signal (for total evacuation) in accordance with NFPA 72, 2002 Edition, the appliance must be used with a fire alarm control unit that can generate the temporal pattern signal. Refer to manufacturer's Installation Manual for details.

\*Revision 01-31-2017 dcc



This listing is based upon technical data submitted by the applicant. CSFM Fire Engineering staff has reviewed the test results and/or other data but does not make an independent verification of any claims. This listing is not an endorsement or recommendation of the item listed. This listing should not be used to verify correct operational requirements or installation criteria. Refer to listee's data sheet, installation instructions and/or other

Date Issued: **July 01, 2017**

*Listing Expires* **June 30, 2018**

Authorized By: **DAVID CASTILLO**, Program Coordinator  
*Fire Engineering Division*



Specifications subject to change without notice.

Ordering Information			
Nominal Pipe Size		Model	Part Number
2"	DN50	VSR-2	1144402
2 1/2"	DN65	VSR-2 1/2	1144425
3"	DN80	VSR-3	1144403
3 1/2"	-	VSR-3 1/2	1144435
4"	DN100	VSR-4	1144404
5"	-	VSR-5	1144405
6"	DN150	VSR-6	1144406
8"	DN200	VSR-8	1144408

**Optional:** Cover Tamper Switch Kit, stock no. 0090148

**Replaceable Components:** Retard/Switch Assembly, stock no. 1029030

**UL, CUL and CSFM Listed, FM Approved, LPCB Approved, For CE Marked (EN12259-5) / VdS Approved model use VSR-EU**

**Service Pressure:** 450 PSI (31 BAR) - UL

**Flow Sensitivity Range for Signal:**

4-10 GPM (15-38 LPM) - UL

**Maximum Surge:** 18 FPS (5.5 m/s)

**Contact Ratings:** Two sets of SPDT (Form C)

10.0 Amps at 125/250VAC

2.0 Amps at 30VDC Resistive

10 mAmps min. at 24VDC

**Conduit Entrances:** Two knockouts provided for 1/2" conduit.

Individual switch compartments suitable for dissimilar voltages.

**Environmental Specifications:**

- NEMA 4/IP54 Rated Enclosure suitable for indoor or outdoor use with factory installed gasket and die-cast housing when used with appropriate conduit fitting.
- Temperature Range: 40°F - 120°F, (4.5°C - 49°C) - UL
- Non-corrosive sleeve factory installed in saddle.

**Service Use:**

Automatic Sprinkler

NFPA-13

One or two family dwelling

NFPA-13D

Residential occupancy up to four stories

NFPA-13R

National Fire Alarm Code

NFPA-72

### **⚠ WARNING**

- Installation must be performed by qualified personnel and in accordance with all national and local codes and ordinances.
- Shock hazard. Disconnect power source before servicing. Serious injury or death could result.
- Risk of explosion. Not for use in hazardous locations. Serious injury or death could result.

### **CAUTION**

Waterflow switches that are monitoring wet pipe sprinkler systems shall not be used as the sole initiating device to discharge AFFF, deluge, or chemical suppression systems. Waterflow switches used for this application may result in unintended discharges caused by surges, trapped air, or short retard times.

#### **General Information**

The Model VSR is a vane type waterflow switch for use on wet sprinkler systems. It is UL Listed and FM Approved for use on steel pipe; schedules 10 through 40, sizes 2" thru 8" (50 mm thru 200 mm). LPC approved sizes are 2" thru 8" (50 mm thru 200 mm). See Ordering Information chart.

The VSR may also be used as a sectional waterflow detector on large systems. The VSR contains two single pole, double throw, snap action switches and an adjustable, instantly recycling pneumatic retard. The switches are actuated when a flow of 10 GPM (38 LPM) or more occurs downstream of the device. The flow condition must exist for a period of time necessary to overcome the selected retard period.

#### **Enclosure**

The VSR switches and retard device are enclosed in a general purpose, die-cast housing. The cover is held in place with two tamper resistant screws which require a special key for removal. A field installable cover tamper switch is available as an option which may be used to indicate unauthorized removal of the cover. See bulletin number 5401103 for installation instructions of this switch.

### Installation (see Fig. 1)

These devices may be mounted on horizontal or vertical pipe. On horizontal pipe they shall be installed on the top side of the pipe where they will be accessible. The device should not be installed within 6" (15 cm) of a fitting which changes the direction of the waterflow or within 24" (60 cm) of a valve or drain.

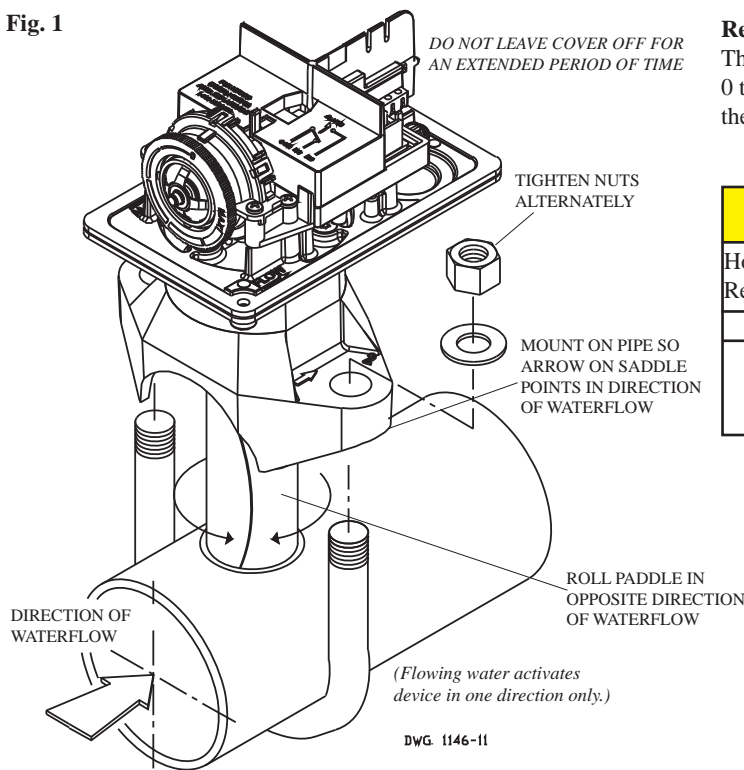
**NOTE:** Do not leave cover off for an extended period of time.

Drain the system and drill a hole in the pipe using a hole saw in a slow speed drill (see Fig. 1). Clean the inside pipe of all growth or other material for a distance equal to the pipe diameter on either side of the hole. Roll the vane so that it may be inserted into the hole; do not bend or crease it. Insert the vane so that the arrow on the saddle points in the direction of the waterflow. Take care not to damage the non-corrosive bushing in the saddle. The bushing should fit inside the hole in the pipe. Install the saddle strap and tighten nuts alternately to required torque (see the chart in Fig. 1). The vane must not rub the inside of the pipe or bind in any way.

**CAUTION**

Do not trim the paddle. Failure to follow these instructions may prevent the device from operating and will void the warranty.

Fig. 1



### Retard Adjustment

The delay can be adjusted by rotating the retard adjustment knob from 0 to the max setting (60-90 seconds). The time delay should be set at the minimum required to prevent false alarms

**CAUTION**

Hole must be drilled perpendicular to the pipe and vertically centered. Refer to the Compatible Pipe/Installation Requirements chart for size.

Correct	Incorrect

DN50 ONLY

USE (2) 5180162 ADAPTERS AS SHOWN ABOVE

DWG# 1146-1F

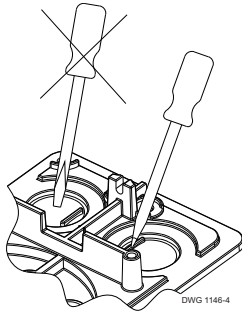
Compatible Pipe/ Installation Requirements																
Model	Nominal Pipe Size		Nominal Pipe O.D.		Pipe Wall Thickness								Hole Size		U-Bolt Nuts Torque	
	inch	mm	inch	mm	Schedule 10 (UL)		Schedule 40 (UL)		BS-1387 (LPC)		DN (VDS)		inch	mm	ft-lb	n-m
VSR-2	2	DN50	2.375	60.3	0.109	2.77	0.154	3.91	0.142	3.6	0.091	2.3	1.25 + .125/-0.062	33.0 ± 2.0	20	27
VSR-2 1/2	2.5	-	2.875	73.0	0.120	3.05	0.203	5.16	-	-	-	-				
VSR-2 1/2	-	DN65	3.000	76.1	-	-	-	-	0.142	3.6	0.102	2.6				
VSR-3	3	DN80	3.500	88.9	0.120	3.05	0.216	5.49	0.157	4.0	0.114	2.9	2.00 ± .125	50.8 ± 2.0		
VSR-3 1/2	3.5	-	4.000	101.6	0.120	3.05	0.226	5.74	-	-	-	-				
VSR-4	4	DN100	4.500	114.3	0.120	3.05	0.237	6.02	0.177	4.5	0.126	3.2				
VSR-5	5	-	5.563	141.3	0.134	3.40	0.258	6.55	-	-	-	-				
VSR-6	6	DN150	6.625	168.3	0.134	3.40	0.280	7.11	0.197	5.0	0.157	4.0				
VSR-8	8	DN200	8.625	219.1	0.148	3.76	0.322	8.18	0.248	6.3	0.177	4.5				

**NOTE:** For copper or plastic pipe use Model VSR-CF.



**Fig. 2**

To remove knockouts: Place screwdriver at inside edge of knockouts, not in the center.



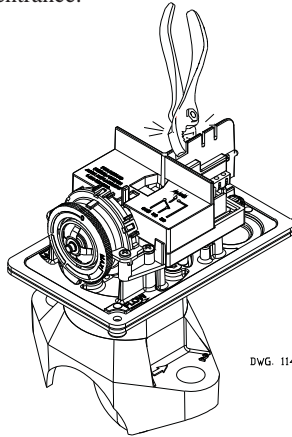
DWG. 1146-4

### NOTICE

Do not drill into the base as this creates metal shavings which can create electrical hazards and damage the device. Drilling voids the warranty.

**Fig. 3**

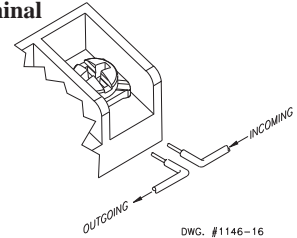
Break out thin section of cover when wiring both switches from one conduit entrance.



DWG. 1146-13

**Fig. 4**

Switch Terminal Connections Clamping Plate Terminal



DWG. #1146-16

### WARNING

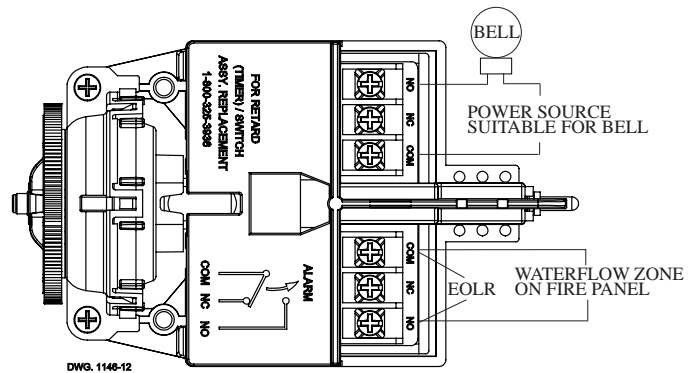
An uninsulated section of a single conductor should not be looped around the terminal and serve as two separate connections. The wire must be severed, thereby providing supervision of the connection in the event that the wire become dislodged from under the terminal. Failure to sever the wire may render the device inoperable risking severe property damage and loss of life.

Do not strip wire beyond 3/8" of length or expose an uninsulated conductor beyond the edge of the terminal block. When using stranded wire, capture all strands under the clamping plate.

**Fig. 5 Typical Electrical Connections**

#### Notes:

1. The Model VSR has two switches, one can be used to operate a central station, proprietary or remote signaling unit, while the other contact is used to operate a local audible or visual annunciator.
2. A condition of LPC Approval of this product is that the electrical entry must be sealed to exclude moisture.
3. For supervised circuits, see "Switch Terminal Connections" drawing and warning note (Fig. 4).



DWG. 1146-12

#### Testing

The frequency of inspection and testing for the Model VSR and its associated protective monitoring system shall be in accordance with applicable NFPA Codes and Standards and/or the authority having jurisdiction (manufacturer recommends quarterly or more frequently).

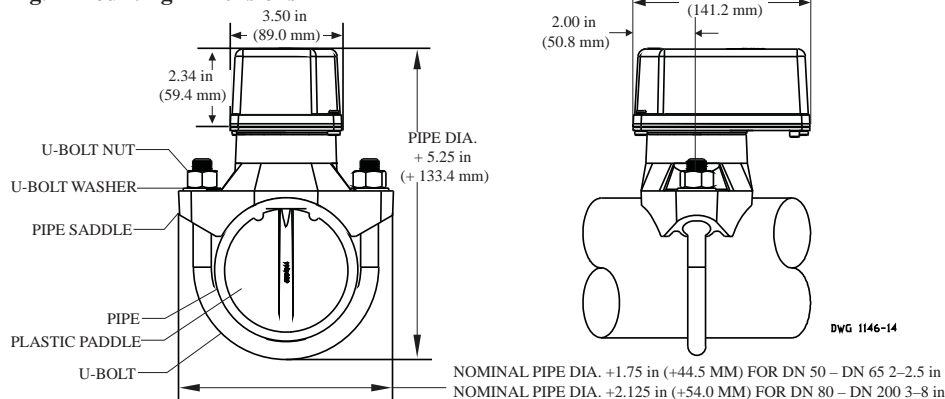
If provided, the inspector's test valve shall always be used for test purposes. If there are no provisions for testing the operation of the flow detection device on the system, application of the VSR is not recommended or advisable.

A minimum flow of 10 GPM (38 LPM) is required to activate this device.

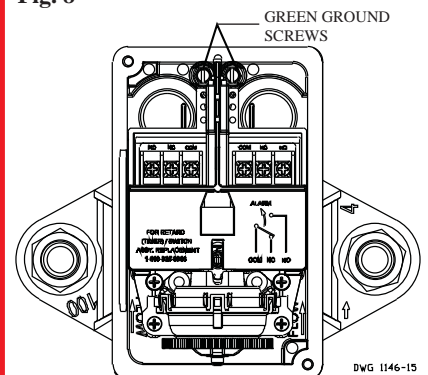
### NOTICE

Advise the person responsible for testing of the fire protection system that this system must be tested in accordance with the testing instructions.

**Fig. 7 Mounting Dimensions**



**Fig. 8**



DWG. 1146-15

**Maintenance**

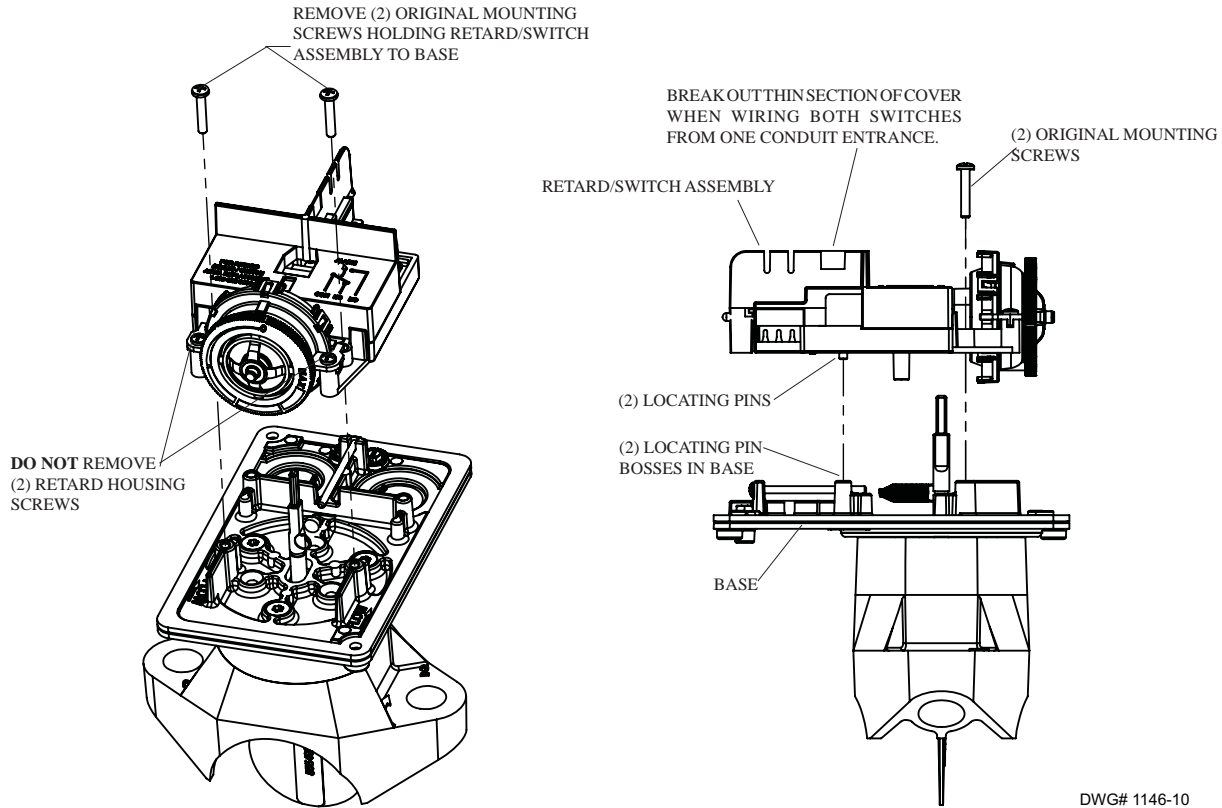
Inspect detectors monthly. If leaks are found, replace the detector. The VSR waterflow switch should provide years of trouble-free service. The retard and switch assembly are easily field replaceable. In the unlikely event that either component does not perform properly, please order replacement retard switch assembly stock #1029030 (see Fig. 6). There is no maintenance required, only periodic testing and inspection.

**Retard/Switch Assembly Replacement (See Fig. 6)**

**NOTICE** The Retard/Switch Assembly is field-replaceable without draining the system or removing the waterflow switch from the pipe

1. Make sure the fire alarm zone or circuit connected to the waterflow switch is bypassed or otherwise taken out of service.
2. Disconnect the power source for local bell (if applicable).
3. Identify and remove all wires from the waterflow switch.
4. Remove the (2) mounting screws holding retard/switch assembly to the base. **Do not** remove the (2) retard housing screws.
5. Remove the retard assembly by lifting it straight up over the tripstem.
6. Install the new retard assembly. Make sure the locating pins on the retard/switch assembly fit into the locating pin bosses on the base.
7. Re-install the (2) original mounting screws.
8. Reconnect all wires. Perform a flow test and place the system back in service.

**Fig. 6**



DWG# 1146-10

**Removal of Waterflow Switch**

- To prevent accidental water damage, all control valves should be shut tight and the system completely drained before waterflow detectors are removed or replaced.
- Turn off electrical power to the detector, then disconnect wiring.
- Loosen nuts and remove U-bolts.
- Gently lift the saddle far enough to get your fingers under it. With your fingers, roll the vane so it will fit through the hole while continuing to lift the waterflow detector saddle.
- Lift detector clear of pipe.

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION  
OFFICE OF THE STATE FIRE MARSHAL  
FIRE ENGINEERING - BUILDING MATERIALS LISTING PROGRAM



# LISTING SERVICE

**LISTING No.** 7770-0328:0001

Page 1 of 1

**CATEGORY:** 7770 -- VALVES/SWITCHES

**LISTEE:** Potter Electric Signal Co 1609 Park 370 Place, Hazelwood, 63042 United States  
Contact: Bill Witherspoon (314) 595-6900 Fax (314) 595-6999  
Email: BillW@pottersignal.com

**DESIGN:** Vane and pressure type water flow alarm switches listed below. Refer to listee's data sheet for detailed product description and operational considerations.

Vane Types:

VSR-CF	VSR-D	VSR-F	VSR-SF
VSR-FE-2	VS-SP	VS-F	VSR-SFG
VSR-SFT	VSG	VSR	VSR-S
VSR-C	VSR-ST	VSR-SG	

Pressure Type:

WFS-B	WFSR-C	WFSPD-B	PS10
PS-10A	PS-100A	WFSR-F	PS100

**INSTALLATION:** In accordance with listee's printed installation instructions, applicable codes and ordinances and in a manner acceptable to the authority having jurisdiction.

**MARKING:** Listee's name, model number and UL or FM label.

**APPROVAL:** Listed as waterflow alarm switches for use with fire sprinkler systems. Vane models may be used in wet pipe systems; pressure models may be used in wet or dry systems. Model VSR-CF is for use on K, L or M copper pipe (2", 2-1/2", 3", 4") and listed CPVC pipe (2", 2-1/2", 3"). Model VSR-SF for use on 1", 1-1/4", 1-1/2" and \*2" steel, copper or listed plastic pipe. Model VSG is for low flow rate. Model VSR-SFG and VSR-SFT are for use on 1", 1-1/4", 1-1/2" and \*2" plastic pipe. Models VS-F, VSR-F, VSR-FE and VSR-FE-2 is for use on 2", 2-1/2", 3", 3-1/2", 4", 5", 6", 8" and 10" pipe. \*Model VSR is for use on steel pipe sizes from 2" through 8". Vane type switches may be used outdoors when the outdoor temperature never falls below 40oF.

Rev\*5-17-2007 jw



This listing is based upon technical data submitted by the applicant. CSFM Fire Engineering staff has reviewed the test results and/or other data but does not make an independent verification of any claims. This listing is not an endorsement or recommendation of the item listed. This listing should not be used to verify correct operational requirements or installation criteria. Refer to listee's data sheet, installation instructions and/or other

Date Issued: **July 01, 2017**

Listing Expires **June 30, 2018**

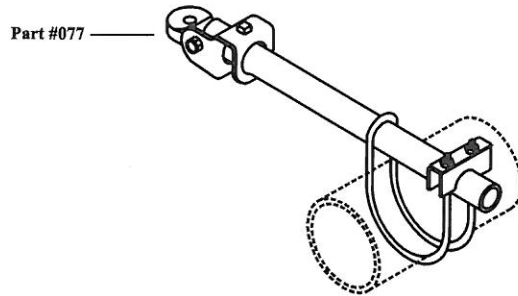
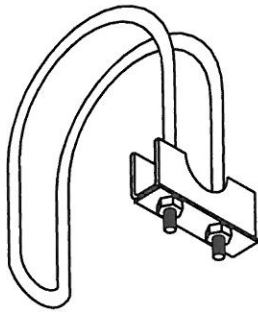
Authorized By: **DAVID CASTILLO, Program Coordinator**  
Fire Engineering Division



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001/020

### SWAY BRACE FITTING MODEL E



**SIZE - SYSTEM PIPE:** Nominal Pipe Size  
Steel 1" thru 4" Sch. 10 and Sch. 40  
**SIZE - BRACE PIPE:** 1" or 1 1/4" Sch. 40  
**MATERIAL -** Carbon Steel or S.S. (Type 304).  
**FINISH -** Plain or E.G.  
**LISTING/APPROVAL**

Horizontal Load Ratings			
Size	FM Sch. 10	FM Sch. 40	UL Sch. 10-40
1	250	1000	2015
1 1/4	250	1000	2015
1 1/2	250	1000	2015
2	1000	1300	2015
2 1/2	800	1300	2015
3	800	1300	2015
4	800	1500	2015

 203A-EX 2625  
 Listed only for use with *AFCON* products.  
 FM Approved  
OSHPD OPA-0601-07 See Website.

Special Note: Listed as restraint device on 1" thru 2" Allied Dynaflo per NFPA 13.

**FUNCTION -** Lateral fitting of an *AFCON* sway brace assembly.

Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**INSTALLATION -** Per these instructions including NFPA 13 and 13R.

**Load rating -** see chart.

Align brace pipe perpendicular to system pipe.

**ASSEMBLY -** See drawing.

Combine with proper *AFCON* components.

Insert brace pipe through rod bend and under channel bracket to achieve minimum 1" extension.

Tighten hex nuts until gage spring lays flat or torque to 65 in.-lbs.

**FEATURES**

\* Visual inspection, verifies proper installation.

**ORDERING -** Part #, size - system pipe, size - brace pipe and finish.



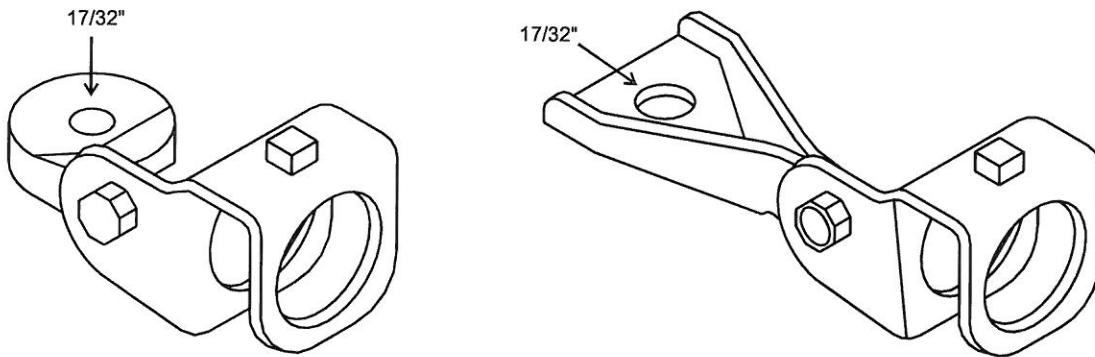
Specific *AFCON* products are exclusively designed to be compatible **ONLY** with other *AFCON* products including parts and fasteners, resulting in a listed sway brace, restrainer or hanger assembly. Be advised the following warranty restriction will apply. **DISCLAIMER -** *AFCON* will **NOT** warrant against the failure of its products when used in combination with other products, parts or systems not manufactured or sold by *AFCON*. *AFCON* shall **NOT** be liable under any circumstances whatsoever for any direct or indirect, incidental or consequential damages of any kind, including but not limited to loss of business or profit, when non-*AFCON* products have been, or are used.



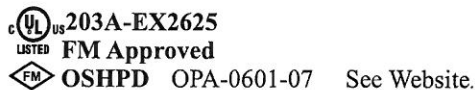
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077

## ATTACHMENT FITTING LOCKING



**SIZE - BRACE PIPE** - 1" and 1 1/4" Sch. 40  
**MATERIAL** - Carbon Steel, Ductile Iron or S.S. (Type 304).  
**FINISH** - Plain or E.G.  
**LISTING/APPROVAL** -



**FUNCTION** - Structure attachment fitting of an *AFCON* sway brace assembly.  
 Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**INSTALLATION** - Per these instructions including NFPA 13 and 13R.

**Load rating** - see chart.

The required type, number and size of fasteners used to structure attachment fitting shall be in accordance with NFPA 13.

### ASSEMBLY

Combine with proper *AFCON* components.  
 Insert brace pipe into fitting against the pivot bolt.  
 Tighten set bolt until head contacts bracket.  
 Torque pivot bolt to 40 ft. lbs.

### FEATURES

- \* Swivel allows attachment at any angle.
- \* Visual inspection, verifies proper installation.
- \* Larger fastener hole available.- Consult factory.

**ORDERING** - Part #, pipe size and finish.

Horizontal Load Ratings		
Base Material	FM	UL
Ductile	1500	2015
Steel	---	2015

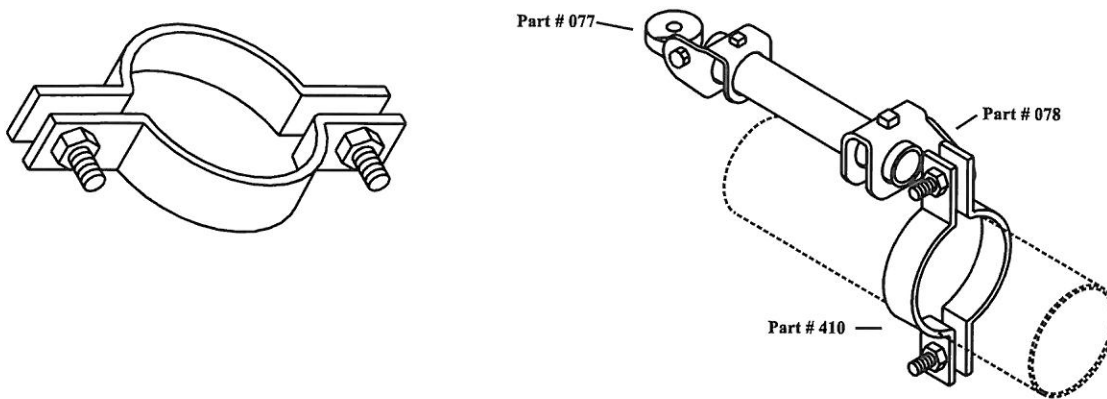
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410

## SWAY BRACE FITTING




**SIZE - SYSTEM PIPE:** Nominal Pipe Size  
**Sch. 40 Steel** 1" thru 8"  
**Sch. 10 Steel** 1 1/4" thru 8"

**MATERIAL** - Carbon Steel

**FINISH** - Plain or E.G.

**LISTING/APPROVAL** -

 **203A-EX 2625**  
**203-EX 2551 (4"-8" Only)**

**Listed only for use with other AFCON bracing products.**

**OSHDP OPA-0601 See Website.**

Horizontal Load Ratings	
Size	UL
1" - 4"	1000
6" - 8"	2015

**FUNCTION** - Longitudinal fitting of an *AFCON* sway brace assembly.

Sway brace assemblies are intended to be installed in accordance with NFPA 13 and the manufacturer's installation instructions.

**INSTALLATION** - Per NFPA 13 and these instructions.

**Load rating** - see chart.

Align brace pipe parallel to system pipe.

**ASSEMBLY** - See drawing.

Combine with proper *AFCON* components.

Tighten bolts to minimum required torque of 40 ft. lbs.

*078 is a preferred assembly component.*

**ORDERING** - Part #, pipe size and finish.



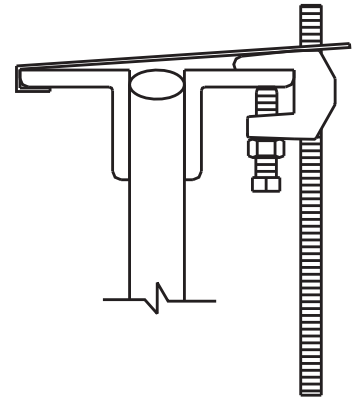
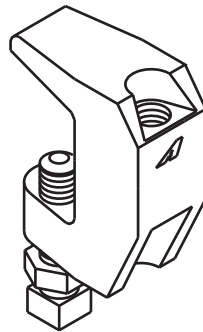
Specific *AFCON* products are exclusively designed to be compatible **ONLY** with other *AFCON* products including parts and fasteners, resulting in a listed sway brace, restrainer or hanger assembly. Be advised the following warranty restriction will apply. **DISCLAIMER** - *AFCON* will **NOT** warrant against the failure of its products when used in combination with other products, parts or systems not manufactured or sold by *AFCON*. *AFCON* shall **NOT** be liable under any circumstances whatsoever for any direct or indirect, incidental or consequential damages of any kind, including but not limited to loss of business or profit, when non-*AFCON* products have been, or are used.



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105

## REVERSIBLE BEAM CLAMP 1 1/4" MOUTH



**SIZE - ROD:** 3/8"    **SIZE - SYSTEM PIPE:** 4" max.  
**SIZE - ROD:** 1/2"    **SIZE - SYSTEM PIPE:** 8" max.

**MATERIAL** - Ductile iron.

**FINISH** - Plain, E.G. and H.D.G.

**LISTING/APPROVAL** -



**FUNCTION** - Attachment component of an *AFCON* hanger.  
To support horizontal piping.

**INSTALLATION** - Per NFPA 13 and these instructions.  
Install on steel flange - thickness less than 1 1/4".  
Set bolt up or down.

**ASSEMBLY/ATTACHMENT** - See drawing.

Torque - 3/8"= 60 lb-in or 1/2"= 125 lb-in.

In the absence of a torque wrench, engage set bolt finger tight then additionally tighten 1/4 turn.

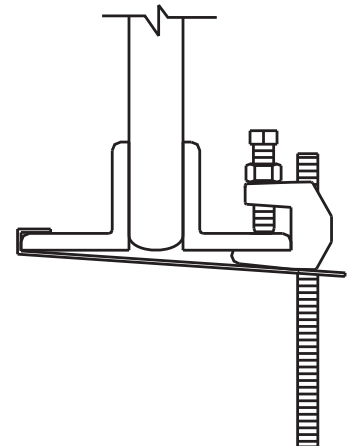
**Caution** - Do not over tighten set bolt.

### FEATURES

\* Maintains **CONSTANT HANGER CENTER-LINE**, with set bolt up or down.

\* **Flat throat back** to prevent twisting on structure during installation.

**ORDERING** - Part #, rod size and finish.

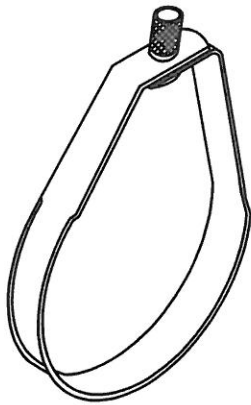




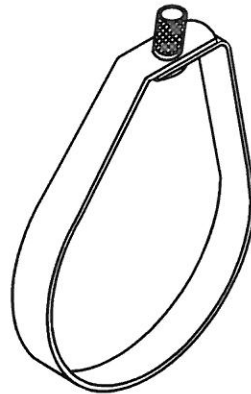
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300

RING HANGER





1 thru 4 inch pipe  
LISTED FOR STEEL/CPVC



1/2 & 3/4 inch pipe  
5 thru 8 inch pipe

SIZE - ROD- 3/8" or 1/2"  
 SIZE - SYSTEM PIPE - 1/2" thru 8"  
 MATERIAL - Carbon Steel, Mil. Galvanized to G-90 spec.  
 LISTING/APPROVAL -



 203-EX 2551 1"- 8"  
 Approval guide - 1"- 8"  
 OSHPD OPA-0601 See Website.

NFPA 13				
PIPE	ROD	1 WT.	5 WT.+250	UL TEST LOAD
1	3/8	30.75	403.75	750
1 1/4	3/8	43.95	469.75	750
1 1/2	3/8	54.15	520.75	750
2	3/8	76.95	634.75	750
2 1/2	3/8	118.35	841.75	850
3	3/8	162.30	1061.50	1050
4	3/8	246.00	1480.00	1500
5	1/2	349.45	1996.75	2000
6	1/2	476.35	2631.75	2650
8	1/2	711.00	3805.00	4050

CONFORMS WITH: Federal Specification WW-H-171E, Type 10.  
 Manufacturers Standardization Society ANSI/MSS-SP-58 Type 10.

MAXIMUM TEMPERATURE - 650°F.

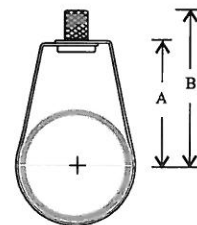
FUNCTION - Pipe hanger component of an AFCON hanger.  
 To support steel, CPVC or copper pipe.

INSTALLATION - Per NFPA 13, 13R, 13D, these instructions and the CPVC or copper pipe manufacturers instructions.

FEATURES -

- \* Sized and listed exclusively for use with #310 Surge Restrainer.
- \* Band edge is offset for EASY pipe insertion.
- \* Custom fit swivel nut for better retention in ring.

ORDERING - Part #, pipe size.



PIPE	A	B
1	1.8793	2.5259
1 1/4	2.1382	2.7850
1 1/2	2.2673	2.9140
2	2.6048	3.2516
2 1/2	3.4920	4.1150
3	3.7845	4.4311
4	4.3582	4.9982
6	6.0668	6.8180
8	7.5768	8.3280







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### 650

## ALL THREADED ROD 10' - 0" LENGTHS



ROD SIZE	MAX. REC. LOAD LBS. FOR SERVICE TEMP.	
	650°F	750°F
1/4	240	215
3/8	610	540
1/2	1130	1010
5/8	1810	1610
3/4	2710	2420
7/8	3770	3360
1	4960	4420
1 1/4	8000	7140
1 1/2	11630	10370

NOTE; maximum Temperature: 750°F

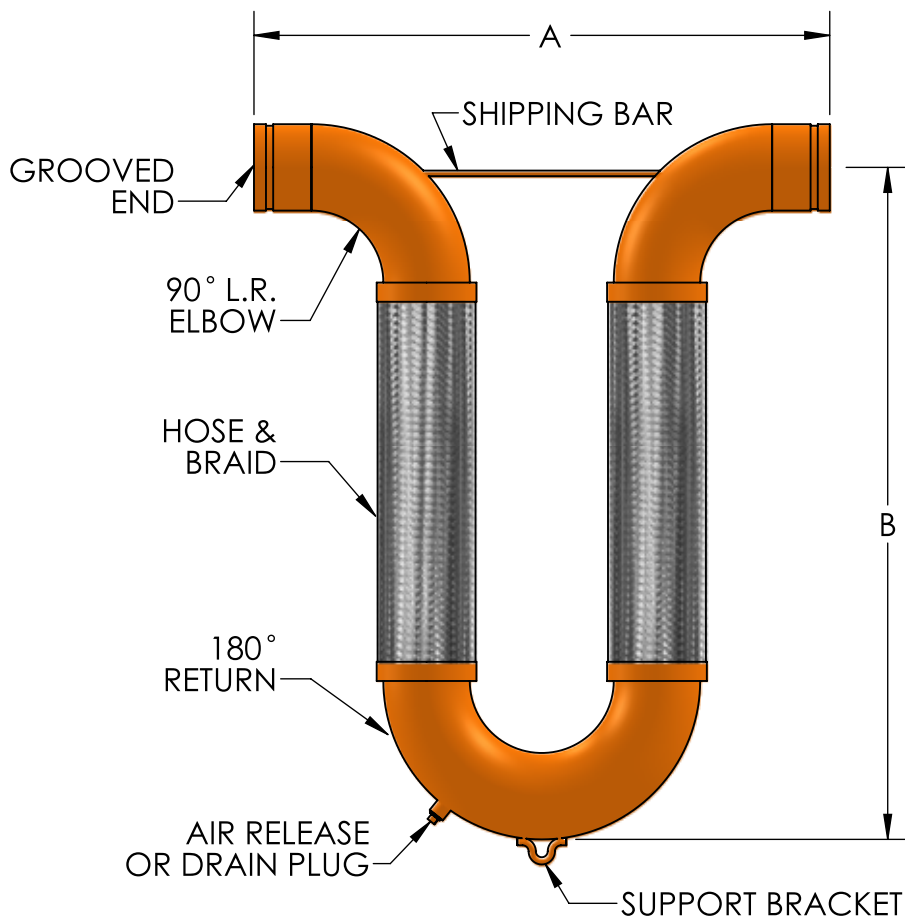
**SIZE** - 1/4 thru 1 1/2 inch rod in 10' - 0" lengths.

**MATERIAL** - Carbon Steel.

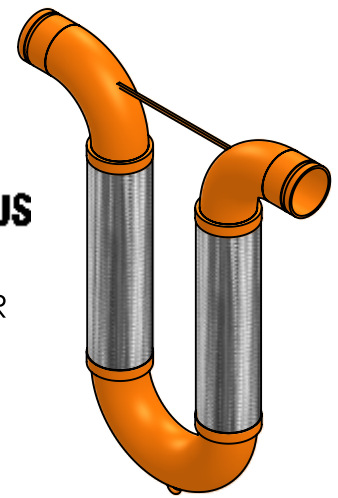
**FINISH** - Plain, E.G., H.D.G. and S.S.

**ORDERING** - Part #, rod diameter and finish.





FOR FIRE  
SPRINKLER  
SYSTEMS



**MATERIALS OF  
CONSTRUCTION**

END FITTINGS - CARBON STEEL - SCH 40/STD WT  
HOSE & BRAID - STAINLESS STEEL - 300 SERIES  
90° ELBOW - CARBON STEEL - SCH 40/STD WT  
180° RETURN - CARBON STEEL - SCH 40/STD WT

NOTE: METRALOOPS 2" AND LARGER INSTALLED IN ANY ORIENTATION OTHER THAN HANGING DOWN MUST HAVE THE 180° RETURN SUPPORTED. (SEE INSTALLATION INSTRUCTIONS.)

CONTACT FACTORY FOR ADDITIONAL SIZES AND MOVEMENTS. ALL DIMENSIONS IN INCHES.

QTY	SIZE	MODEL	MOVEMENT	A	B	PSI	WT (LBS)	PROJECT INFO
	1" (25mm)	MLUG80100	+/- 4"	15"	20"	300	8	
	1.25" (32mm)	MLUG80125	+/- 4"	15.75"	21"	300	10	
	1.5" (40mm)	MLUG80150	+/- 4"	17.5"	23"	300	15	
	2" (50mm)	MLUG80200	+/- 4"	20"	25"	300	18	
	2.5" (65mm)	MLUG80250	+/- 4"	21.5"	28"	300	29	
	3" (80mm)	MLUG80300	+/- 4"	24"	30"	300	43	
	4" (100mm)	MLUG80400	+/- 4"	30"	35"	175	60	
	5" (125mm)	MLUG80500	+/- 4"	36"	40"	175	99	
	6" (150mm)	MLUG80600	+/- 4"	42"	46"	175	150	
	8" (200mm)	MLUG80800	+/- 4"	56"	58"	175	286	

SUITABLE FOR USE IN DRY PIPE SYSTEMS  
FOR TEMPERATURES TO -40°F.

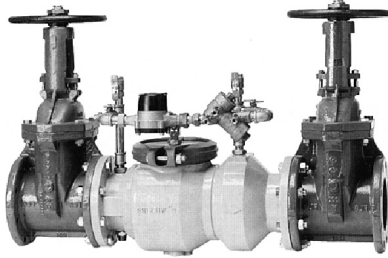
2	SIZES ADDED	1/4/2017
REV. 1	SUPPORT BRACKET CHANGE	DATE 2/5/2015
		2323 W. HUBBARD ST. CHICAGO, IL 60612 TEL: 312-738-3800 WWW.METRAFIRE.COM
<b>METRAFLEX FIRELOOP™</b> GROOVED ENDS, +/- 4" MOVEMENT		
DRAWN BY: <b>DKISH</b>		DATE: <b>1/4/2014</b>
APPROVED: <b>ZB</b>		DATE: <b>1/4/2014</b>
SCALE: <b>NONE</b>	DRAWING NUMBER: <b>MLUG8-2</b>	

CUSTOMER: \_\_\_\_\_

PROJECT: \_\_\_\_\_

ENGINEER: \_\_\_\_\_

### SPECIFICATION SUBMITTAL SHEET



#### FEATURES

Sizes:  2 1/2"  3"  4"  6"  8"  10"  12"

Maximum working water pressure 175 PSI  
 Maximum working water temperature 140°F  
 Hydrostatic test pressure 350 PSI  
 End connections (Grooved for steel) AWWA C606  
 (Flanged) ANSI B16.1 Class 125

#### OPTIONS (suffixes can be combined)

- with OS & Y gate valves (standard)
- L - less shut-off valves (flanged body connections)
- LM - less water meter
- with remote reading meter
- with gpm meter (standard)
- CFM - with cu ft/min meter
- G - with groove end gate valves
- FG - with flanged inlet gate connection and grooved outlet gate connection
- PI - with Post Indicator Gate Valve (3"-10")

#### ACCESSORIES

- Repair kit (rubber only)
- Thermal expansion tank (Model XT)
- OS & Y Gate valve tamper switch (OSY-40)
- Test Cock Lock (Model TCL24)

#### APPLICATION

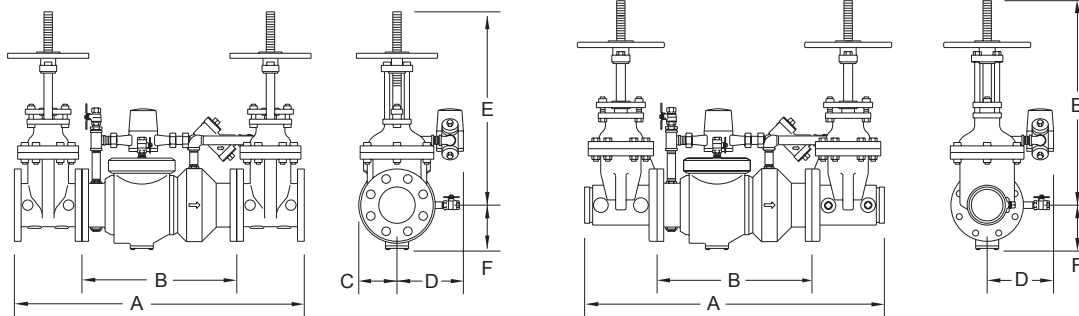
Designed for installation on potable water connections in fire sprinkler systems to protect against both backsiphonage and backpressure of polluted water into the potable water supply. Model 350DA shall provide protection where a potential health hazard does not exist. Incorporates metered by-pass to detect leaks and unauthorized water use.

#### STANDARDS COMPLIANCE (Sizes 2 1/2"-10" Horiz. & Vert.) (12" Horizontal Only)

- ASSE® Listed 1048 (Sizes 2 1/2" thru 12")
- CSA® Certified B64.5 (Sizes 2 1/2" thru 8")
- AWWA Compliant C510 (Sizes 2 1/2" thru 12")
- UL® Classified (Sizes 2 1/2" thru 12")
- C-UL® Classified (Sizes 2 1/2" thru 12")
- FM® Approved (Sizes 2 1/2" thru 10")
- NYC MEA 147-99-M Vol 4 (2-1/2" - 10)
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California (Sizes 2 1/2" thru 12")

#### MATERIALS

Main valve body	Ductile Iron ASTM A 536 Grade 4
Access covers	Ductile Iron ASTM A 536 Grade 4
Coatings	FDA Approved fusion epoxy finish
Internals	Stainless steel, 300 Series NORYL™, NSF Listed
Fasteners	Stainless Steel, 300 Series
Elastomers	EPDM (FDA approved) Buna Nitrile (FDA approved)
Polymers	NORYL™, NSF Listed
Springs	Stainless Steel, 300 Series



MODEL 350DAG SHOWN ABOVE

**Attention:**  
 Model 350DA (flange body) and Model 350ADA (grooved body) have different lay lengths.

#### DIMENSIONS & WEIGHTS (do not include pkg.)

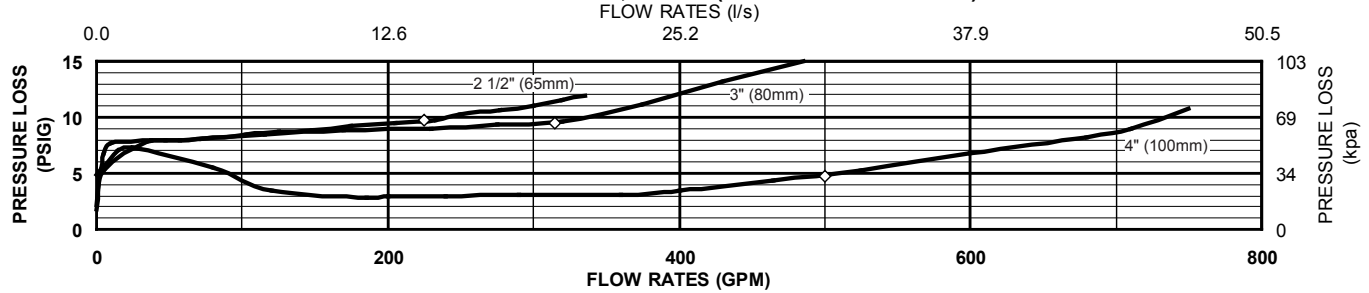
MODEL 350DA SIZE	DIMENSION (approximate)														WEIGHT				
	A		B LESS GATE VALVES		C		D		E OS&Y OPEN		E OS&Y CLOSED		F		WITHOUT GATES VALVES		WITH OS&Y GATE VALVES		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs.	kg	lbs.	kg	
2 1/2	65	31	787	15 7/8	403	3 3/4	95	9	229	16 3/8	416	13 7/8	352	3 1/2	89	68	30.9	178	80.8
3	80	32	813	15 7/8	403	3 3/4	95	9	229	18 7/8	479	15 5/8	397	3 1/2	89	68	30.9	198	90
4	100	37 5/8	956	19 1/2	495	4 1/2	114	9	229	22 3/4	578	18 1/4	464	6	152	106	48	296	134.4
6	150	44 3/4	1137	23 1/2	597	5 1/2	140	10 1/2	267	30 1/8	765	23 3/4	603	7	178	180	81.7	480	217.9
8	200	60 3/4	1543	37 3/4	959	10	254	12	305	37 3/4	959	29 1/4	743	8 1/2	216	374	170	850	385.9
10	250	63 3/4	1619	37 3/4	959	10	254	12	305	45 3/4	1162	35 3/8	899	8 1/2	216	404	183	1222	554.8
12	300	66 1/4	1683	38	965	10	254	12	305	53 1/8	1349	40 5/8	1032	8 7/8	226	463	210	1623	736.2

(Patent No. 5,913,331)

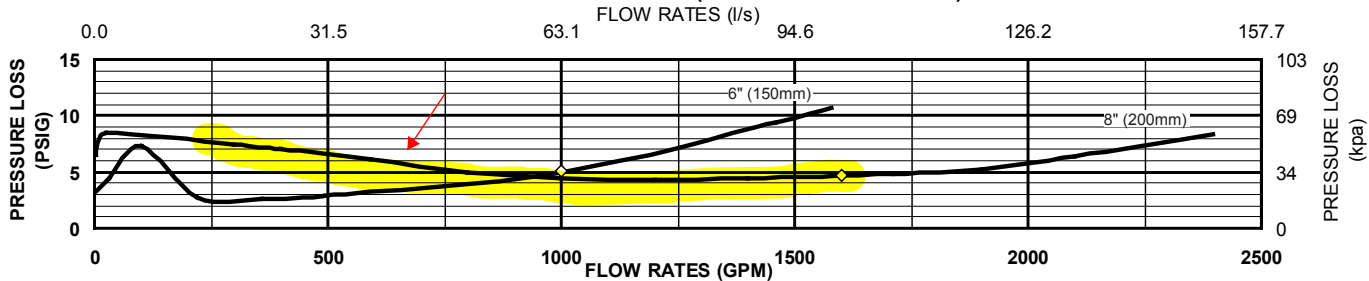
DOCUMENT #: BF-350DA REVISION: 10/09

## FLOW CHARACTERISTICS

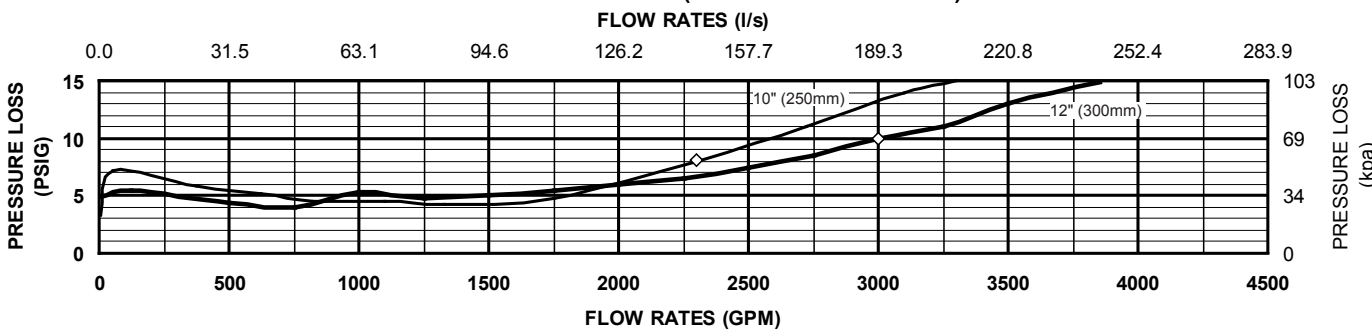
### MODEL 350DA 2 1/2", 3" & 4" (STANDARD & METRIC)



### MODEL 350DA 6" & 8" (STANDARD & METRIC)



### MODEL 350DA 10" & 12" (STANDARD & METRIC)

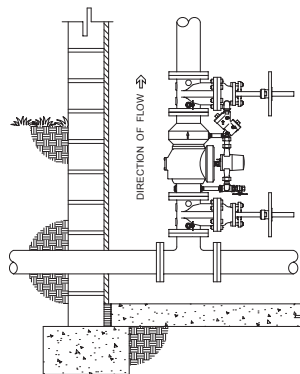


◇ Rated Flow (Established by approval agencies)

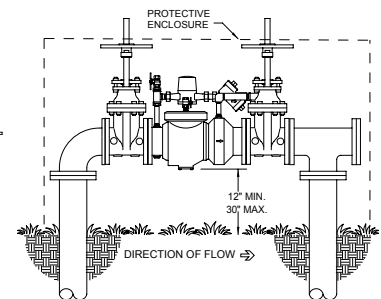
## TYPICAL INSTALLATION

Local codes shall govern installation requirements. Unless otherwise specified, the assembly shall be mounted at a minimum of 12" (305mm) and a maximum of 30" (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.

Capacity thru Schedule 40 Pipe (GPM)				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
2 1/2"	75	112	149	224
3"	115	173	230	346
4"	198	298	397	595
6"	450	675	900	1351
8"	780	1169	1559	2339
10"	1229	1843	2458	3687
12"	1763	2644	3525	5288



**VERTICAL INSTALLATION**



**OUTDOOR INSTALLATION**

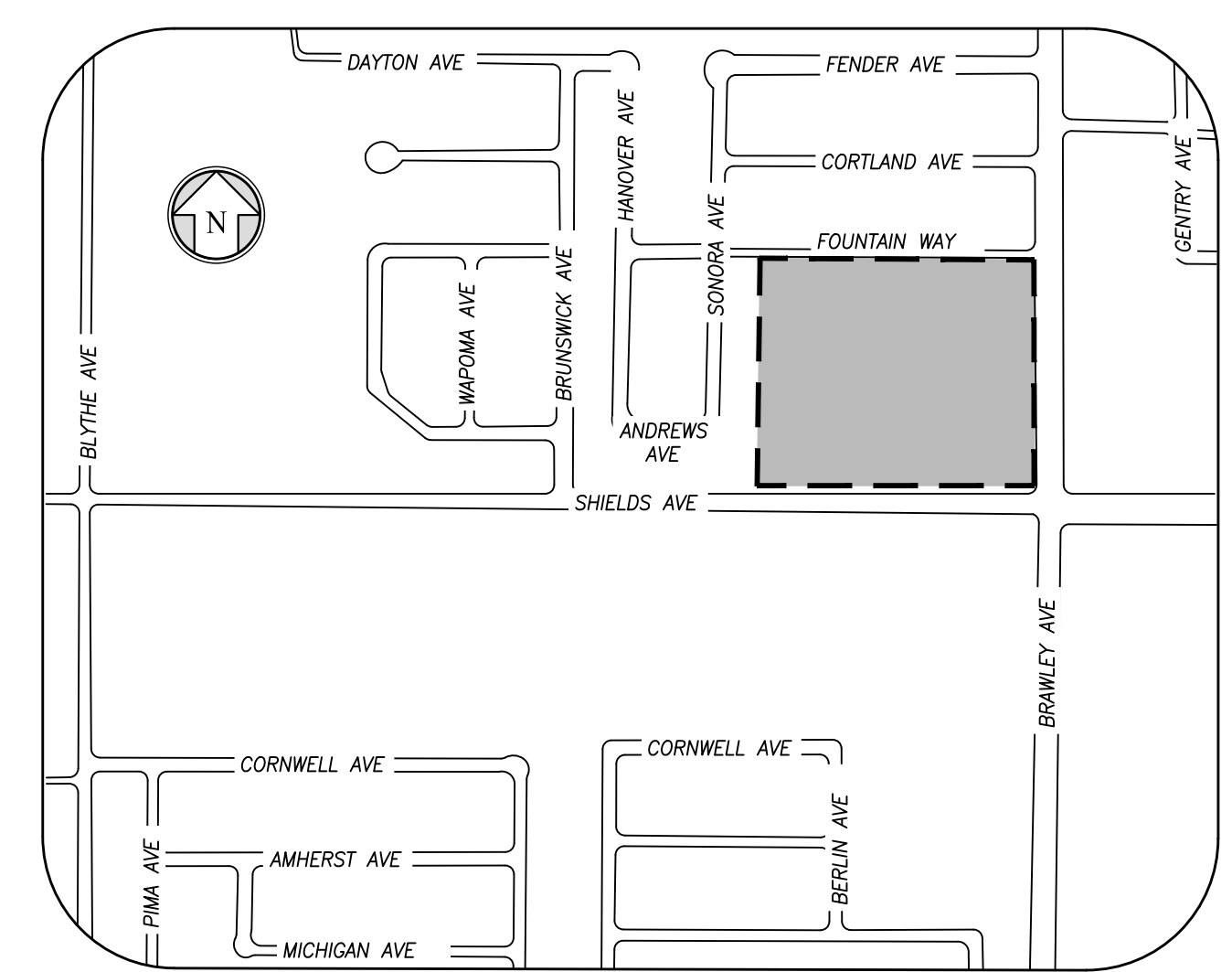
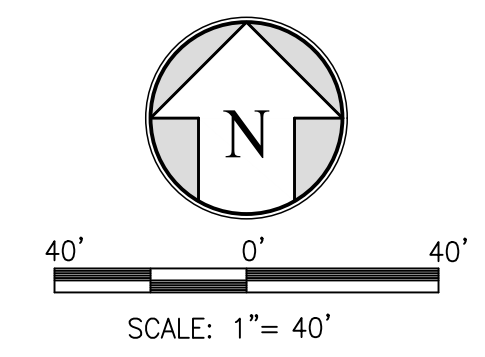
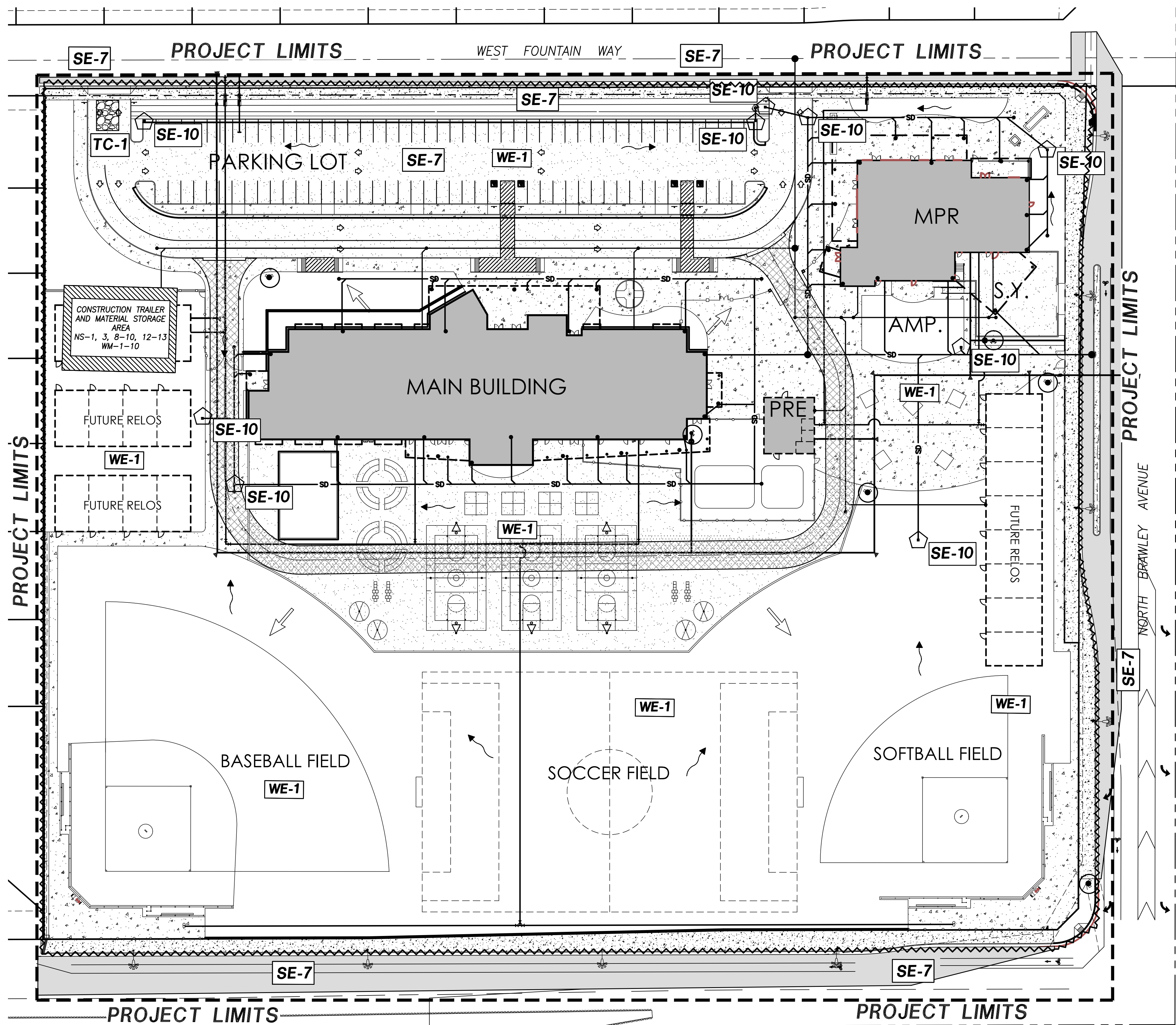
## SPECIFICATIONS

The Double Check Detector Backflow Prevention Assembly shall be ASSE® Listed 1048, and supplied with full port gate valves. The main body and access cover shall be epoxy coated ductile iron (ASTM A 536 Grade 4), the seat ring and check valve shall be Noryl™ (NSF Listed), the stem shall be stainless steel (ASTM A 276) and the seat disc elastomers shall be EPDM. The first and second check valves shall be accessible for maintenance without removing the device from the line. The Double Check Detector Backflow Prevention Assembly shall be a WILKINS Model 350DA.

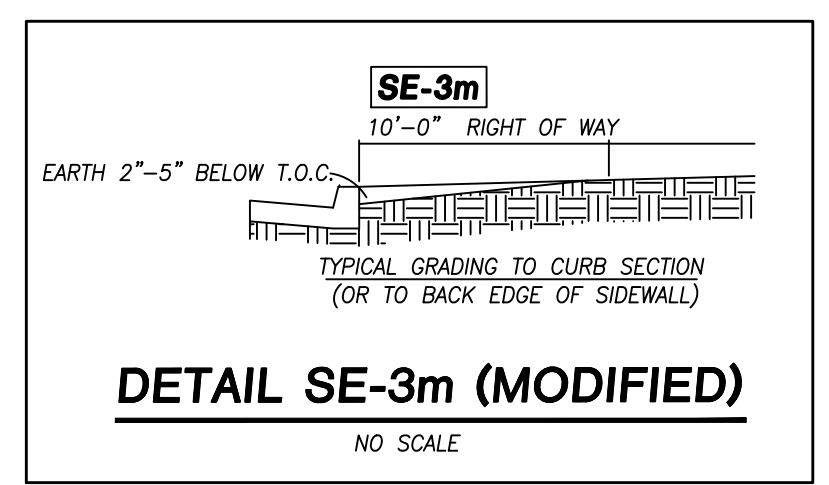
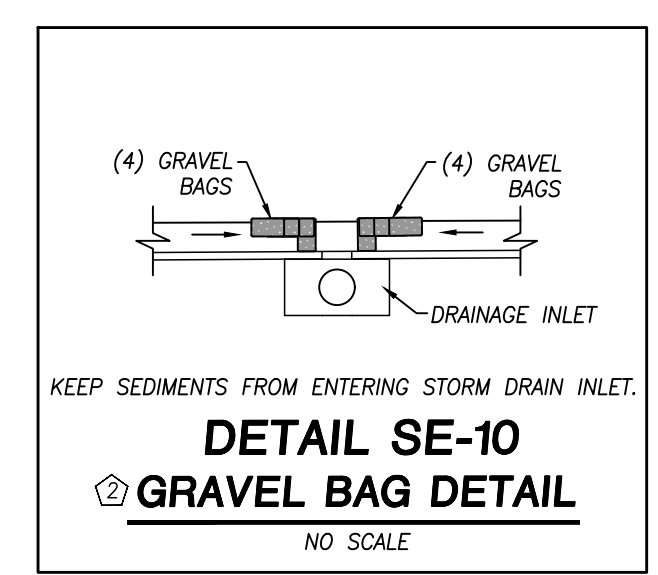
WILKINS a Zurn company, 1747 Commerce Way, Paso Robles, CA 93446 Phone:805/238-7100 Fax:805/238-5766

In Canada: ZURN INDUSTRIES LIMITED, 3544 Nashua Dr., Mississauga, Ontario L4V 1L2 Phone:905/405-8272 Fax:905/405-1292

Product Support Help Line: 1-877-BACKFLOW (1-877-222-5356) • Website: <http://www.zurn.com>



VICINITY MAP  
NO SCALE



NOTES:  
 \*STREET SWEEP (DURING GRADING ACTIVITIES, STREETS WILL BE SWEEP AS NECESSARY TO PREVENT DIRT AND DUST FROM LEAVING THE CONSTRUCTION AREA)  
 \* CONTRACTOR SHALL PROVIDE ADEQUATE DUST SUPPRESSION TO MEET ALL SJVAPCD REQUIREMENTS.

**GENERAL EROSION CONTROL NOTES**

- LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL A NOTICE OF INTENT AND ALL PROJECT REQUIRED DOCUMENTS HAVE BEEN SUBMITTED VIA SMARTS, AND APPROVED BY RWOCB.
- THE GENERAL CONTRACTOR SHALL STRICTLY ADHERE TO THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) DURING CONSTRUCTION OPERATIONS. IF FIELD CONDITIONS WARRANT IT, THE SWPPP MAY BE MODIFIED AS LONG AS THE ORIGINAL ENVIRONMENTAL PROTECTIONS INTENDED ARE MAINTAINED. ANY ALTERATIONS TO THE SWPPP MUST BE NOTED AND JUSTIFIED IN THE SWPPP ENDS KEPT ON SITE.
- THE STOCKPILE AREA AND VEHICLE STORAGE AREA IF ROCK BASE IS REMOVED AT CONSTRUCTION, AREA SHALL BE SEEDED AS SPECIFIED OR PERMANENT SOIL STABILIZATION APPLIED WITHIN 14 DAYS OF FINAL GRADING.
- SHOULD CONSTRUCTION STOP FOR LONGER THAN 14 DAYS, ALL EXPOSED AREAS SHALL BE SEED AS SPECIFIED.
- THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SOIL SEDIMENT FROM LEAVING THE SITE.
- GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
- ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON SITE INSPECTION.
- IF INSTALLATION OF STORM DRAINAGE SYSTEM SHOULD BE INTERRUPTED BY WEATHER OR NIGHTFALL, THE PIPE ENDS SHALL BE COVERED WITH FILTER FABRIC.
- DRAIN INLET PROTECTION SHALL BE PROVIDED THROUGHOUT THE DURATION OF THE PROJECT.
- GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION ON ANY EXPOSED AREAS WHEN THE PROJECT IS COMPLETE.

**SITE SPECIFIC NOTES**

- THIS PROJECT IS ON AN UNDEVELOPED AREA SURROUNDED BY RESIDENTIAL NEIGHBORHOODS.
- CONSTRUCT WORK EQUIPMENT STORAGE AREAS AS NEED FOR CONSTRUCTION PER THE CALIFORNIA BMP HANDBOOK.
  - PROVIDE STANDARD STORM DRAIN INLET PROTECTION PER BMP STANDARD OF THE CASQA HANDBOOK (SE-10).
  - SAMPLING FOR THIS PROJECT IS REQUIRED FOR NON-VISIBLE POLLUTANT MONITORING ONLY IF A BREACH, MALFUNCTION, LEAKAGE, OR SPILL HAS OCCURRED. DISCHARGERS MUST COLLECT A SAMPLE OF RUNOFF THAT HAS COME INTO CONTACT WITH THE MATERIALS AND ALSO COLLECT A RUNOFF SAMPLE THAT HAS NOT COME INTO CONTACT WITH MATERIALS (UNCONTAMINATED SAMPLE) FOR COMPARISON.
  - ENCIRCLE TEMPORARY DIRT STOCKPILES WITH FIBER ROLLS (SE-5) AT THE TOE OF THE SLOPE PER CASQA BMP WM-5.
  - NEAREST WATER SOURCE: FIRE HYDRANT LOCATED WHERE SHOWN.
  - PERMETER CONTROL BMP: EC-2, SE-1, SE-5 OR OTHER APPROVED MEASURES.

**SWPPP BMP LEGEND**

- |  |                                       |
|--|---------------------------------------|
| EC-1 SCHEDULING                            | NS-12 CONCRETE CURING                 |
| EC-2 PRESERVATION OF EXISTING VEGETATION   | NS-13 CONCRETE FINISHING              |
| SE-1 SILT FENCE                            | WM-1 MATERIAL DELIVERY AND STORAGE    |
| SE-3m CURB GRADING DETAIL PER THIS SHEET   | WM-2 MATERIAL USE                     |
| SE-5 FIBER ROLLS                           | WM-3 STOCK PILE MANAGEMENT            |
| SE-6 GRAVEL BAG BERM                       | WM-4 SPILL PREVENTION AND CONTROL     |
| SE-7 STREET SWEEPING AND VACUUMING         | WM-5 SOLID WASTE MANAGEMENT           |
| SE-10 STORM DRAIN INLET PROTECTION         | WM-6 HAZARDOUS WASTE MANAGEMENT       |
| TC-1 STABILIZED CONSTRUCTION ENTRANCE/EXIT | WM-7 CONTAMINATED SOIL MANAGEMENT     |
| WE-1 WIND EROSION CONTROL                  | WM-8 CONCRETE WASTE MANAGEMENT        |
| NS-1 WATER CONSERVATION PRACTICES          | WM-9 SANITARY/SEPTIC WASTE MANAGEMENT |
| NS-3 PAVING AND GRADING OPERATIONS         | WM-10 LIQUID WASTE MANAGEMENT         |
| NS-8 VEHICLE AND EQUIPMENT CLEANING        | ← PROPOSED DRAINAGE                   |
| NS-9 VEHICLE AND EQUIPMENT FUELING         | → EXISTING DRAINAGE                   |
| NS-10 VEHICLE AND EQUIPMENT MAINTENANCE    | --- PROJECT LIMITS                    |

**AD 6-37a  
 S&B Elementary  
 02-116800**

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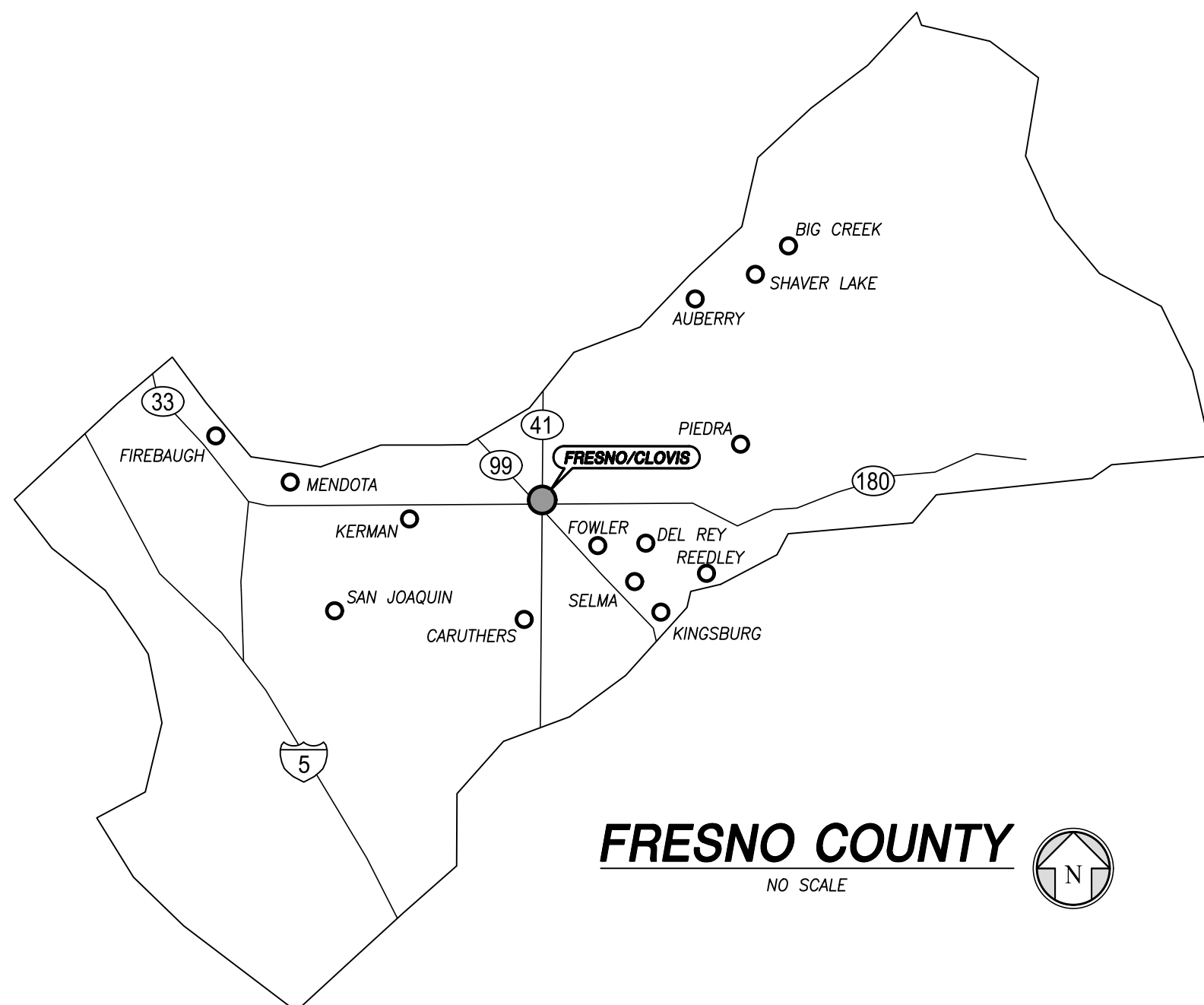
REVISIONS NO. DATE BY DESCRIPTION	APPROVED BY: DATE: 6-29-2018 VISUALIZATION: C. WELLO OSD/NO.22554
 901 EAST MAIN STREET VISALIA, CA 93272 TEL: (559) 733-0440 WWW.QKINC.COM <small>© COPYRIGHT BY QK INC. UNAUTHORIZED USE PROHIBITED.</small>	
<b>CENTRAL UNIFIED SCHOOL DISTRICT</b> <b>WEST SHIELDS ELEMENTARY SCHOOL</b> <b>WATER POLLUTION CONTROL DRAWING</b>	
PROJECT NO.: 180155 DRAWN BY: MM QA/QC BY: BL SCALE: AS SHOWN SHEET NO.: 1 of 1	

# City of Fresno

County of Fresno

State of California

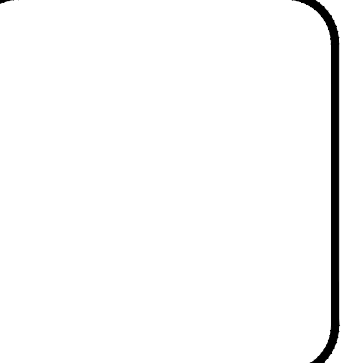
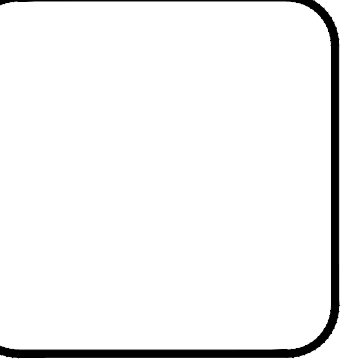
## WEST SHIELDS ELEMENTARY SCHOOL STORM WATER POLLUTION PREVENTION PLAN



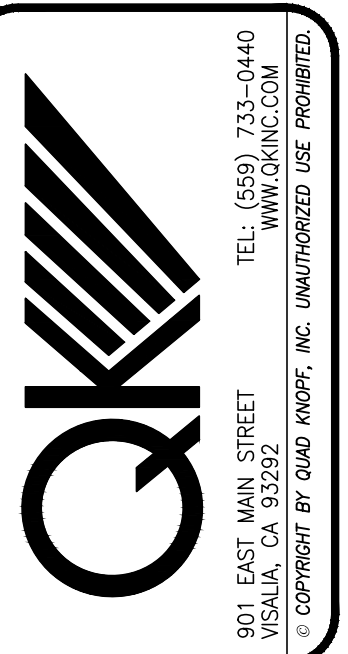
### SHEET INDEX

- 1 - COVER SHEET
- 2 - PRE-CONSTRUCTION BMPS
- 3 - CONSTRUCTION BMPS

REVISIONS	ID	DATE	BY	DESCRIPTION



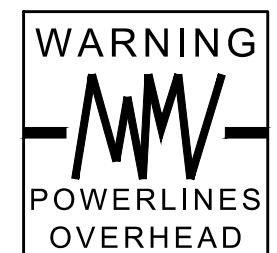
DATE	WESTSHIELDS ELEMENTARY QUALIFIED SWPPP DEVELOPER	CERT. NO. 22554
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**CENTRAL UNIFIED SCHOOL DISTRICT**  
4085 N. POLK AVENUE  
FRESNO, CA 93723  
(559) 274-4700

**WEST SHIELDS ELEMENTARY SCHOOL**  
COVER SHEET  
STORM WATER POLLUTION PREVENTION PLAN

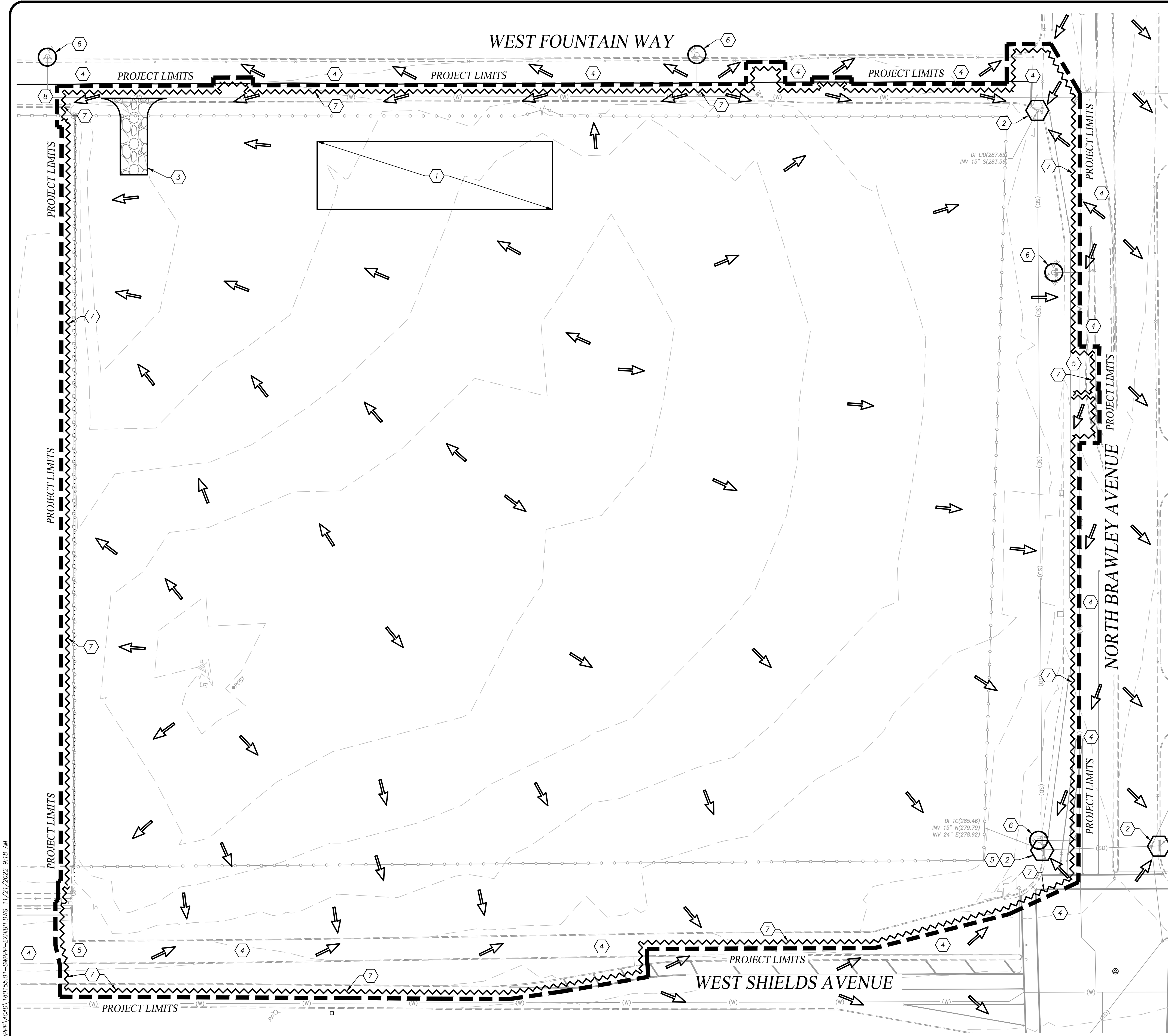
**AD 6-37b**  
**S&B Elementary**  
**02-116800**



PROJECT NO.:	180155
DRAWN BY:	HK
QA/QC BY:	AP
SCALE:	AS SHOWN
SHEET NO.:	1 of 3

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PROGRESS SET - NOT FOR CONSTRUCTION



**SWPPP BMP LEGEND**

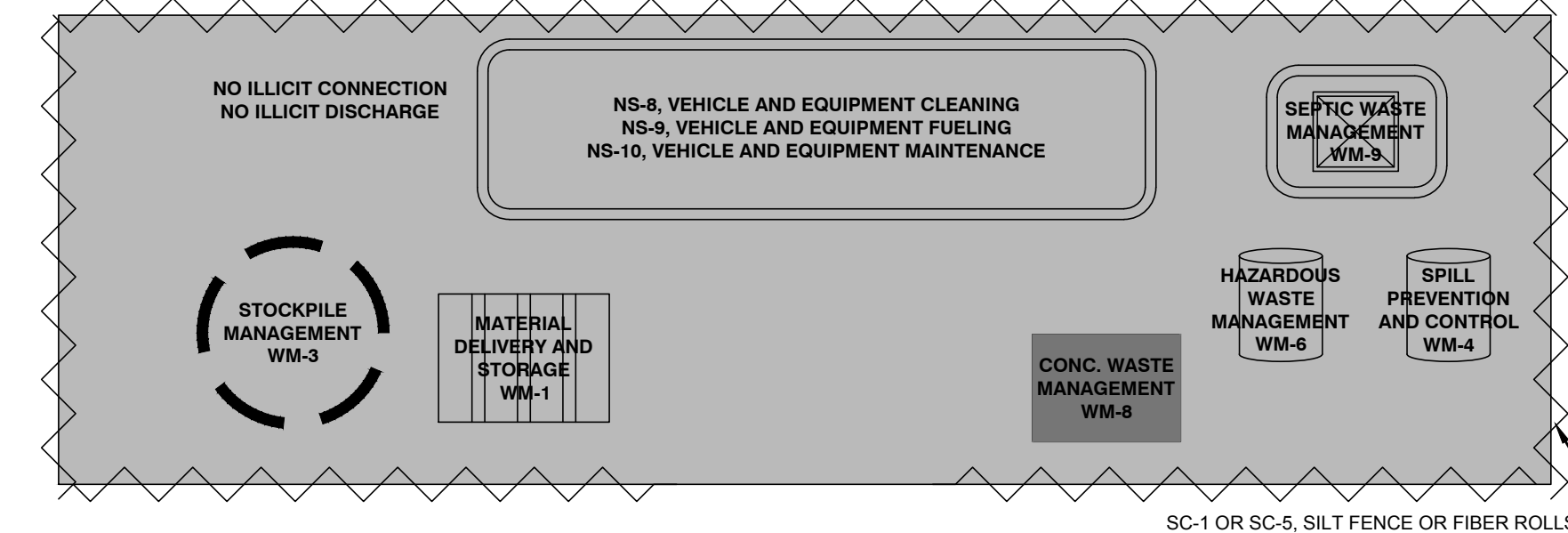
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- EXISTING DRAINAGE  
 PROPOSED DRAINAGE  
 LIMIT OF CONSTRUCTION

**SITE SPECIFIC SWPPP NOTES:**

- THIS SITE HAS BEEN CALCULATED AS A RISK LEVEL 1 DISCHARGER AND SHALL COMPLY WITH ALL OF THE REQUIREMENTS OF THE PROJECT SWPPP AND AS SPECIFIED IN ATTACHMENT C OF THE GENERAL PERMIT. THIS PROJECT DOES NOT REQUIRE A RAIN EVENT ACTION PLAN (REAP).
- 1 CONSTRUCT WORK EQUIPMENT STORAGE AREAS AS NEEDED FOR CONSTRUCTION PER THE CALIFORNIA BMP HANDBOOK.
  - 2 SE-10: PROVIDE STANDARD STORM DRAIN INLET PROTECTION PER BMP STANDARD IN THE CALIFORNIA BMP HANDBOOK. PROVIDE INLET PROTECTION FOR EXISTING INLETS AT START OF CONSTRUCTION. AS PROPOSED INLETS ARE CONSTRUCTED INLET PROTECTION SHALL BE INSTALLED.
  - 3 TC-1: THE STABILIZED CONSTRUCTION ENTRANCE IS DESIGNED TO REDUCE SOIL TRACK OFF INTO THE STREET. LOCATION AT CONTRACTOR'S DISCRETION. ONCE THE INTERIOR ROADS AND PARKING LOTS ARE COMPLETE, IT MAY BE POSSIBLE TO REPLACE THE CONSTRUCTION ENTRANCES WITH REGULAR STREET SWEEPING AT CONTRACTOR'S DISCRETION.
  - 4 SE-7: STREET SWEEPING. KEEP TRAVELED ROADWAYS CLEAR OF SEDIMENT AND SOIL ACCUMULATION DURING CONSTRUCTION.
  - 5 SAMPLING LOCATIONS SHALL BE AT MINIMUM LOCATED UPSTREAM (CONTROL SAMPLE) AND DOWNSTREAM OF CONSTRUCTION ACTIVITIES. SAMPLING IS ON AN AS NEEDED BASIS PER THE SWPPP AND CONSTRUCTION GENERAL PERMIT.
  - 6 NEAREST WATER SOURCE. APPROXIMATE LOCATION OF NEARBY EXISTING FIRE HYDRANTS TO THE PROJECT SITE AND PROPOSED WATER SOURCE LOCATIONS AS SHOWN.
  - 7 PERIMETER CONTROL BMP: EC-2, SE-1, SE-3m, SE-5 OR OTHER APPROPRIATE MEASURES.
  - 8 ADD SANDBAGS WHERE SHOWN ON PLAN TO PREVENT SEDIMENT FROM LEAVING THE CONSTRUCTION AREA

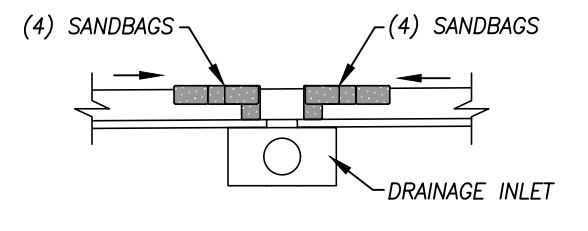
**GENERAL EROSION AND SEDIMENT CONTROL NOTES:**

1. LAND DISTURBING ACTIVITIES SHALL NOT COMMENCE UNTIL APPROVAL TO DO SO HAS BEEN GRANTED BY GOVERNING AUTHORITIES.
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3. THE OWNER, CONTRACTOR AND SUB-CONTRACTORS (BUT NOT LIMITED TO) ARE RESPONSIBLE FOR SWPPP IMPLEMENTATION AND VIOLATIONS. THEY SHOULD BE TRAINED AS NEEDED BY THE QSP (QUALIFIED SWPPP PRACTITIONER) OR HIS/HER DESIGNATED REPRESENTATIVE.
4. NO LAND CLEARING OR GRADING SHALL BEGIN UNTIL ALL PERIMETER EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED.
5. THIS PLAN SHALL NOT BE CONSIDERED ALL INCLUSIVE AS THE GENERAL CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SOIL SEDIMENT FROM LEAVING THE SITE AND BE IN COMPLIANCE WITH THE CONSTRUCTION GENERAL PERMIT.
6. GENERAL CONTRACTOR SHALL COMPLY WITH ALL STATE AND LOCAL ORDINANCES THAT APPLY.
7. ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IF DEEMED NECESSARY BY ON-SITE INSPECTION.
8. DRAIN INLET PROTECTION SHALL BE PROVIDED THROUGHOUT THE DURATION OF THE PROJECT. EXISTING DRAIN INLETS SHALL BE PROTECTED UNTIL FINAL REMOVAL AND THE CONNECTING PIPE SHALL BE PROPERLY CAPPED TO PREVENT SEDIMENT FROM ENTERING THE STORM DRAIN SYSTEM.
9. GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION ON ANY EXPOSED AREAS UNTIL THE PROJECT IS COMPLETE.
10. REFER TO THE SWPPP PLAN (THE BMP BINDER OF DOCUMENTS) FOR DETAILS ON BMPs (BEST MANAGEMENT PRACTICES) USED FOR THE SITE. THE BINDER SHALL BE KEPT ON THE SITE AT ALL TIMES AND BE MADE AVAILABLE FOR THE QSP AND OTHERS INSPECTING THE SITE. A DIGITAL COPY CAN BE FOUND AT [HTTPS://SMARTS.WATERSHEDS.CA.GOV/SMARTS](https://smarts.watersheds.ca.gov/smarts)
11. ALL MATERIALS FOR THE PROJECT, INCLUDING THE NATIVE SOIL (SEDIMENT) ARE CONSIDERED POLLUTANTS. THE POLLUTANTS SHALL NOT LEAVE THE SITE VIA DRAINAGE, WHEEL TRACKING AND/OR WIND. ALL MATERIALS INCLUDING WASTE ARE TO LEAVE THE SITE IN ADEQUATELY COVERED CONTAINERS.
12. ALL SITE SWPPP CHANGES ARE TO BE COORDINATED WITH THE QSP. THE PRACTITIONER WILL PROVIDE WEEKLY MAINTENANCE AND REPAIRS. ALL REPAIRS AND MAINTENANCE FOR BMP'S ARE TO BE DONE AS SOON AS POSSIBLE.
13. ALL WASTE AND STORAGE CONTAINERS SHALL BE KEPT COVERED AT ALL TIMES TO PREVENT LEACHING OF WASTE AND MATERIALS FROM ESCAPING THEIR CONTAINER AND ONTO THE SITE. HAZARDOUS WASTE (PAINTS, STAINS, GLUES, ADHESIVES, ETC.) SHALL BE STORED IN COVERED AREAS WITH SECONDARY CONTAINMENT FOR LIQUID MATERIALS IN CASE OF ACCIDENTAL LEAKAGE/SPILLAGE.
14. THE BEST PLAN FOR PROTECTING WATER QUALITY IS TO MINIMIZE DISTURBANCE AND PERFORM GRADING OPERATIONS DURING DRY WEATHER. GOOD SITE MANAGEMENT HELPS PREVENT POLLUTION IN STORM DRAINS, RIVERS, STREAMS AND LAKES.
15. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE FOLLOWING "GOOD HOUSEKEEPING" MEASURES: COVERING LOOSE MATERIAL (STORING CHEMICALS, ETC.) WHEN NOT IN USE; STORING CHEMICALS IN WATER TIGHT CONTAINERS; IMPLEMENTING BEST MANAGEMENT PRACTICES TO PREVENT OFF-SITE TRACKING (E.G., STREET SWEEPING AND CONSTRUCTION ENTRANCE); IMPLEMENTING PROCEDURES THAT EFFECTIVELY ADDRESS HAZARDOUS MATERIALS, INCLUDING A SPILL RESPONSE KIT; PREVENTING OIL, GREASE AND FUEL LEAKS BY MAINTAINING AND STORING VEHICLES AND EQUIPMENT AT APPROPRIATE OFF-SITE LOCATIONS; CONTROLLING FUGITIVE DUST EMISSIONS; PREVENTING ILLICIT DISCHARGES INTO THE STORM DRAIN SYSTEM; AND PREVENTING THE ACCUMULATION AND INFILTRATION OF SEDIMENT AT OR NEAR EXISTING STORM DRAIN SYSTEMS AND WATERWAYS.
16. ACCUMULATED SEDIMENT IN BMP'S SHALL BE REMOVED AT REGULAR INTERVALS, WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT, AND PRIOR TO THE NEXT ANTICIPATED STORM EVENT. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

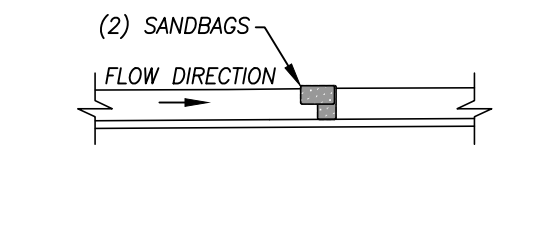


**TYPICAL EQUIPMENT AND MATERIAL STORAGE AREA NOTES:**

- EQUIPMENT AND MATERIAL STORAGE WILL BE LOCATED IN A DESIGNATED AREA OR REMOVED DAILY.
- INSTALL LINEAR SEDIMENT BARRIERS ON DRAINAGE PERIMETER OF STORAGE AREA.
- SPILL KITS ARE LOCATED IN STORAGE AREA AT ALL TIMES.
- IF NECESSARY, CONCRETE WASHOUT AREA WILL BE LOCATED IN STORAGE AREA.
- PROPER STORAGE OF VEHICLES AND EQUIPMENT ARE TO BE IN ACCORDANCE WITH SWPPP REQUIREMENTS.
- MATERIAL STORAGE FACILITIES ARE TO BE LOCATED IN STORAGE AREA.
- MATERIAL WASTE CONTAINMENT FACILITIES ARE TO BE LOCATED IN STORAGE AREA.
- LOOSE MATERIALS ARE TO BE COVERED WHEN NOT IN USE.
- VEHICLE AND EQUIPMENT FUELING ARE TO BE DONE IN STORAGE AREA.
- PAVING EQUIPMENT IS TO BE PARKED OVER PLASTIC COVERS.
- FINAL STAGING AREAS ARE TO BE DETERMINED BY CONTRACTOR.



PREVENTS SEDIMENTS FROM ENTERING STORM DRAIN INLET  
**2 SANDBAG DETAIL**  
NO SCALE



PREVENTS SEDIMENTS FROM LEAVING CONSTRUCTION AREA.  
**8 SANDBAG DETAIL**  
NO SCALE

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REVISIONS	DATE	BY	DESCRIPTION

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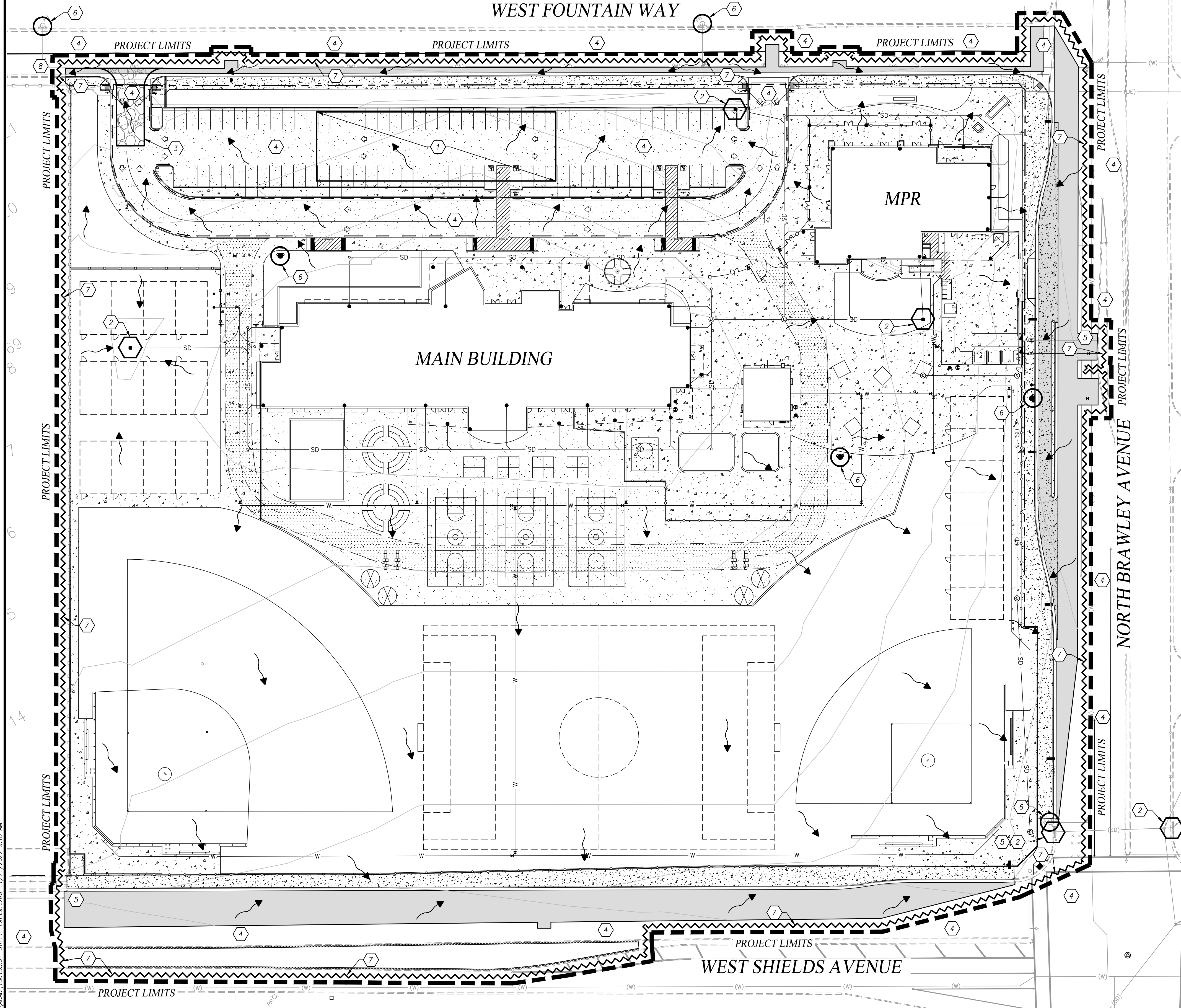
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 TEL: (559) 733-0440  
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**CENTRAL UNIFIED SCHOOL DISTRICT**  
 4085 N. POLK AVENUE  
 FRESNO, CA 93722  
 (559) 274-4700

**WEST SHIELDS ELEMENTARY SCHOOL**  
**PRE-CONSTRUCTION BMPs**  
**STORM WATER POLLUTION PREVENTION PLAN**

PROJECT NO.: 180155
DRAWN BY: HK
QA/QC BY: AP
SCALE: AS SHOWN
SHEET NO.: 2 of 3

PROGRESS SET - NOT FOR CONSTRUCTION



**SWPPP BMP LEGEND**

- EC-1 SCHEDULING
  - EC-2 PRESERVATION OF EXISTING VEGETATION
  - SE-1 SILT FENCE
  - SE-3M CURB GRADING DETAIL PER THIS SHEET
  - SE-5 FIBER ROLLS (STRAW WATTLE)
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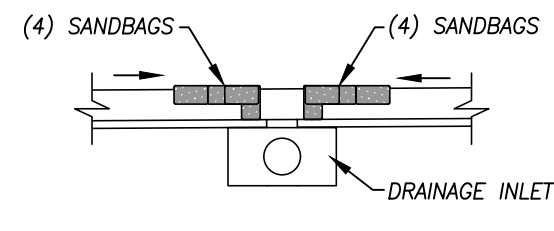
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9. GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO TAKE WHATEVER MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION ON ANY EXPOSED AREAS UNTIL THE PROJECT IS COMPLETE.
10. REFER TO THE SWPPP PLAN (THE BMP BINDER OF DOCUMENTS) FOR DETAILS ON BMPs (BEST MANAGEMENT PRACTICES) USED FOR THE SITE. THE BINDER SHALL BE KEPT ON THE SITE AT ALL TIMES AND BE MADE AVAILABLE FOR THE OSP AND OTHERS INSPECTING THE SITE. A DIGITAL COPY CAN BE FOUND AT [HTTPS://SMARTS.WATERBOARDS.CA.GOV/SMARTS](https://smarts.waterboards.ca.gov/smarts)
11. ALL MATERIALS FOR THE PROJECT, INCLUDING THE NATIVE SOIL (SEDIMENT) ARE CONSIDERED POLLUTANTS. THE POLLUTANTS SHALL NOT LEAVE THE SITE VIA DRAINAGE, WHEEL TRACKING AND/OR WIND. ALL MATERIALS INCLUDING WASTE ARE TO LEAVE THE SITE IN ADEQUATELY COVERED CONTAINERS.
12. ALL SITE SWPPP CHANGES ARE TO BE COORDINATED WITH THE OSP. THE PRACTITIONER WILL PROVIDE WEEKLY INSPECTIONS AND AT LEAST ONE FOR EACH 24-HR PERIOD DURING QUALIFYING STORM EVENTS TO CHECK MAINTENANCE AND REPAIRS. ALL REPAIRS AND MAINTENANCE FOR BMP'S ARE TO BE DONE AS SOON AS POSSIBLE.
13. ALL WASTE AND STORAGE CONTAINERS SHALL BE KEPT COVERED AT ALL TIMES TO PREVENT LEACHING OF WASTE AND MATERIALS FROM ESCAPING THEIR CONTAINER AND ONTO THE SITE. HAZARDOUS WASTE (PAINTS, STAINS, GLUES, ADHESIVES, ETC.) SHALL BE STORED IN COVERED AREAS WITH SECONDARY CONTAINMENT FOR LIQUID MATERIALS IN CASE OF ACCIDENTAL LEAKAGE/SPILLAGE.
14. THE BEST PLAN FOR PROTECTING WATER QUALITY IS TO MINIMIZE DISTURBANCE AND PERFORM GRADING OPERATIONS DURING DRY WEATHER. GOOD SITE MANAGEMENT HELPS PREVENT POLLUTION IN STORM DRAINS, RIVERS, STREAMS AND LAKES.
15. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE FOLLOWING "GOOD HOUSEKEEPING" MEASURES: COVERING LOOSE MATERIAL (STOCKPILES, ETC.) WHEN NOT IN USE; STORING CHEMICALS IN WATER TIGHT CONTAINERS; IMPLEMENTING BEST MANAGEMENT PRACTICES TO PREVENT OFF-SITE TRACKING (E.G., STREET SWEEPING AND CONSTRUCTION ENTRANCES); IMPLEMENTING PROCEDURES THAT EFFECTIVELY ADDRESS HAZARDOUS MATERIALS, INCLUDING A SPILL RESPONSE KIT; PREVENTING OIL, GREASE AND FUEL LEAKS BY MAINTAINING AND STORING VEHICLES AND EQUIPMENT AT APPROPRIATE OFF-SITE LOCATIONS; CONTROLLING FUGITIVE DUST EMISSIONS; PREVENTING ILLICIT DISCHARGES INTO THE STORM DRAIN SYSTEM; AND PREVENTING THE ACCUMULATION AND INFILTRATION OF SEDIMENT AT OR NEAR EXISTING STORM DRAIN SYSTEMS AND WATERWAYS.
16. ACCUMULATED SEDIMENT IN BMP'S SHALL BE REMOVED AT REGULAR INTERVALS, WITHIN SEVEN DAYS AFTER A STORMWATER RUNOFF EVENT, AND PRIOR TO THE NEXT ANTICIPATED STORM EVENT. SEDIMENT MUST BE REMOVED WHEN BMP DESIGN CAPACITY HAS BEEN REDUCED BY 50 PERCENT OR MORE.

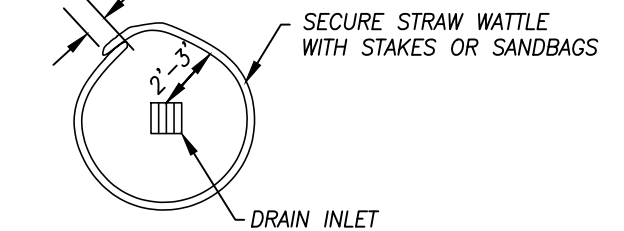


**TYPICAL EQUIPMENT AND MATERIAL STORAGE AREA NOTES:**

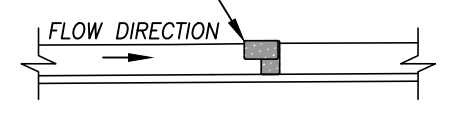
- EQUIPMENT AND MATERIAL STORAGE WILL BE LOCATED IN A DESIGNATED AREA OR REMOVED DAILY.
- INSTALL LINEAR SEDIMENT BARRIERS ON DRAINAGE PERIMETER OF STORAGE AREA.
- SPILL KITS ARE LOCATED IN STORAGE AREA AT ALL TIMES.
- IF NECESSARY, CONCRETE WASHOUT AREA WILL BE LOCATED IN STORAGE AREA.
- PROPER STORAGE OF VEHICLES AND EQUIPMENT ARE TO BE IN ACCORDANCE WITH SWPPP REQUIREMENTS.
- MATERIAL STORAGE FACILITIES ARE TO BE LOCATED IN STORAGE AREA.
- MATERIAL WASTE CONTAINMENT FACILITIES ARE TO BE LOCATED IN STORAGE AREA.
- LOOSE MATERIALS ARE TO BE COVERED WHEN NOT IN USE.
- VEHICLE AND EQUIPMENT FUELING ARE TO BE DONE IN STORAGE AREA.
- PAVING EQUIPMENT IS TO BE PARKED OVER PLASTIC COVERS.
- FINAL STAGING AREAS ARE TO BE DETERMINED BY CONTRACTOR.



**2 SANDBAG DETAIL**  
NO SCALE



**7 DROP INLET PROTECTION DETAIL**  
NO SCALE



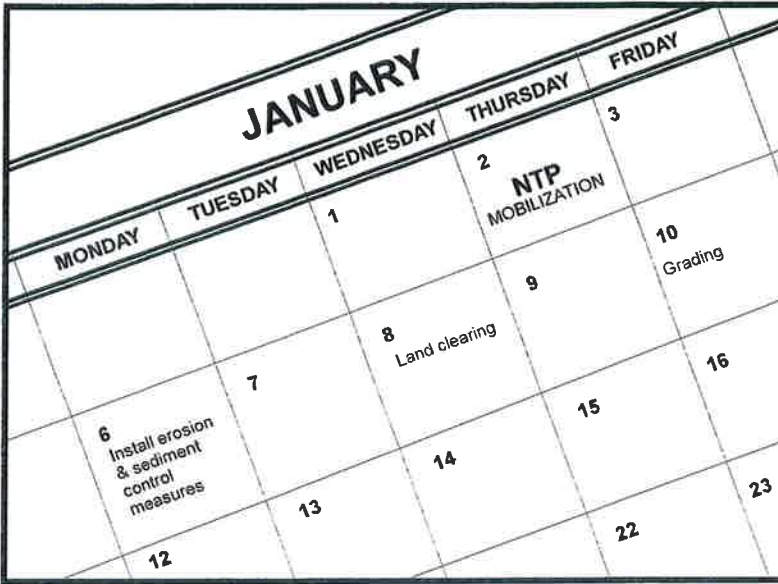
**8 SANDBAG DETAIL**  
NO SCALE

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<p>REVISIONS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> <th>BY</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>	NO.	DESCRIPTION	DATE	BY																																									<p style="text-align: right;">CERT. No. 22554</p> <p style="text-align: center;">MENDOCINO COUNTY QUALIFIED SWPPP DEVELOPER</p> <p style="text-align: right;">DATE</p> <div style="text-align: center;"> <p>TEL: (559) 733-0440 WWW.QKINC.COM</p> <p>901 EAST MAIN STREET VISALIA, CA 93272</p> <p style="font-size: small;">COPYRIGHT BY QK INC. UNAUTHORIZED USE PROHIBITED.</p> </div> <hr/> <p><b>CENTRAL UNIFIED SCHOOL DISTRICT</b> 4085 N. FOLK AVE. FRESNO, CA 93723 (559) 274-4700</p> <p><b>WEST SHIELDS ELEMENTARY SCHOOL</b> CONSTRUCTION BMPs STORM WATER POLLUTION PREVENTION PLAN</p> <hr/> <p>PROJECT NO.: 180155 DRAWN BY: HK QA/QC BY: AP SCALE: AS SHOWN SHEET NO.: 3 of 3</p>
NO.	DESCRIPTION	DATE	BY																																										

PROGRESS SET - NOT FOR CONSTRUCTION





### Description and Purpose

Scheduling is the development of a written plan that includes sequencing of construction activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

### Suitable Applications

Proper sequencing of construction activities to reduce erosion potential should be incorporated into the schedule of every construction project especially during rainy season. Use of other, more costly yet less effective, erosion and sediment control BMPs may often be reduced through proper construction sequencing.

### Limitations

- Environmental constraints such as nesting season prohibitions reduce the full capabilities of this BMP.

### Implementation

- Avoid rainy periods. Schedule major grading operations during dry months when practical. Allow enough time before rainfall begins to stabilize the soil with vegetation or physical means or to install sediment trapping devices.
- Plan the project and develop a schedule showing each phase

### Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	<input checked="" type="checkbox"/>
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

### Legend:

- Primary Objective
- Secondary Objective

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

### Potential Alternatives

None

AD 6-37c  
S&B Elementary  
02-116800



of construction. Clearly show how the rainy season relates to soil disturbing and re-stabilization activities. Incorporate the construction schedule into the SWPPP.

- Include on the schedule, details on the rainy season implementation and deployment of:
  - Erosion control BMPs
  - Sediment control BMPs
  - Tracking control BMPs
  - Wind erosion control BMPs
  - Non-stormwater BMPs
  - Waste management and materials pollution control BMPs
- Include dates for activities that may require non-stormwater discharges such as dewatering, sawcutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, pavement cleaning, etc.
- Work out the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, foundation pouring utilities installation, etc., to minimize the active construction area during the rainy season.
  - Sequence trenching activities so that most open portions are closed before new trenching begins.
  - Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
  - Schedule establishment of permanent vegetation during appropriate planting time for specified vegetation.
- Non-active areas should be stabilized as soon as practical after the cessation of soil disturbing activities or one day prior to the onset of precipitation.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year round to deploy erosion control and sediment control BMPs. Erosion may be caused during dry seasons by un-seasonal rainfall, wind, and vehicle tracking. Keep the site stabilized year round, and retain and maintain rainy season sediment trapping devices in operational condition.
- Apply permanent erosion control to areas deemed substantially complete during the project's defined seeding window.

## Costs

Construction scheduling to reduce erosion may increase other construction costs due to reduced economies of scale in performing site grading. The cost effectiveness of scheduling techniques should be compared with the other less effective erosion and sedimentation controls to achieve a cost effective balance.

## **Inspection and Maintenance**

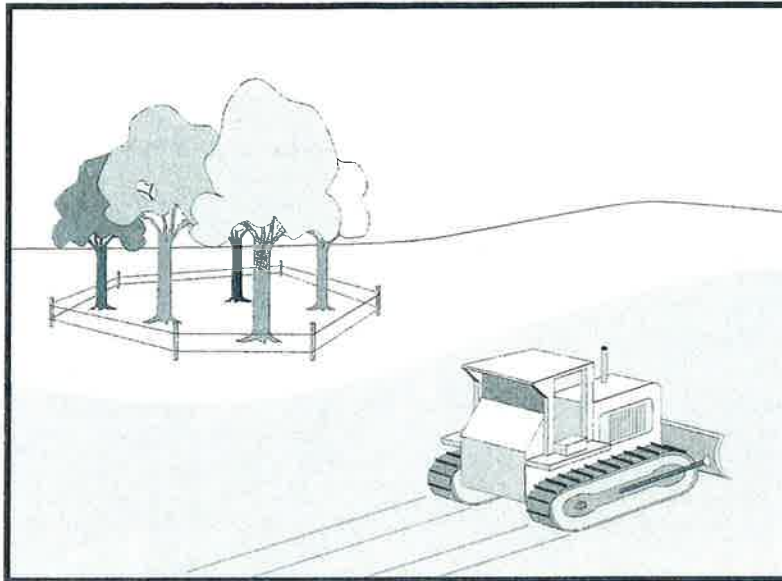
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

## **References**

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities Developing Pollution Prevention Plans and Best Management Practices (EPA 832-R-92-005), U.S. Environmental Protection Agency, Office of Water, September 1992.

# Preservation Of Existing Vegetation EC-2



## Description and Purpose

Carefully planned preservation of existing vegetation minimizes the potential of removing or injuring existing trees, vines, shrubs, and grasses that protect soil from erosion.

## Suitable Applications

Preservation of existing vegetation is suitable for use on most projects. Large project sites often provide the greatest opportunity for use of this BMP. Suitable applications include the following:

- Areas within the site where no construction activity occurs, or occurs at a later date. This BMP is especially suitable to multi year projects where grading can be phased.
- Areas where natural vegetation exists and is designated for preservation. Such areas often include steep slopes, watercourse, and building sites in wooded areas.
- Areas where local, state, and federal government require preservation, such as vernal pools, wetlands, marshes, certain oak trees, etc. These areas are usually designated on the plans, or in the specifications, permits, or environmental documents.
- Where vegetation designated for ultimate removal can be temporarily preserved and be utilized for erosion control and sediment control.

## Limitations

- Requires forward planning by the owner/developer,

## Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input type="checkbox"/>
TC	Tracking Control	<input type="checkbox"/>
WE	Wind Erosion Control	<input type="checkbox"/>
NS	Non-Stormwater Management Control	<input type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input type="checkbox"/>

## Legend:

- Primary Objective
- Secondary Objective

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input type="checkbox"/>
Trash	<input type="checkbox"/>
Metals	<input type="checkbox"/>
Bacteria	<input type="checkbox"/>
Oil and Grease	<input type="checkbox"/>
Organics	<input type="checkbox"/>

## Potential Alternatives

None



# Preservation Of Existing Vegetation EC-2

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contractor, and design staff.

- Limited opportunities for use when project plans do not incorporate existing vegetation into the site design.
- For sites with diverse topography, it is often difficult and expensive to save existing trees while grading the site satisfactory for the planned development.

## **Implementation**

The best way to prevent erosion is to not disturb the land. In order to reduce the impacts of new development and redevelopment, projects may be designed to avoid disturbing land in sensitive areas of the site (e.g., natural watercourses, steep slopes), and to incorporate unique or desirable existing vegetation into the site's landscaping plan. Clearly marking and leaving a buffer area around these unique areas during construction will help to preserve these areas as well as take advantage of natural erosion prevention and sediment trapping.

Existing vegetation to be preserved on the site must be protected from mechanical and other injury while the land is being developed. The purpose of protecting existing vegetation is to ensure the survival of desirable vegetation for shade, beautification, and erosion control. Mature vegetation has extensive root systems that help to hold soil in place, thus reducing erosion. In addition, vegetation helps keep soil from drying rapidly and becoming susceptible to erosion. To effectively save existing vegetation, no disturbances of any kind should be allowed within a defined area around the vegetation. For trees, no construction activity should occur within the drip line of the tree.

## **Timing**

- Provide for preservation of existing vegetation prior to the commencement of clearing and grubbing operations or other soil disturbing activities in areas where no construction activity is planned or will occur at a later date.

## **Design and Layout**

- Mark areas to be preserved with temporary fencing. Include sufficient setback to protect roots.
  - Orange colored plastic mesh fencing works well.
  - Use appropriate fence posts and adequate post spacing and depth to completely support the fence in an upright position.
- Locate temporary roadways, stockpiles, and layout areas to avoid stands of trees, shrubs, and grass.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Maintain existing irrigation systems where feasible. Temporary irrigation may be required.
- Instruct employees and subcontractors to honor protective devices. Prohibit heavy equipment, vehicular traffic, or storage of construction materials within the protected area.

# **Preservation Of Existing Vegetation EC-2**

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## **Costs**

There is little cost associated with preserving existing vegetation if properly planned during the project design, and these costs may be offset by aesthetic benefits that enhance property values. During construction, the cost for preserving existing vegetation will likely be less than the cost of applying erosion and sediment controls to the disturbed area. Replacing vegetation inadvertently destroyed during construction can be extremely expensive, sometimes in excess of \$10,000 per tree.

## **Inspection and Maintenance**

During construction, the limits of disturbance should remain clearly marked at all times. Irrigation or maintenance of existing vegetation should be described in the landscaping plan. If damage to protected trees still occurs, maintenance guidelines described below should be followed:

- Verify that protective measures remain in place. Restore damaged protection measures immediately.
- Serious tree injuries shall be attended to by an arborist.
- Damage to the crown, trunk, or root system of a retained tree shall be repaired immediately.
- Trench as far from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching or tunneling near or under trees to be retained, place tunnels at least 18 in. below the ground surface, and not below the tree center to minimize impact on the roots.
- Do not leave tree roots exposed to air. Cover exposed roots with soil as soon as possible. If soil covering is not practical, protect exposed roots with wet burlap or peat moss until the tunnel or trench is ready for backfill.
- Cleanly remove the ends of damaged roots with a smooth cut.
- Fill trenches and tunnels as soon as possible. Careful filling and tamping will eliminate air spaces in the soil, which can damage roots.
- If bark damage occurs, cut back all loosened bark into the undamaged area, with the cut tapered at the top and bottom and drainage provided at the base of the wood. Limit cutting the undamaged area as much as possible.
- Aerate soil that has been compacted over a trees root zone by punching holes 12 in. deep with an iron bar, and moving the bar back and forth until the soil is loosened. Place holes 18 in. apart throughout the area of compacted soil under the tree crown.
- Fertilization
  - Fertilize stressed or damaged broadleaf trees to aid recovery.
  - Fertilize trees in the late fall or early spring.

# **Preservation Of Existing Vegetation EC-2**

- Apply fertilizer to the soil over the feeder roots and in accordance with label instructions, but never closer than 3 ft to the trunk. Increase the fertilized area by one-fourth of the crown area for conifers that have extended root systems.
- Retain protective measures until all other construction activity is complete to avoid damage during site cleanup and stabilization.

## **References**

County of Sacramento Tree Preservation Ordinance, September 1981.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Water Quality Management Plan for The Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.



## Description and Purpose

A silt fence is made of a woven geotextile that has been entrenched, attached to supporting poles, and sometimes backed by a plastic or wire mesh for support. The silt fence detains sediment-laden water, promoting sedimentation behind the fence.

## Suitable Applications

Silt fences are suitable for perimeter control, placed below areas where sheet flows discharge from the site. They could also be used as interior controls below disturbed areas where runoff may occur in the form of sheet and rill erosion and around inlets within disturbed areas (SE-10). Silt fences are generally ineffective in locations where the flow is concentrated and are only applicable for sheet or overland flows. Silt fences are most effective when used in combination with erosion controls. Suitable applications include:

- Along the perimeter of a project.
- Below the toe or down slope of exposed and erodible slopes.
- Along streams and channels.
- Around temporary spoil areas and stockpiles.
- Around inlets.
- Below other small cleared areas.

## Categories

<b>EC</b>	Erosion Control	
<b>SE</b>	Sediment Control	<input checked="" type="checkbox"/>
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	
<b>NS</b>	Non-Stormwater Management Control	
<b>WM</b>	Waste Management and Materials Pollution Control	

## Legend:

- Primary Category**
- Secondary Category**

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

## Potential Alternatives

- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-10 Storm Drain Inlet Protection
- SE-14 Biofilter Bags





## Limitations

- Do not use in streams, channels, drain inlets, or anywhere flow is concentrated.
- Do not use in locations where ponded water may cause a flooding hazard. Runoff typically ponds temporarily on the upstream side of silt fence.
- Do not use silt fence to divert water flows or place across any contour line. Fences not constructed on a level contour, or fences used to divert flow will concentrate flows resulting in additional erosion and possibly overtopping or failure of the silt fence.
- Improperly installed fences are subject to failure from undercutting, overtopping, or collapsing.
- Not effective unless trenched and keyed in.
- Not intended for use as mid-slope protection on slopes greater than 4:1 (H:V).
- Do not use on slopes subject to creeping, slumping, or landslides.

## Implementation

### *General*

A silt fence is a temporary sediment barrier consisting of woven geotextile stretched across and attached to supporting posts, trenched-in, and, depending upon the strength of fabric used, supported with plastic or wire mesh fence. Silt fences trap sediment by intercepting and detaining small amounts of sediment-laden runoff from disturbed areas in order to promote sedimentation behind the fence.

The following layout and installation guidance can improve performance and should be followed:

- Use principally in areas where sheet flow occurs.
- Install along a level contour, so water does not pond more than 1.5 ft at any point along the silt fence.
- The maximum length of slope draining to any point along the silt fence should be 200 ft or less.
- The maximum slope perpendicular to the fence line should be 1:1.
- Provide sufficient room for runoff to pond behind the fence and to allow sediment removal equipment to pass between the silt fence and toes of slopes or other obstructions. About 1200 ft<sup>2</sup> of ponding area should be provided for every acre draining to the fence.
- Turn the ends of the filter fence uphill to prevent stormwater from flowing around the fence.
- Leave an undisturbed or stabilized area immediately down slope from the fence where feasible.

- Silt fences should remain in place until the disturbed area is permanently stabilized, after which, the silt fence should be removed and properly disposed.
- Silt fence should be used in combination with erosion source controls up slope in order to provide the most effective sediment control.
- Be aware of local regulations regarding the type and installation requirements of silt fence, which may differ from those presented in this fact sheet.

## ***Design and Layout***

The fence should be supported by a plastic or wire mesh if the fabric selected does not have sufficient strength and bursting strength characteristics for the planned application (as recommended by the fabric manufacturer). Woven geotextile material should contain ultraviolet inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0 °F to 120 °F.

- Layout in accordance with attached figures.
- For slopes steeper than 2:1 (H:V) and that contain a high number of rocks or large dirt clods that tend to dislodge, it may be necessary to install additional protection immediately adjacent to the bottom of the slope, prior to installing silt fence. Additional protection may be a chain link fence or a cable fence.
- For slopes adjacent to sensitive receiving waters or Environmentally Sensitive Areas (ESAs), silt fence should be used in conjunction with erosion control BMPs.

## ***Standard vs. Heavy Duty Silt Fence***

### *Standard Silt Fence*

- Generally applicable in cases where the slope of area draining to the silt fence is 4:1 (H:V) or less.
- Used for shorter durations, typically 5 months or less
- Area draining to fence produces moderate sediment loads.

### *Heavy Duty Silt Fence*

- Use is generally limited to 8 months or less.
- Area draining to fence produces moderate sediment loads.
- Heavy duty silt fence usually has 1 or more of the following characteristics, not possessed by standard silt fence.
  - Fence fabric has higher tensile strength.
  - Fabric is reinforced with wire backing or additional support.
  - Posts are spaced closer than pre-manufactured, standard silt fence products.
  - Posts are metal (steel or aluminum)

## ***Materials***

### **Standard Silt Fence**

- Silt fence material should be woven geotextile with a minimum width of 36 in. and a minimum tensile strength of 100 lb force. The fabric should conform to the requirements in ASTM designation D4632 and should have an integral reinforcement layer. The

reinforcement layer should be a polypropylene, or equivalent, net provided by the manufacturer. The permittivity of the fabric should be between  $0.1 \text{ sec}^{-1}$  and  $0.15 \text{ sec}^{-1}$  in conformance with the requirements in ASTM designation D4491.

- Wood stakes should be commercial quality lumber of the size and shape shown on the plans. Each stake should be free from decay, splits or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.
- Staples used to fasten the fence fabric to the stakes should be not less than 1.75 in. long and should be fabricated from 15 gauge or heavier wire. The wire used to fasten the tops of the stakes together when joining two sections of fence should be 9 gauge or heavier wire. Galvanizing of the fastening wire will not be required.

### Heavy-Duty Silt Fence

- Some silt fence has a wire backing to provide additional support, and there are products that may use prefabricated plastic holders for the silt fence and use metal posts or bar reinforcement instead of wood stakes. If bar reinforcement is used in lieu of wood stakes, use number four or greater bar. Provide end protection for any exposed bar reinforcement for health and safety purposes.

### ***Installation Guidelines – Traditional Method***

Silt fences are to be constructed on a level contour. Sufficient area should exist behind the fence for ponding to occur without flooding or overtopping the fence.

- A trench should be excavated approximately 6 in. wide and 6 in. deep along the line of the proposed silt fence (trenches should not be excavated wider or deeper than necessary for proper silt fence installation).
- Bottom of the silt fence should be keyed-in a minimum of 12 in.
- Posts should be spaced a maximum of 6 ft apart and driven securely into the ground a minimum of 18 in. or 12 in. below the bottom of the trench.
- When standard strength geotextile is used, a plastic or wire mesh support fence should be fastened securely to the upslope side of posts using heavy-duty wire staples at least 1 in. long. The mesh should extend into the trench.
- When extra-strength geotextile and closer post spacing are used, the mesh support fence may be eliminated.
- Woven geotextile should be purchased in a long roll, then cut to the length of the barrier. When joints are necessary, geotextile should be spliced together only at a support post, with a minimum 6 in. overlap and both ends securely fastened to the post.
- The trench should be backfilled with native material and compacted.
- Construct silt fences with a setback of at least 3 ft from the toe of a slope. Where, due to specific site conditions, a 3 ft setback is not available, the silt fence may be constructed at the

toe of the slope, but should be constructed as far from the toe of the slope as practicable. Silt fences close to the toe of the slope will be less effective and more difficult to maintain.

- Construct the length of each reach so that the change in base elevation along the reach does not exceed  $\frac{1}{3}$  the height of the barrier; in no case should the reach exceed 500 ft.
- Cross barriers should be a minimum of  $\frac{1}{3}$  and a maximum of  $\frac{1}{2}$  the height of the linear barrier.
- See typical installation details at the end of this fact sheet.

### ***Installation Guidelines - Static Slicing Method***

- Static Slicing is defined as insertion of a narrow blade pulled behind a tractor, similar to a plow blade, at least 10 inches into the soil while at the same time pulling silt geotextile fabric into the ground through the opening created by the blade to the depth of the blade. Once the geotextile is installed, the soil is compacted using tractor tires.
- This method will not work with pre-fabricated, wire backed silt fence.
- Benefits:
  - Ease of installation (most often done with a 2 person crew). In addition, installation using static slicing has been found to be more efficient on slopes, in rocky soils, and in saturated soils.
  - Minimal soil disturbance.
  - Greater level of compaction along fence, leading to higher performance (i.e. greater sediment retention).
  - Uniform installation.
  - Less susceptible to undercutting/undermining.

### **Costs**

- It should be noted that costs vary greatly across regions due to available supplies and labor costs.
- Average annual cost for installation using the traditional silt fence installation method (assumes 6 month useful life) is \$7 per linear foot based on vendor research. Range of cost is \$3.50 - \$9.10 per linear foot.
- In tests, the slicing method required 0.33 man hours per 100 linear feet, while the trenched based systems required as much as 1.01 man hours per linear foot.

### **Inspection and Maintenance**

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair undercut silt fences.

- Repair or replace split, torn, slumping, or weathered fabric. The lifespan of silt fence fabric is generally 5 to 8 months.
- Silt fences that are damaged and become unsuitable for the intended purpose should be removed from the site of work, disposed, and replaced with new silt fence barriers.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Silt fences should be left in place until the upstream area is permanently stabilized. Until then, the silt fence should be inspected and maintained regularly.
- Remove silt fence when upgradient areas are stabilized. Fill and compact post holes and anchor trench, remove sediment accumulation, grade fence alignment to blend with adjacent ground, and stabilize disturbed area.

## References

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group-Working Paper, USEPA, April 1992.

Sedimentation and Erosion Control Practices, and Inventory of Current Practices (Draft), UESPA, 1990.

Southeastern Wisconsin Regional Planning Commission (SWRPC). Costs of Urban Nonpoint Source Water Pollution Control Measures. Technical Report No. 31. Southeastern Wisconsin Regional Planning Commission, Waukesha, WI. 1991

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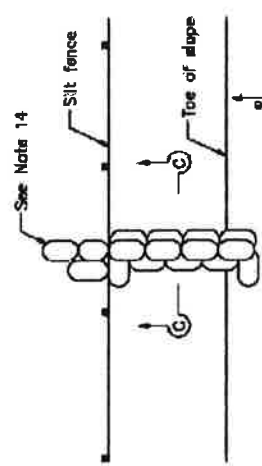
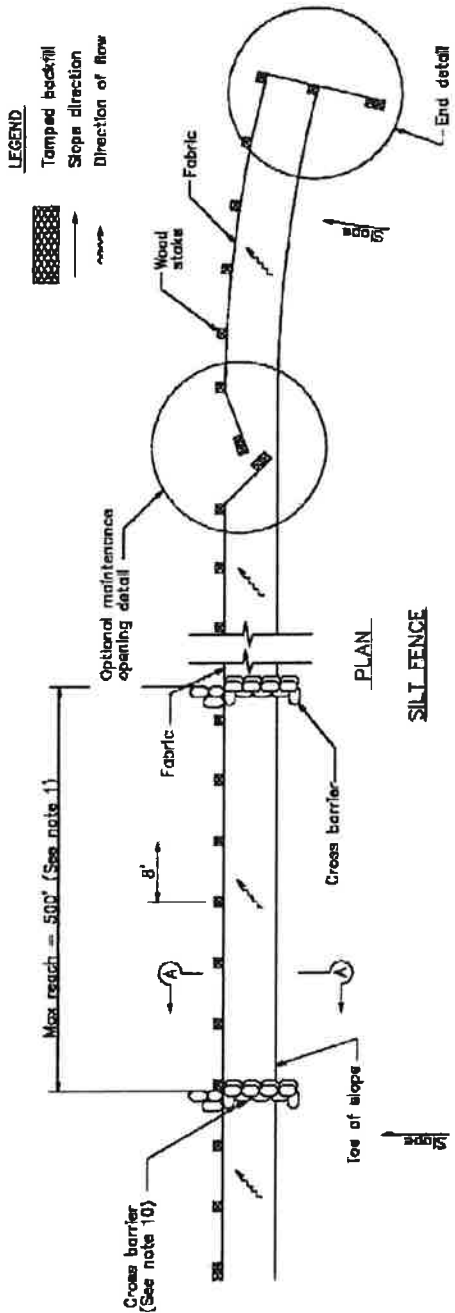
U.S. Environmental Protection Agency (USEPA). Stormwater Management for Industrial Activities: Developing Pollution Prevention Plans and Best Management Practices. U.S. Environmental Protection Agency, Office of Water, Washington, DC, 1992.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988. Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

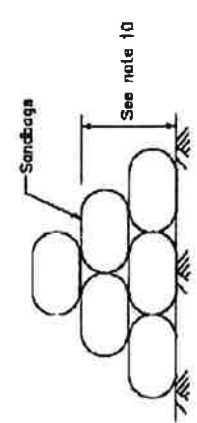
Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

# Silt Fence

SE-1



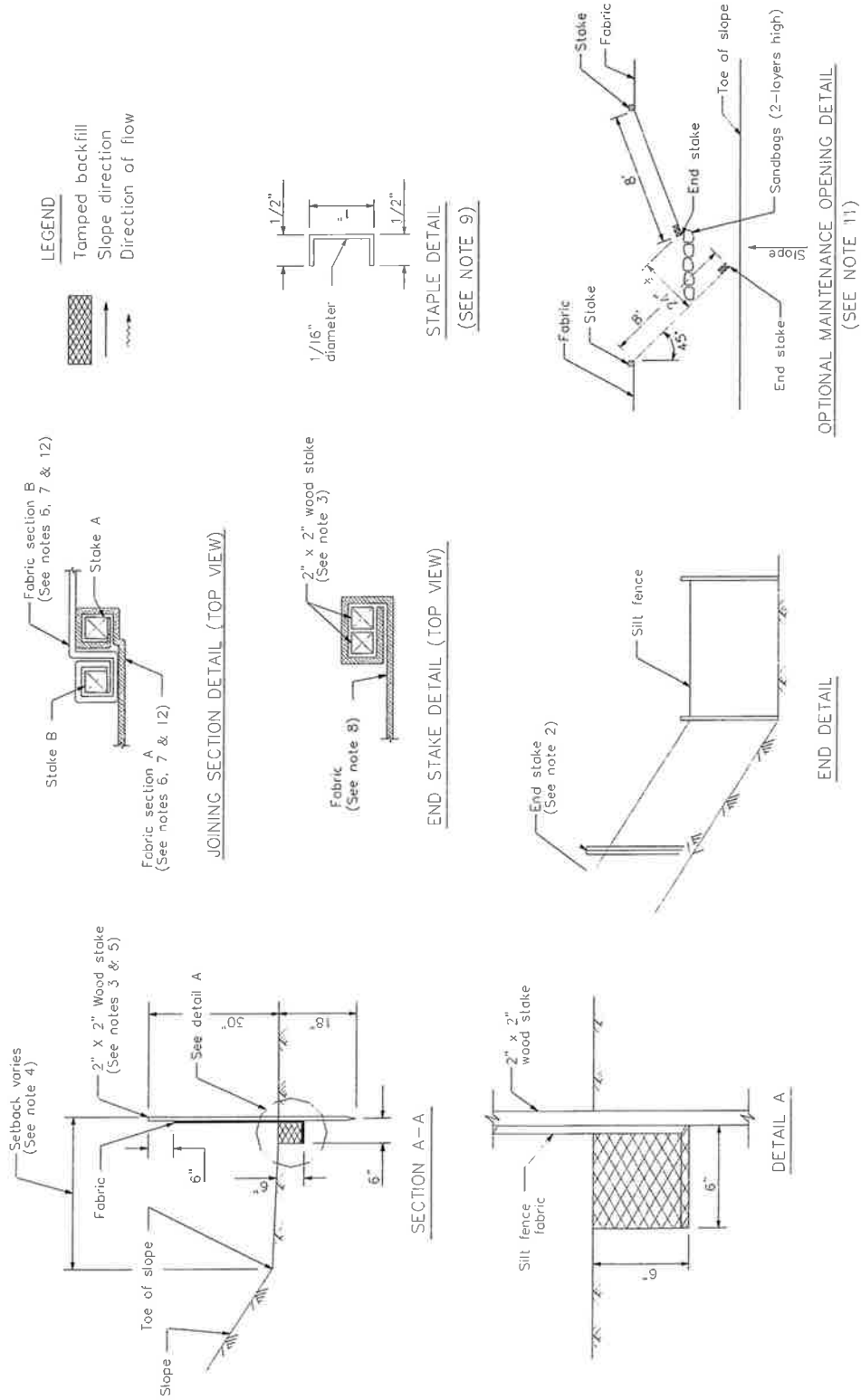
CROSS BARRIER DETAIL

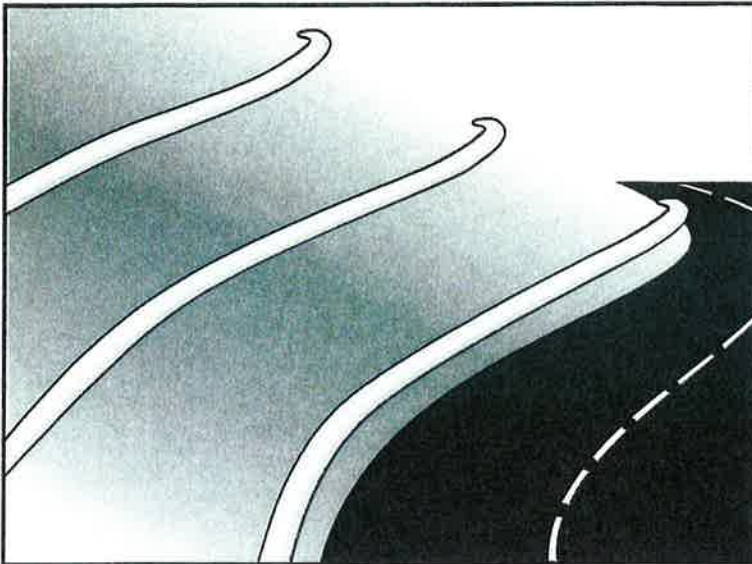


SECTION C-C

**NOTES**

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/3 the height of the linear barrier. In no case shall the reach length exceed 500'.
2. The last 8'-0" of fence shall be turned up slope.
3. Stake dimensions are nominal.
4. Dimension may vary to fit field condition.
5. Stakes shall be spaced at 8'-0" maximum and shall be positioned on downstream side of fence.
6. Stakes to overlap and fence fabric to fold around each stake one full turn. Secure fabric to stakes with 4 staples.
7. Stakes shall be driven tightly together to prevent potential flow-through of sediment at joint. The tops of the stakes shall be secured with wire.
8. For end stakes, fence fabric shall be folded around two stakes one full turn and secured with 4 staples.
9. Minimum 4 staples per stake. Dimensions shown are typical.
10. Cross barriers shall be a minimum of 1/3 and a maximum of 1/2 the height of the linear barrier.
11. Maintenance openings shall be constructed in a manner to ensure sediment remains behind silt fence.
12. Jointing sections shall not be placed at sump locations.
13. Sandbag rows and layers shall be offset to eliminate gaps.
14. Add 3-4 bags to cross barrier on downgradient side of silt fence as needed to prevent bypass or undermining and as allowable based on site limits of disturbance.





### Description and Purpose

A fiber roll consists of straw, coir, or other biodegradable materials bound into a tight tubular roll wrapped by netting, which can be photodegradable or natural. Additionally, gravel core fiber rolls are available, which contain an imbedded ballast material such as gravel or sand for additional weight when staking the rolls are not feasible (such as use as inlet protection). When fiber rolls are placed at the toe and on the face of slopes along the contours, they intercept runoff, reduce its flow velocity, release the runoff as sheet flow, and provide removal of sediment from the runoff (through sedimentation). By interrupting the length of a slope, fiber rolls can also reduce sheet and rill erosion until vegetation is established.

### Suitable Applications

Fiber rolls may be suitable:

- Along the toe, top, face, and at grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow.
- At the end of a downward slope where it transitions to a steeper slope.
- Along the perimeter of a project.
- As check dams in unlined ditches with minimal grade.
- Down-slope of exposed soil areas.
- At operational storm drains as a form of inlet protection.

### Categories

<b>EC</b>	Erosion Control	<input checked="" type="checkbox"/>
<b>SE</b>	Sediment Control	<input checked="" type="checkbox"/>
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	
<b>NS</b>	Non-Stormwater Management Control	
<b>WM</b>	Waste Management and Materials Pollution Control	

### Legend:

- Primary Category
- Secondary Category

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

### Potential Alternatives

- SE-1 Silt Fence
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-14 Biofilter Bags





- Around temporary stockpiles.

## **Limitations**

- Fiber rolls are not effective unless trenched in and staked.
- Not intended for use in high flow situations.
- Difficult to move once saturated.
- If not properly staked and trenched in, fiber rolls could be transported by high flows.
- Fiber rolls have a very limited sediment capture zone.
- Fiber rolls should not be used on slopes subject to creep, slumping, or landslide.
- Rolls typically function for 12-24 months depending upon local conditions.

## **Implementation**

### ***Fiber Roll Materials***

- Fiber rolls should be prefabricated.
- Fiber rolls may come manufactured containing polyacrylamide (PAM), a flocculating agent within the roll. Fiber rolls impregnated with PAM provide additional sediment removal capabilities and should be used in areas with fine, clayey or silty soils to provide additional sediment removal capabilities. Monitoring may be required for these installations.
- Fiber rolls are made from weed free rice straw, flax, or a similar agricultural material bound into a tight tubular roll by netting.
- Typical fiber rolls vary in diameter from 9 in. to 20 in. Larger diameter rolls are available as well.

### ***Installation***

- Locate fiber rolls on level contours spaced as follows:
  - Slope inclination of 4:1 (H:V) or flatter: Fiber rolls should be placed at a maximum interval of 20 ft.
  - Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 ft. (a closer spacing is more effective).
  - Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 ft. (a closer spacing is more effective).
- Prepare the slope before beginning installation.
- Dig small trenches across the slope on the contour. The trench depth should be 1/4 to 1/3 of the thickness of the roll, and the width should equal the roll diameter, in order to provide area to backfill the trench.

- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- It is recommended that pilot holes be driven through the fiber roll. Use a straight bar to drive holes through the roll and into the soil for the wooden stakes.
- Turn the ends of the fiber roll up slope to prevent runoff from going around the roll.
- Stake fiber rolls into the trench.
  - Drive stakes at the end of each fiber roll and spaced 4 ft maximum on center.
  - Use wood stakes with a nominal classification of 0.75 by 0.75 in. and minimum length of 24 in.
- If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.
- See typical fiber roll installation details at the end of this fact sheet.

## **Removal**

- Fiber rolls can be left in place or removed depending on the type of fiber roll and application (temporary vs. permanent installation). Typically, fiber rolls encased with plastic netting are used for a temporary application because the netting does not biodegrade. Fiber rolls used in a permanent application are typically encased with a biodegradable material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance.
- Temporary installations should only be removed when up gradient areas are stabilized per General Permit requirements, and/or pollutant sources no longer present a hazard. But, they should also be removed before vegetation becomes too mature so that the removal process does not disturb more soil and vegetation than is necessary.

## **Costs**

Material costs for regular fiber rolls range from \$20 - \$30 per 25 ft roll.

Material costs for PAM impregnated fiber rolls range between 7.00-\$9.00 per linear foot, based upon vendor research.

## **Inspection and Maintenance**

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Repair or replace split, torn, unraveling, or slumping fiber rolls.
- If the fiber roll is used as a sediment capture device, or as an erosion control device to maintain sheet flows, sediment that accumulates in the BMP should be periodically removed

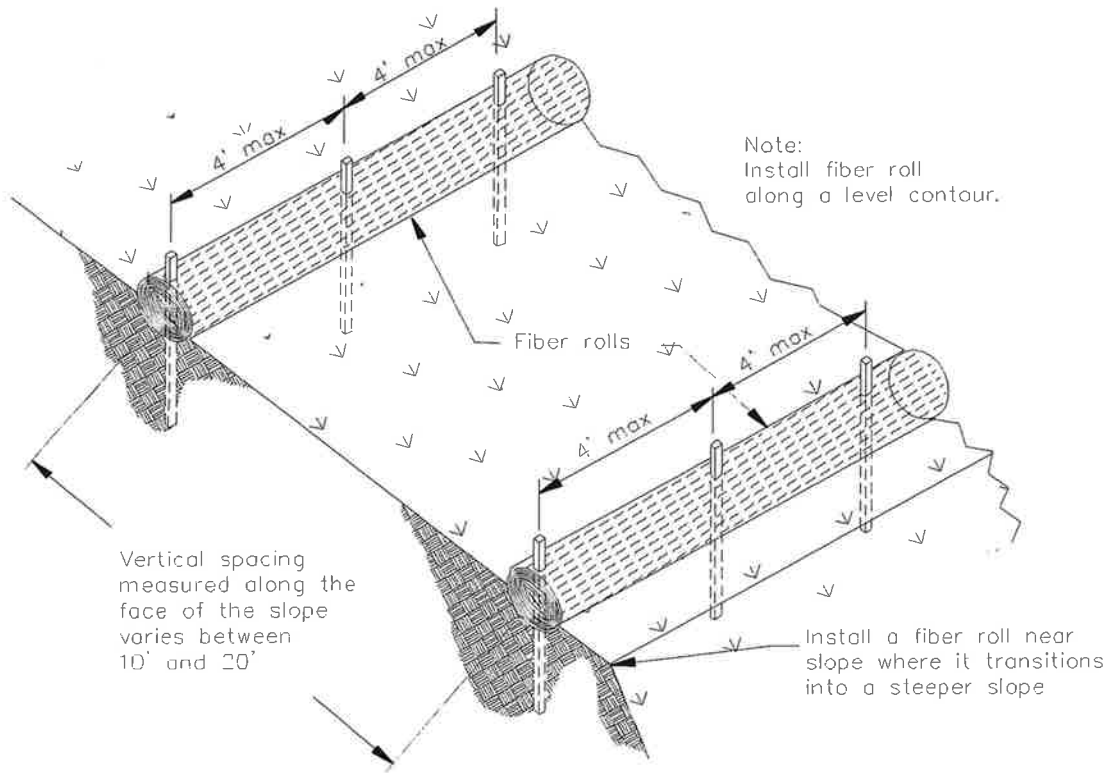
in order to maintain BMP effectiveness. Sediment should be removed when sediment accumulation reaches one-third the designated sediment storage depth.

- If fiber rolls are used for erosion control, such as in a check dam, sediment removal should not be required as long as the system continues to control the grade. Sediment control BMPs will likely be required in conjunction with this type of application.
- Repair any rills or gullies promptly.

## References

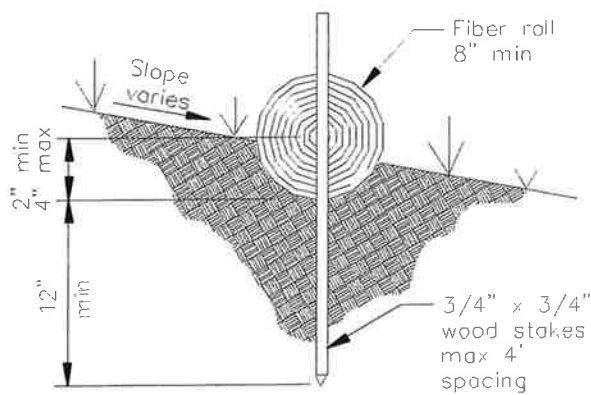
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



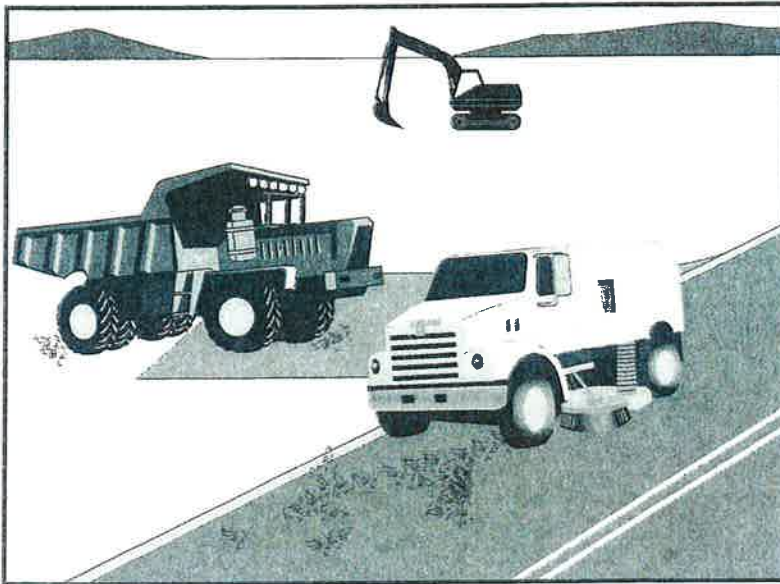
TYPICAL FIBER ROLL INSTALLATION

N.T.S.



ENTRENCHMENT DETAIL

N.T.S.



### Description and Purpose

Street sweeping and vacuuming includes use of self-propelled and walk-behind equipment to remove sediment from streets and roadways, and to clean paved surfaces in preparation for final paving. Sweeping and vacuuming prevents sediment from the project site from entering storm drains or receiving waters.

### Suitable Applications

Sweeping and vacuuming are suitable anywhere sediment is tracked from the project site onto public or private paved streets and roads, typically at points of egress. Sweeping and vacuuming are also applicable during preparation of paved surfaces for final paving.

### Limitations

Sweeping and vacuuming may not be effective when sediment is wet or when tracked soil is caked (caked soil may need to be scraped loose).

### Implementation

- Controlling the number of points where vehicles can leave the site will allow sweeping and vacuuming efforts to be focused, and perhaps save money.
- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed on a daily basis.
- Do not use kick brooms or sweeper attachments. These tend to spread the dirt rather than remove it.

### Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

### Legend:

- Primary Objective
- Secondary Objective

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

### Potential Alternatives

None



- If not mixed with debris or trash, consider incorporating the removed sediment back into the project

## Costs

Rental rates for self-propelled sweepers vary depending on hopper size and duration of rental. Expect rental rates from \$58/hour (3 yd<sup>3</sup> hopper) to \$88/hour (9 yd<sup>3</sup> hopper), plus operator costs. Hourly production rates vary with the amount of area to be swept and amount of sediment. Match the hopper size to the area and expect sediment load to minimize time spent dumping.

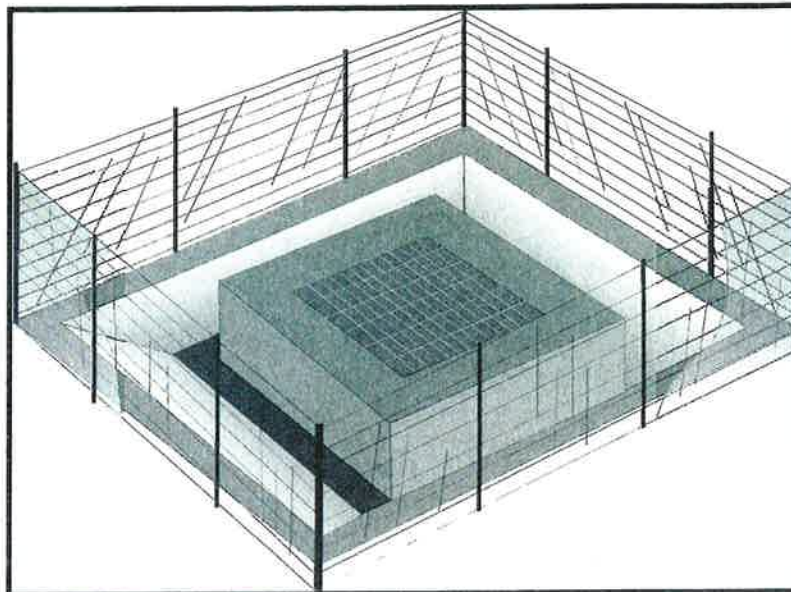
## Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in use, points of ingress and egress must be inspected daily.
- When tracked or spilled sediment is observed outside the construction limits, it must be removed at least daily. More frequent removal, even continuous removal, may be required in some jurisdictions.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- Adjust brooms frequently; maximize efficiency of sweeping operations.
- After sweeping is finished, properly dispose of sweeper wastes at an approved dumpsite.

## References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Labor Surcharge and Equipment Rental Rates, State of California Department of Transportation (Caltrans), April 1, 2002 – March 31, 2003.



### Description and Purpose

Storm drain inlet protection consists of a sediment filter or an impounding area in, around or upstream of a storm drain, drop inlet, or curb inlet. Storm drain inlet protection measures temporarily pond runoff before it enters the storm drain, allowing sediment to settle. Some filter configurations also remove sediment by filtering, but usually the ponding action results in the greatest sediment reduction. Temporary geotextile storm drain inserts attach underneath storm drain grates to capture and filter storm water.

### Suitable Applications

Every storm drain inlet receiving runoff from unstabilized or otherwise active work areas should be protected. Inlet protection should be used in conjunction with other erosion and sediment controls to prevent sediment-laden stormwater and non-stormwater discharges from entering the storm drain system.

### Limitations

- Drainage area should not exceed 1 acre.
- In general straw bales should not be used as inlet protection.
- Requires an adequate area for water to pond without encroaching into portions of the roadway subject to traffic.

### Categories

<b>EC</b>	Erosion Control	
<b>SE</b>	Sediment Control	<input checked="" type="checkbox"/>
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	
<b>NS</b>	Non-Stormwater Management Control	
<b>WM</b>	Waste Management and Materials Pollution Control	

### Legend:

- Primary Category**
- Secondary Category**

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	
Organics	

### Potential Alternatives

- SE-1 Silt Fence
- SE-5 Fiber Rolls
- SE-6 Gravel Bag Berm
- SE-8 Sandbag Barrier
- SE-14 Biofilter Bags



- Sediment removal may be inadequate to prevent sediment discharges in high flow conditions or if runoff is heavily sediment laden. If high flow conditions are expected, use other onsite sediment trapping techniques in conjunction with inlet protection.
- Frequent maintenance is required.
- Limit drainage area to 1 acre maximum. For drainage areas larger than 1 acre, runoff should be routed to a sediment-trapping device designed for larger flows. See BMPs SE-2, Sediment Basin, and SE-3, Sediment Traps.
- Excavated drop inlet sediment traps are appropriate where relatively heavy flows are expected, and overflow capability is needed.

## Implementation

### *General*

Inlet control measures presented in this handbook should not be used for inlets draining more than one acre. Runoff from larger disturbed areas should be first routed through SE-2, Sediment Basin or SE-3, Sediment Trap and/or used in conjunction with other drainage control, erosion control, and sediment control BMPs to protect the site. Different types of inlet protection are appropriate for different applications depending on site conditions and the type of inlet. Alternative methods are available in addition to the methods described/shown herein such as prefabricated inlet insert devices, or gutter protection devices.

### *Design and Layout*

Identify existing and planned storm drain inlets that have the potential to receive sediment-laden surface runoff. Determine if storm drain inlet protection is needed and which method to use.

- The key to successful and safe use of storm drain inlet protection devices is to know where runoff that is directed toward the inlet to be protected will pond or be diverted as a result of installing the protection device.
  - Determine the acceptable location and extent of ponding in the vicinity of the drain inlet. The acceptable location and extent of ponding will influence the type and design of the storm drain inlet protection device.
  - Determine the extent of potential runoff diversion caused by the storm drain inlet protection device. Runoff ponded by inlet protection devices may flow around the device and towards the next downstream inlet. In some cases, this is acceptable; in other cases, serious erosion or downstream property damage can be caused by these diversions. The possibility of runoff diversions will influence whether or not storm drain inlet protection is suitable; and, if suitable, the type and design of the device.
- The location and extent of ponding, and the extent of diversion, can usually be controlled through appropriate placement of the inlet protection device. In some cases, moving the inlet protection device a short distance upstream of the actual inlet can provide more efficient sediment control, limit ponding to desired areas, and prevent or control diversions.



- Six types of inlet protection are presented below. However, it is recognized that other effective methods and proprietary devices exist and may be selected.
  - Silt Fence: Appropriate for drainage basins with less than a 5% slope, sheet flows, and flows under 0.5 cfs.
  - Excavated Drop Inlet Sediment Trap: An excavated area around the inlet to trap sediment (SE-3).
  - Gravel bag barrier: Used to create a small sediment trap upstream of inlets on sloped, paved streets. Appropriate for sheet flow or when concentrated flow may exceed 0.5 cfs, and where overtopping is required to prevent flooding.
  - Block and Gravel Filter: Appropriate for flows greater than 0.5 cfs.
  - Temporary Geotextile Storm drain Inserts: Different products provide different features. Refer to manufacturer details for targeted pollutants and additional features.
  - Biofilter Bag Barrier: Used to create a small retention area upstream of inlets and can be located on pavement or soil. Biofilter bags slowly filter runoff allowing sediment to settle out. Appropriate for flows under 0.5 cfs.
- Select the appropriate type of inlet protection and design as referred to or as described in this fact sheet.
- Provide area around the inlet for water to pond without flooding structures and property.
- Grates and spaces around all inlets should be sealed to prevent seepage of sediment-laden water.
- Excavate sediment sumps (where needed) 1 to 2 ft with 2:1 side slopes around the inlet.

## **Installation**

- **DI Protection Type 1 - Silt Fence** - Similar to constructing a silt fence; see BMP SE-1, Silt Fence. Do not place fabric underneath the inlet grate since the collected sediment may fall into the drain inlet when the fabric is removed or replaced and water flow through the grate will be blocked resulting in flooding. See typical Type 1 installation details at the end of this fact sheet.
  1. Excavate a trench approximately 6 in. wide and 6 in. deep along the line of the silt fence inlet protection device.
  2. Place 2 in. by 2 in. wooden stakes around the perimeter of the inlet a maximum of 3 ft apart and drive them at least 18 in. into the ground or 12 in. below the bottom of the trench. The stakes should be at least 48 in.
  3. Lay fabric along bottom of trench, up side of trench, and then up stakes. See SE-1, Silt Fence, for details. The maximum silt fence height around the inlet is 24 in.
  4. Staple the filter fabric (for materials and specifications, see SE-1, Silt Fence) to wooden stakes. Use heavy-duty wire staples at least 1 in. in length.

5. Backfill the trench with gravel or compacted earth all the way around.
- **DI Protection Type 2 - Excavated Drop Inlet Sediment Trap** - Install filter fabric fence in accordance with DI Protection Type 1. Size excavated trap to provide a minimum storage capacity calculated at the rate 67 yd<sup>3</sup>/acre of drainage area. See typical Type 2 installation details at the end of this fact sheet.
  - **DI Protection Type 3 - Gravel bag** - Flow from a severe storm should not overtop the curb. In areas of high clay and silts, use filter fabric and gravel as additional filter media. Construct gravel bags in accordance with SE-6, Gravel Bag Berm. Gravel bags should be used due to their high permeability. See typical Type 3 installation details at the end of this fact sheet.
    1. Construct on gently sloping street.
    2. Leave room upstream of barrier for water to pond and sediment to settle.
    3. Place several layers of gravel bags – overlapping the bags and packing them tightly together.
    4. Leave gap of one bag on the top row to serve as a spillway. Flow from a severe storm (e.g., 10 year storm) should not overtop the curb.
  - **DI Protection Type 4 – Block and Gravel Filter** - Block and gravel filters are suitable for curb inlets commonly used in residential, commercial, and industrial construction. See typical Type 4 installation details at the end of this fact sheet.
    1. Place hardware cloth or comparable wire mesh with 0.5 in. openings over the drop inlet so that the wire extends a minimum of 1 ft beyond each side of the inlet structure. If more than one strip is necessary, overlap the strips. Place woven geotextile over the wire mesh.
    2. Place concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, so that the open ends face outward, not upward. The ends of adjacent blocks should abut. The height of the barrier can be varied, depending on design needs, by stacking combinations of blocks that are 4 in., 8 in., and 12 in. wide. The row of blocks should be at least 12 in. but no greater than 24 in. high.
    3. Place wire mesh over the outside vertical face (open end) of the concrete blocks to prevent stone from being washed through the blocks. Use hardware cloth or comparable wire mesh with 0.5 in. opening.
    4. Pile washed stone against the wire mesh to the top of the blocks. Use 0.75 to 3 in.
  - **DI Protection Type 5 – Temporary Geotextile Insert (proprietary)** – Many types of temporary inserts are available. Most inserts fit underneath the grate of a drop inlet or inside of a curb inlet and are fastened to the outside of the grate or curb. These inserts are removable and many can be cleaned and reused. Installation of these inserts differs between manufacturers. Please refer to manufacturer instruction for installation of proprietary devices.

- **DI Protection Type 6 - Biofilter bags** – Biofilter bags may be used as a substitute for gravel bags in low-flow situations. Biofilter bags should conform to specifications detailed in SE-14, Biofilter bags.
  1. Construct in a gently sloping area.
  2. Biofilter bags should be placed around inlets to intercept runoff flows.
  3. All bag joints should overlap by 6 in.
  4. Leave room upstream for water to pond and for sediment to settle out.
  5. Stake bags to the ground as described in the following detail. Stakes may be omitted if bags are placed on a paved surface.

## Costs

- Average annual cost for installation and maintenance of DI Type 1-4 and 6 (one year useful life) is \$200 per inlet.
- Temporary geotextile inserts are proprietary and cost varies by region. These inserts can often be reused and may have greater than 1 year of use if maintained and kept undamaged. Average cost per insert ranges from \$50-75 plus installation, but costs can exceed \$100. This cost does not include maintenance.

## Inspection and Maintenance

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Silt Fences. If the fabric becomes clogged, torn, or degrades, it should be replaced. Make sure the stakes are securely driven in the ground and are in good shape (i.e., not bent, cracked, or splintered, and are reasonably perpendicular to the ground). Replace damaged stakes. At a minimum, remove the sediment behind the fabric fence when accumulation reaches one-third the height of the fence or barrier height.
- Gravel Filters. If the gravel becomes clogged with sediment, it should be carefully removed from the inlet and either cleaned or replaced. Since cleaning gravel at a construction site may be difficult, consider using the sediment-laden stone as fill material and put fresh stone around the inlet. Inspect bags for holes, gashes, and snags, and replace bags as needed. Check gravel bags for proper arrangement and displacement.
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.
- Remove storm drain inlet protection once the drainage area is stabilized.

- Clean and regrade area around the inlet and clean the inside of the storm drain inlet, as it should be free of sediment and debris at the time of final inspection.

## References

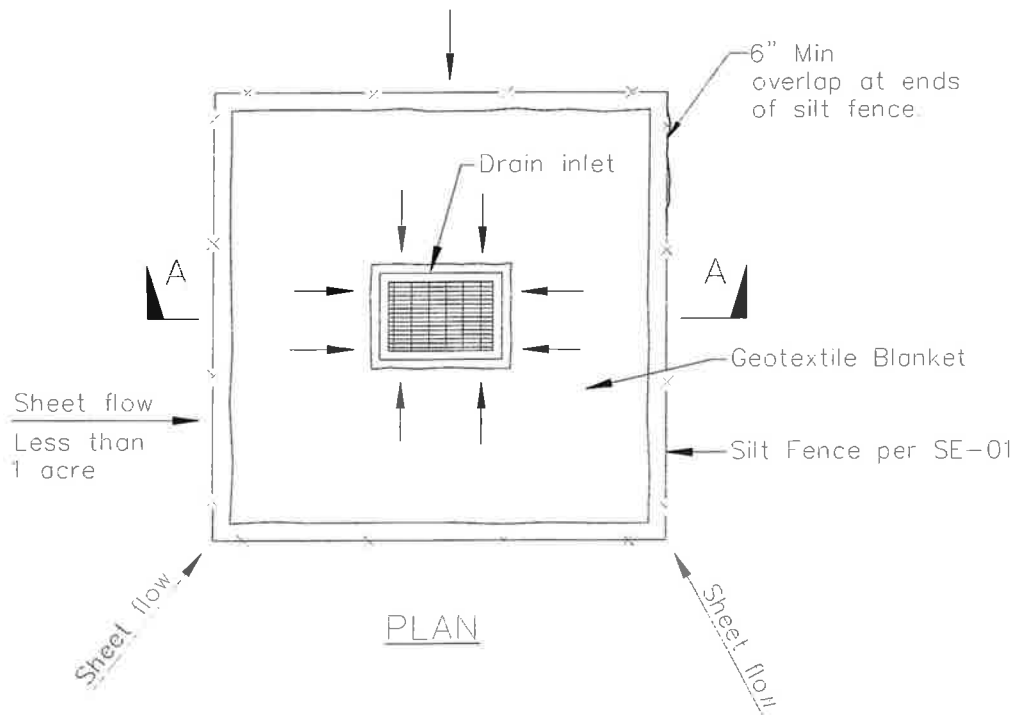
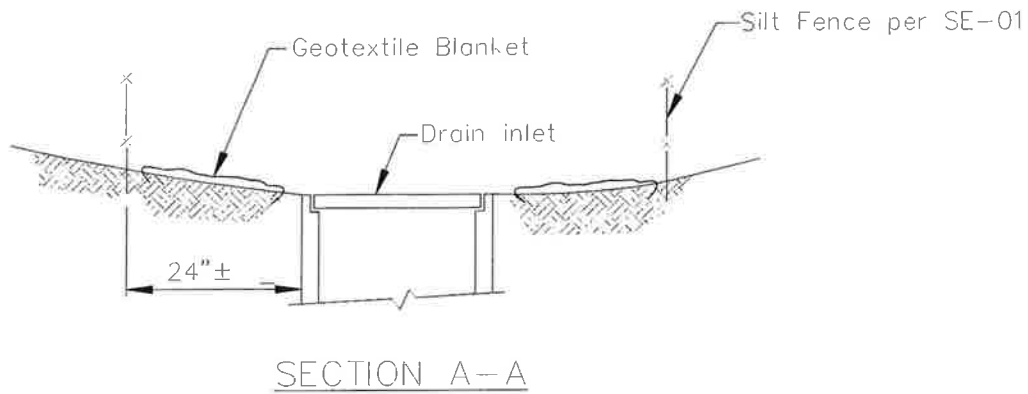
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management Manual for The Puget Sound Basin, Washington State Department of Ecology, Public Review Draft, 1991.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

# Storm Drain Inlet Protection

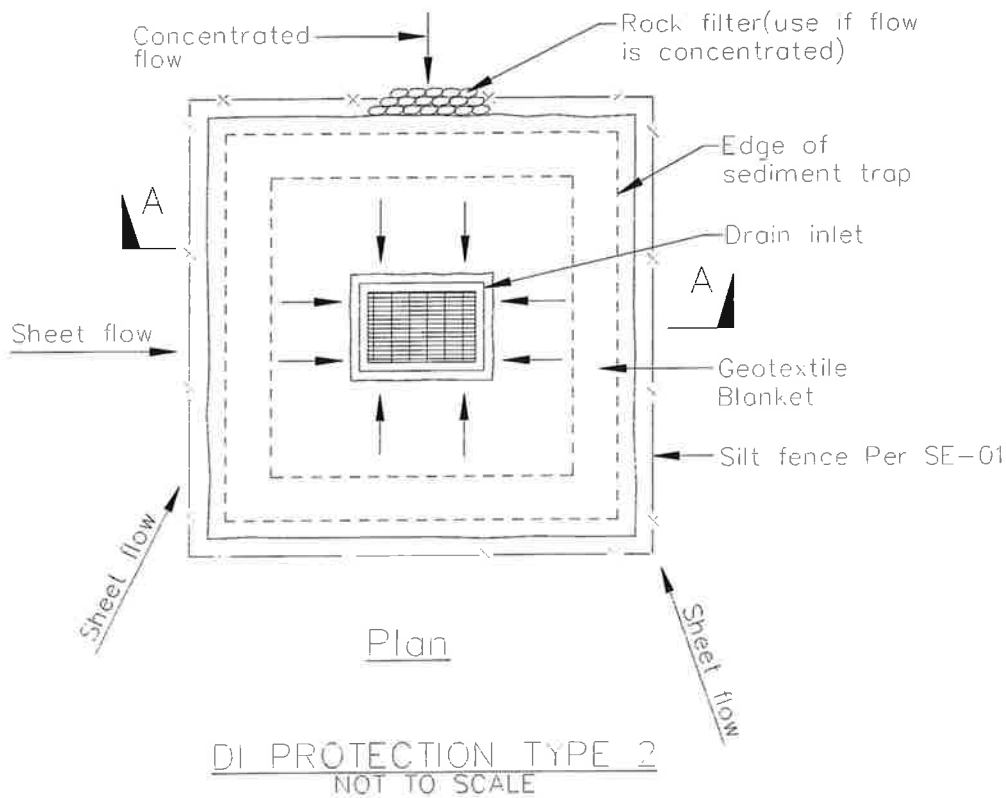
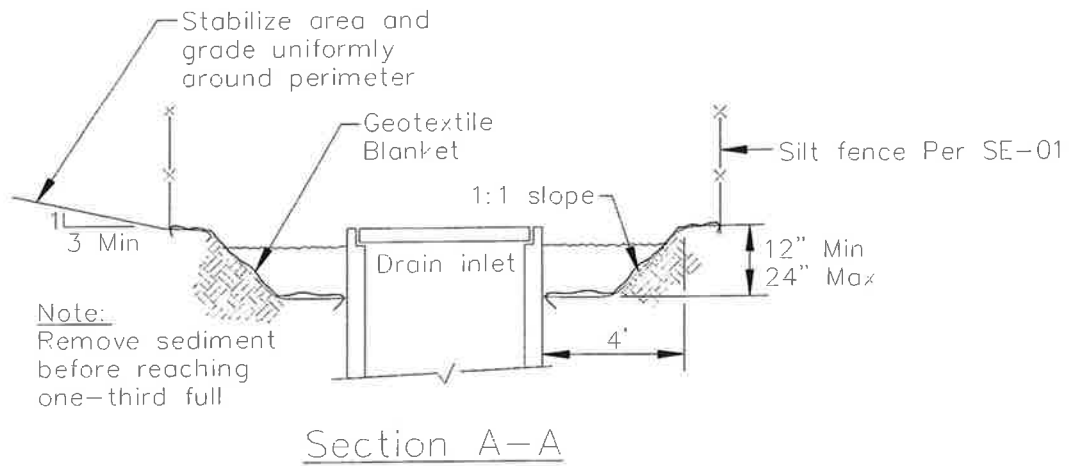
SE-10



DI PROTECTION TYPE 1  
NOT TO SCALE

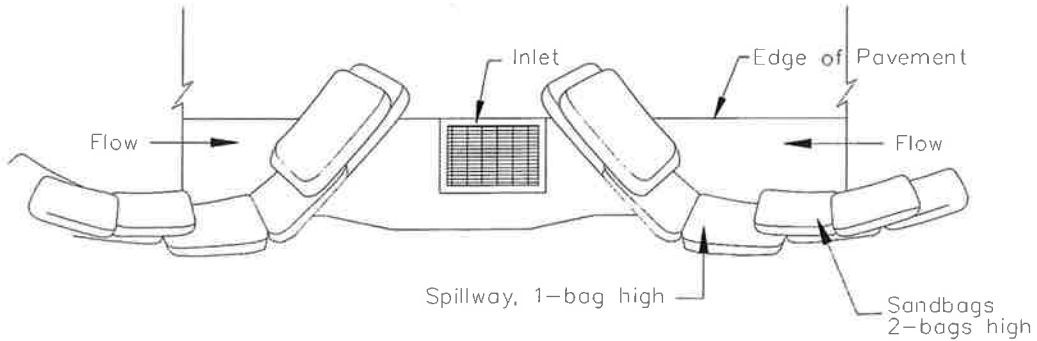
## NOTES:

1. For use in areas where grading has been completed and final soil stabilization and seeding are pending.
2. Not applicable in paved areas
3. Not applicable with concentrated flows

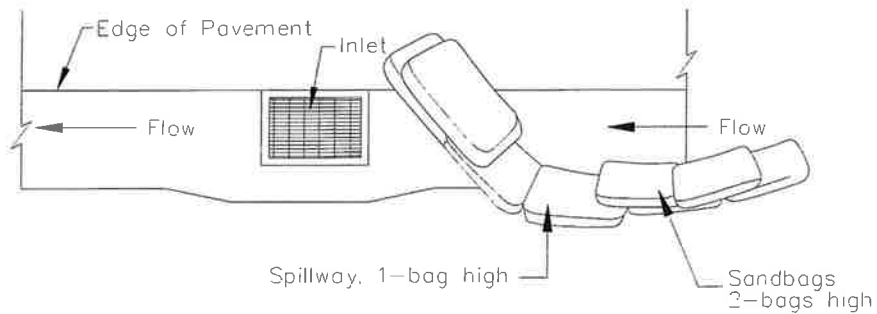


### Notes

- 1 For use in cleared and grubbed and in graded areas
- 2 Shape basin so that longest inflow area faces longest length of trap
- 3 For concentrated flows, shape basin in 2:1 ratio with length oriented towards direction of flow.



TYPICAL PROTECTION FOR INLET ON SUMP

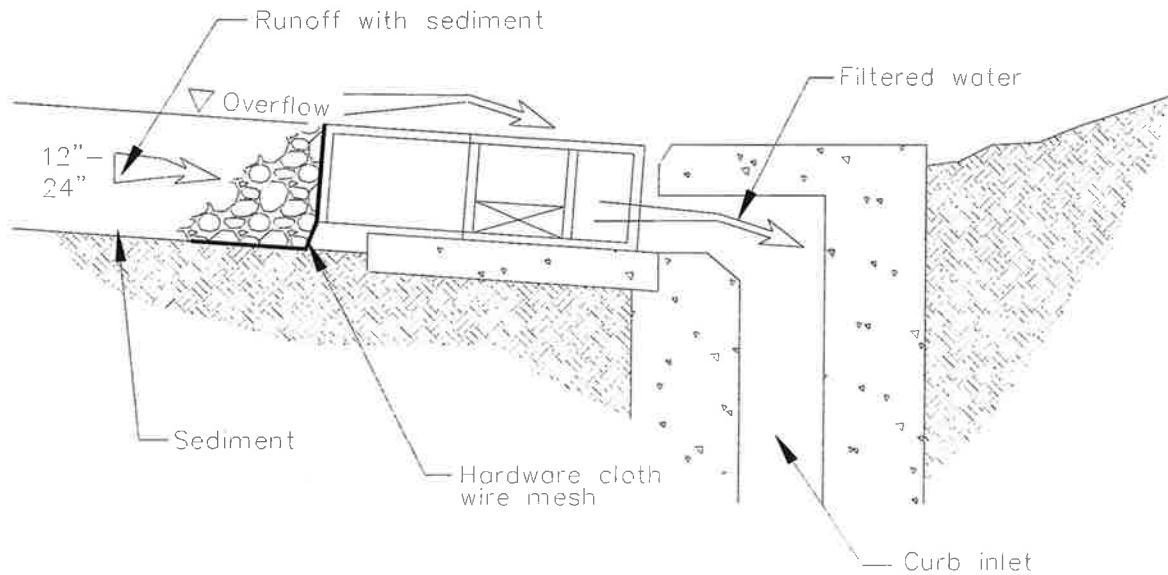
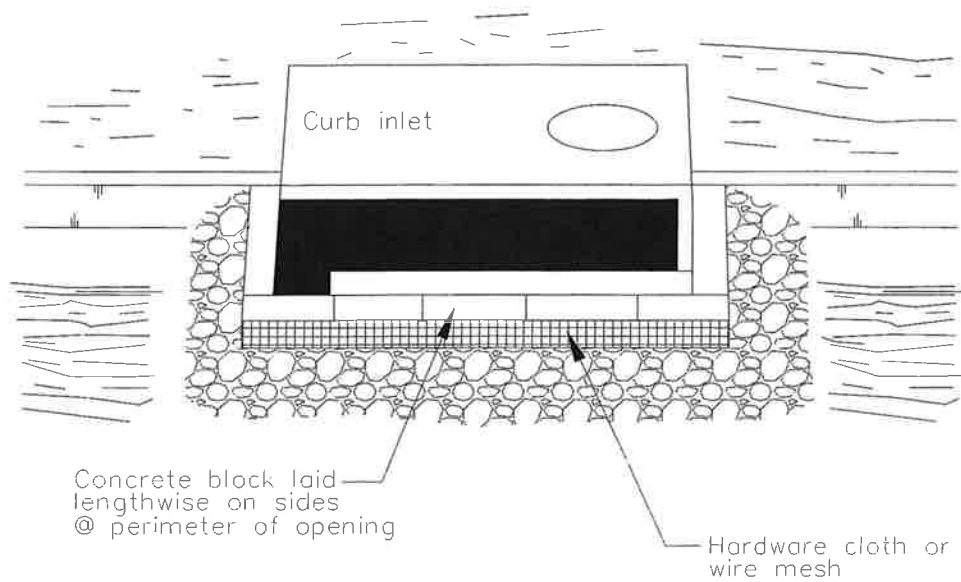


TYPICAL PROTECTION FOR INLET ON GRADE

NOTES:

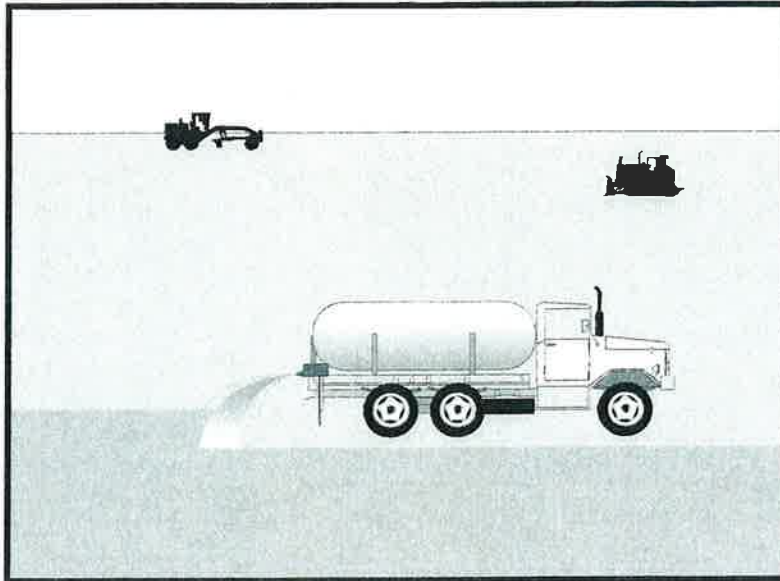
- 1 Intended for short-term use.
- 2 Use to inhibit non-storm water flow
- 3 Allow for proper maintenance and cleanup
- 4 Bags must be removed after adjacent operation is completed
- 5 Not applicable in areas with high silts and clays without filter fabric

DI PROTECTION TYPE 3  
NOT TO SCALE



DI PROTECTION – TYPE 4  
NOT TO SCALE





## Description and Purpose

Wind erosion or dust control consists of applying water or other chemical dust suppressants as necessary to prevent or alleviate dust nuisance generated by construction activities. Covering small stockpiles or areas is an alternative to applying water or other dust palliatives.

California's Mediterranean climate, with a short "wet" season and a typically long, hot "dry" season, allows the soils to thoroughly dry out. During the dry season, construction activities are at their peak, and disturbed and exposed areas are increasingly subject to wind erosion, sediment tracking and dust generated by construction equipment. Site conditions and climate can make dust control more of an erosion problem than water based erosion. Additionally, many local agencies, including Air Quality Management Districts, require dust control and/or dust control permits in order to comply with local nuisance laws, opacity laws (visibility impairment) and the requirements of the Clean Air Act. Wind erosion control is required to be implemented at all construction sites greater than 1 acre by the General Permit.

## Suitable Applications

Most BMPs that provide protection against water-based erosion will also protect against wind-based erosion and dust control requirements required by other agencies will generally meet wind erosion control requirements for water quality protection. Wind erosion control BMPs are suitable during the following construction activities:

## Categories

<b>EC</b>	Erosion Control	
<b>SE</b>	Sediment Control	<input checked="" type="checkbox"/>
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	<input checked="" type="checkbox"/>
<b>NS</b>	Non-Stormwater Management Control	
<b>WM</b>	Waste Management and Materials Pollution Control	

## Legend:

- Primary Category**
- Secondary Category**

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

## Potential Alternatives

EC-5 Soil Binders



- Construction vehicle traffic on unpaved roads
- Drilling and blasting activities
- Soils and debris storage piles
- Batch drop from front-end loaders
- Areas with unstabilized soil
- Final grading/site stabilization

## Limitations

- Watering prevents dust only for a short period (generally less than a few hours) and should be applied daily (or more often) to be effective.
- Over watering may cause erosion and track-out.
- Oil or oil-treated subgrade should not be used for dust control because the oil may migrate into drainageways and/or seep into the soil.
- Chemical dust suppression agents may have potential environmental impacts. Selected chemical dust control agents should be environmentally benign.
- Effectiveness of controls depends on soil, temperature, humidity, wind velocity and traffic.
- Chemical dust suppression agents should not be used within 100 feet of wetlands or water bodies.
- Chemically treated subgrades may make the soil water repellant, interfering with long-term infiltration and the vegetation/re-vegetation of the site. Some chemical dust suppressants may be subject to freezing and may contain solvents and should be handled properly.
- In compacted areas, watering and other liquid dust control measures may wash sediment or other constituents into the drainage system.
- If the soil surface has minimal natural moisture, the affected area may need to be pre-wetted so that chemical dust control agents can uniformly penetrate the soil surface.

## Implementation

### *Dust Control Practices*

Dust control BMPs generally stabilize exposed surfaces and minimize activities that suspend or track dust particles. The following table presents dust control practices that can be applied to varying site conditions that could potentially cause dust. For heavily traveled and disturbed areas, wet suppression (watering), chemical dust suppression, gravel asphalt surfacing, temporary gravel construction entrances, equipment wash-out areas, and haul truck covers can be employed as dust control applications. Permanent or temporary vegetation and mulching can be employed for areas of occasional or no construction traffic. Preventive measures include minimizing surface areas to be disturbed, limiting onsite vehicle traffic to 15 mph or less, and controlling the number and activity of vehicles on a site at any given time.

Chemical dust suppressants include: mulch and fiber based dust palliatives (e.g. paper mulch with gypsum binder), salts and brines (e.g. calcium chloride, magnesium chloride), non-petroleum based organics (e.g. vegetable oil, lignosulfonate), petroleum based organics (e.g. asphalt emulsion, dust oils, petroleum resins), synthetic polymers (e.g. polyvinyl acetate, vinyls, acrylic), clay additives (e.g. bentonite, montmorillonite) and electrochemical products (e.g. enzymes, ionic products).

Site Condition	Dust Control Practices							
	Permanent Vegetation	Mulching	Wet Suppression (Watering)	Chemical Dust Suppression	Gravel or Asphalt	Temporary Gravel Construction Entrances/Equipment Wash Down	Synthetic Covers	Minimize Extent of Disturbed Area
Disturbed Areas not Subject to Traffic	X	X	X	X	X			X
Disturbed Areas Subject to Traffic			X	X	X	X		X
Material Stockpiles		X	X	X			X	X
Demolition			X			X	X	
Clearing/Excavation			X	X				X
Truck Traffic on Unpaved Roads			X	X	X	X	X	
Tracking					X	X		

Additional preventive measures include:

- Schedule construction activities to minimize exposed area (see EC-1, Scheduling).
- Quickly treat exposed soils using water, mulching, chemical dust suppressants, or stone/gravel layering.
- Identify and stabilize key access points prior to commencement of construction.
- Minimize the impact of dust by anticipating the direction of prevailing winds.
- Restrict construction traffic to stabilized roadways within the project site, as practicable.
- Water should be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution.
- All distribution equipment should be equipped with a positive means of shutoff.
- Unless water is applied by means of pipelines, at least one mobile unit should be available at all times to apply water or dust palliative to the project.
- If reclaimed waste water is used, the sources and discharge must meet California Department of Health Services water reclamation criteria and the Regional Water Quality

Control Board (RWQCB) requirements. Non-potable water should not be conveyed in tanks or drain pipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes, and other conveyances should be marked, "NON-POTABLE WATER - DO NOT DRINK."

- Pave or chemically stabilize access points where unpaved traffic surfaces adjoin paved roads.
- Provide covers for haul trucks transporting materials that contribute to dust.
- Provide for rapid clean up of sediments deposited on paved roads. Furnish stabilized construction road entrances and wheel wash areas.
- Stabilize inactive areas of construction sites using temporary vegetation or chemical stabilization methods.

For chemical stabilization, there are many products available for chemically stabilizing gravel roadways and stockpiles. If chemical stabilization is used, the chemicals should not create any adverse effects on stormwater, plant life, or groundwater and should meet all applicable regulatory requirements.

## Costs

Installation costs for water and chemical dust suppression vary based on the method used and the length of effectiveness. Annual costs may be high since some of these measures are effective for only a few hours to a few days.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check areas protected to ensure coverage.
- Most water-based dust control measures require frequent application, often daily or even multiple times per day. Obtain vendor or independent information on longevity of chemical dust suppressants.

## References

Best Management Practices and Erosion Control Manual for Construction Sites, Flood Control District of Maricopa County, Arizona, September 1992.

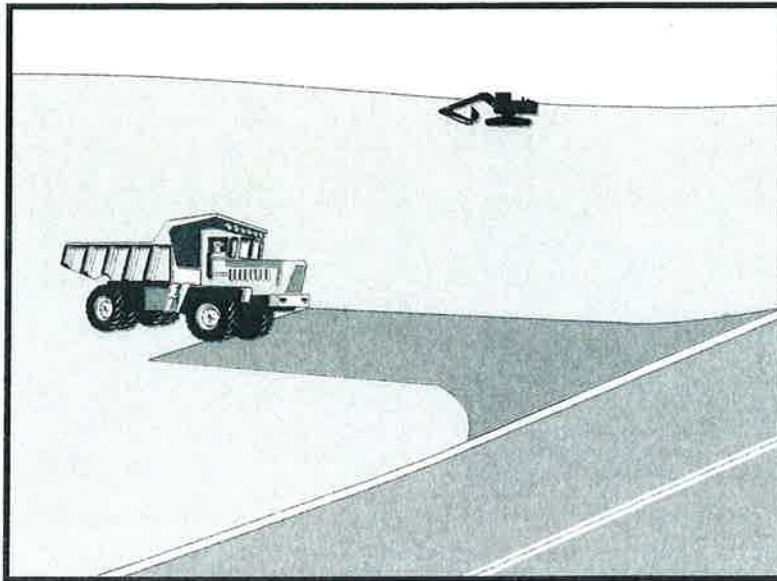
California Air Pollution Control Laws, California Air Resources Board, updated annually.

Construction Manual, Chapter 4, Section 10, "Dust Control"; Section 17, "Watering"; and Section 18, "Dust Palliative", California Department of Transportation (Caltrans), July 2001.

Prospects for Attaining the State Ambient Air Quality Standards for Suspended Particulate Matter (PM<sub>10</sub>), Visibility Reducing Particles, Sulfates, Lead, and Hydrogen Sulfide, California Air Resources Board, April 1991.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

# Stabilized Construction Entrance/Exit TC-1



## Description and Purpose

A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.

## Suitable Applications

Use at construction sites:

- Where dirt or mud can be tracked onto public roads.
- Adjacent to water bodies.
- Where poor soils are encountered.
- Where dust is a problem during dry weather conditions.

## Limitations

- Entrances and exits require periodic top dressing with additional stones.
- This BMP should be used in conjunction with street sweeping on adjacent public right of way.
- Entrances and exits should be constructed on level ground only.
- Stabilized construction entrances are rather expensive to construct and when a wash rack is included, a sediment trap of some kind must also be provided to collect wash water runoff.

## Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	<input checked="" type="checkbox"/>
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	

## Legend:

- Primary Objective
- Secondary Objective

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

## Potential Alternatives

None



# **Stabilized Construction Entrance/Exit TC-1**

## **Implementation**

### ***General***

A stabilized construction entrance is a pad of aggregate underlain with filter cloth located at any point where traffic will be entering or leaving a construction site to or from a public right of way, street, alley, sidewalk, or parking area. The purpose of a stabilized construction entrance is to reduce or eliminate the tracking of sediment onto public rights of way or streets. Reducing tracking of sediments and other pollutants onto paved roads helps prevent deposition of sediments into local storm drains and production of airborne dust.

Where traffic will be entering or leaving the construction site, a stabilized construction entrance should be used. NPDES permits require that appropriate measures be implemented to prevent tracking of sediments onto paved roadways, where a significant source of sediments is derived from mud and dirt carried out from unpaved roads and construction sites.

Stabilized construction entrances are moderately effective in removing sediment from equipment leaving a construction site. The entrance should be built on level ground. Advantages of the Stabilized Construction Entrance/Exit is that it does remove some sediment from equipment and serves to channel construction traffic in and out of the site at specified locations. Efficiency is greatly increased when a washing rack is included as part of a stabilized construction entrance/exit.

### ***Design and Layout***

- Construct on level ground where possible.
- Select 3 to 6 in. diameter stones.
- Use minimum depth of stones of 12 in. or as recommended by soils engineer.
- Construct length of 50 ft or maximum site will allow, and 10 ft minimum width or to accommodate traffic.
- Rumble racks constructed of steel panels with ridges and installed in the stabilized entrance/exit will help remove additional sediment and to keep adjacent streets clean.
- Provide ample turning radii as part of the entrance.
- Limit the points of entrance/exit to the construction site.
- Limit speed of vehicles to control dust.
- Properly grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Route runoff from stabilized entrances/exits through a sediment trapping device before discharge.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.

# **Stabilized Construction Entrance/Exit TC-1**

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- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions. Do not use asphalt concrete (AC) grindings for stabilized construction access/roadway.
- If aggregate is selected, place crushed aggregate over geotextile fabric to at least 12 in. depth, or place aggregate to a depth recommended by a geotechnical engineer. A crushed aggregate greater than 3 in. but smaller than 6 in. should be used.
- Designate combination or single purpose entrances and exits to the construction site.
- Require that all employees, subcontractors, and suppliers utilize the stabilized construction access.
- Implement SE-7, Street Sweeping and Vacuuming, as needed.
- All exit locations intended to be used for more than a two-week period should have stabilized construction entrance/exit BMPs.

## **Inspection and Maintenance**

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMPs are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect local roads adjacent to the site daily. Sweep or vacuum to remove visible accumulated sediment.
- Remove aggregate, separate and dispose of sediment if construction entrance/exit is clogged with sediment.
- Keep all temporary roadway ditches clear.
- Check for damage and repair as needed.
- Replace gravel material when surface voids are visible.
- Remove all sediment deposited on paved roadways within 24 hours.
- Remove gravel and filter fabric at completion of construction

## **Costs**

Average annual cost for installation and maintenance may vary from \$1,200 to \$4,800 each, averaging \$2,400 per entrance. Costs will increase with addition of washing rack, and sediment trap. With wash rack, costs range from \$1,200 - \$6,000 each, averaging \$3,600 per entrance.

## **References**

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.



# **Stabilized Construction Entrance/Exit TC-1**

National Management Measures to Control Nonpoint Source Pollution from Urban Areas, USEPA Agency, 2002.

Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters, Work Group Working Paper, USEPA, April 1992.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

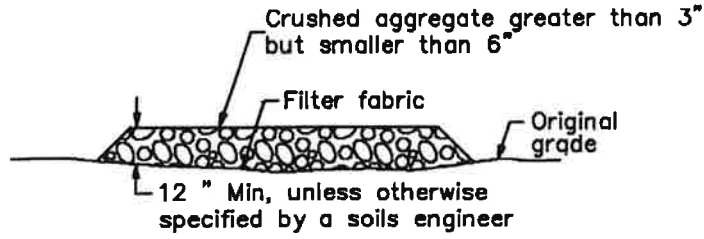
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

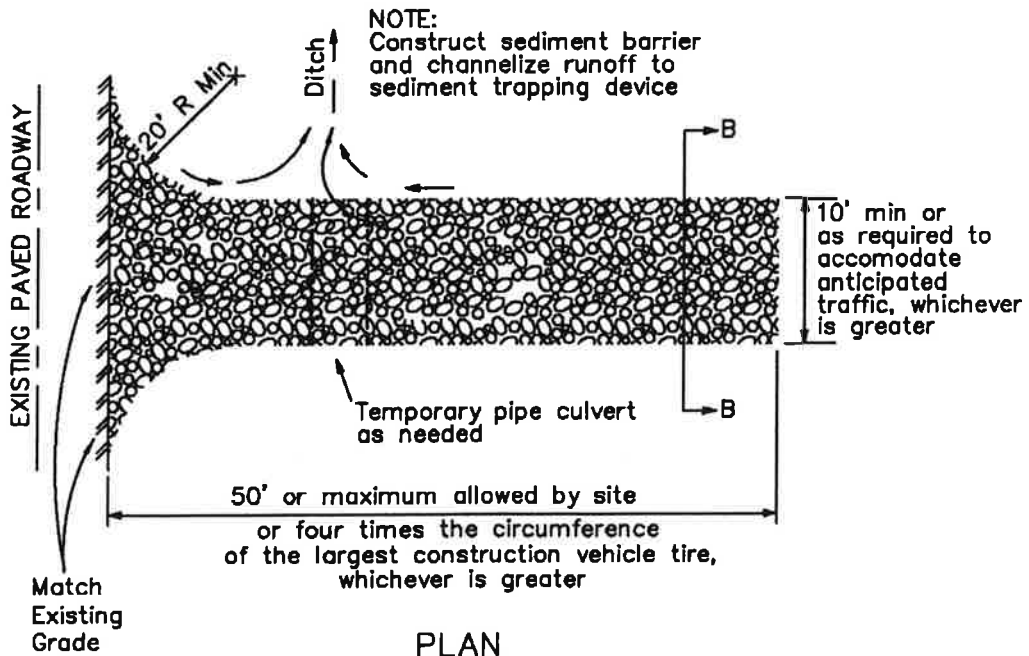
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

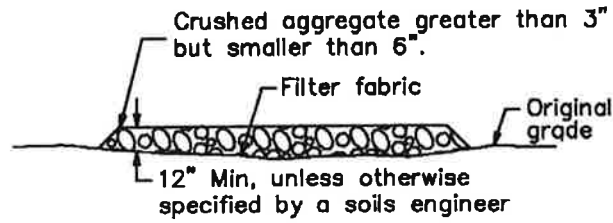
# Stabilized Construction Entrance/Exit TC-1



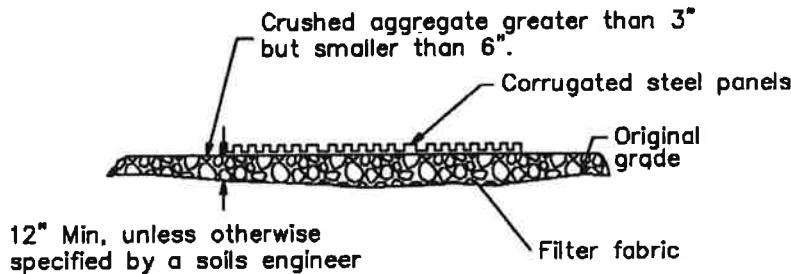
SECTION B-B  
NTS



# Stabilized Construction Entrance/Exit TC-1

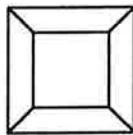


**SECTION B-B**  
NTS

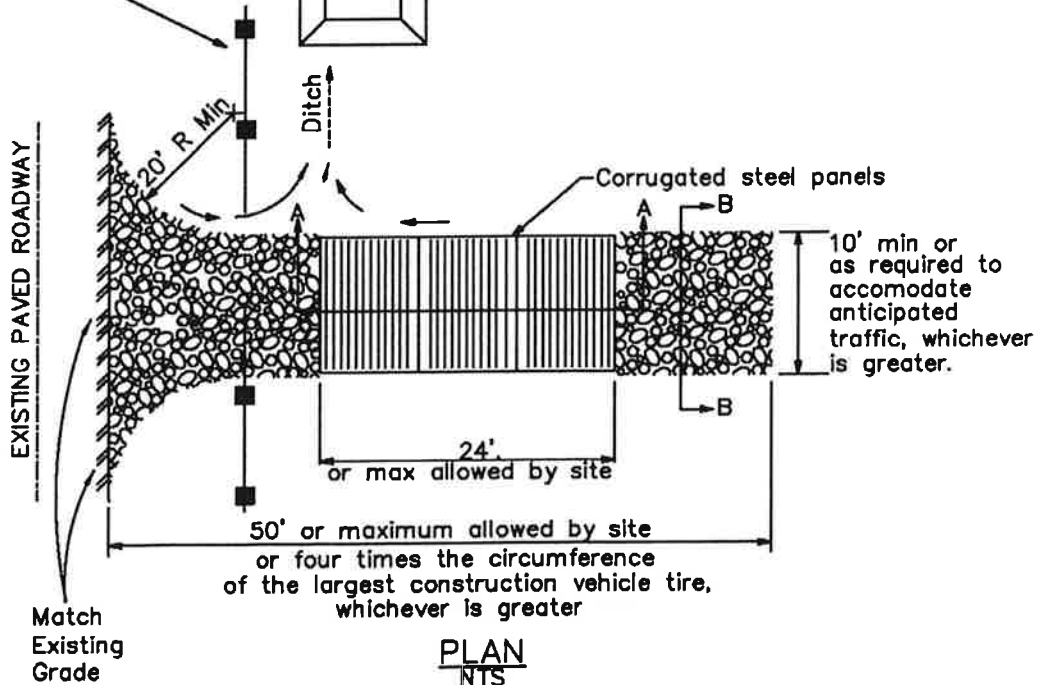


**SECTION A-A**  
NOT TO SCALE

NOTE:  
Construct sediment barrier and channelize runoff to sediment trapping device



Sediment trapping device





## Description and Purpose

Water conservation practices are activities that use water during the construction of a project in a manner that avoids causing erosion and the transport of pollutants offsite. These practices can reduce or eliminate non-stormwater discharges.

## Suitable Applications

Water conservation practices are suitable for all construction sites where water is used, including piped water, metered water, trucked water, and water from a reservoir.

## Limitations

- None identified.

## Implementation

- Keep water equipment in good working condition.
- Stabilize water truck filling area.
- Repair water leaks promptly.
- Washing of vehicles and equipment on the construction site is discouraged.
- Avoid using water to clean construction areas. If water must be used for cleaning or surface preparation, surface should be swept and vacuumed first to remove dirt. This will minimize amount of water required.
- Direct construction water runoff to areas where it can soak

## Categories

EC	Erosion Control	<input checked="" type="checkbox"/>
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

## Legend:

- Primary Objective
- Secondary Objective

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

## Potential Alternatives

None



into the ground or be collected and reused.

- Authorized non-stormwater discharges to the storm drain system, channels, or receiving waters are acceptable with the implementation of appropriate BMPs.
- Lock water tank valves to prevent unauthorized use.

## Costs

The cost is small to none compared to the benefits of conserving water.

## Inspection and Maintenance

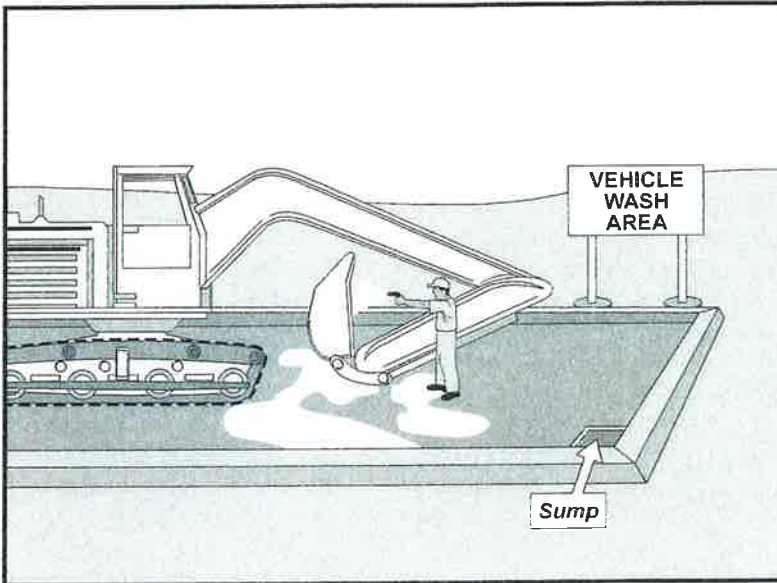
- Inspect and verify that activity based BMPs are in place prior to the commencement of authorized non-stormwater discharges.
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges are occurring.
- Repair water equipment as needed to prevent unintended discharges.
  - Water trucks
  - Water reservoirs (water buffalos)
  - Irrigation systems
  - Hydrant connections

## References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

# Vehicle and Equipment Cleaning

NS-8



## Description and Purpose

Vehicle and equipment cleaning procedures and practices eliminate or reduce the discharge of pollutants to stormwater from vehicle and equipment cleaning operations. Procedures and practices include but are not limited to: using offsite facilities; washing in designated, contained areas only; eliminating discharges to the storm drain by infiltrating the wash water; and training employees and subcontractors in proper cleaning procedures.

## Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment cleaning is performed.

## Limitations

Even phosphate-free, biodegradable soaps have been shown to be toxic to fish before the soap degrades. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

## Implementation

Other options to washing equipment onsite include contracting with either an offsite or mobile commercial washing business. These businesses may be better equipped to handle and dispose of the wash waters properly. Performing this work offsite can also be economical by eliminating the need for a separate washing operation onsite.

If washing operations are to take place onsite, then:

### Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

### Legend:

- Primary Objective
- Secondary Objective

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

### Potential Alternatives

None



- Use phosphate-free, biodegradable soaps.
- Educate employees and subcontractors on pollution prevention measures.
- Do not permit steam cleaning onsite. Steam cleaning can generate significant pollutant concentrates.
- Cleaning of vehicles and equipment with soap, solvents or steam should not occur on the project site unless resulting wastes are fully contained and disposed of. Resulting wastes should not be discharged or buried, and must be captured and recycled or disposed according to the requirements of WM-10, Liquid Waste Management or WM-6, Hazardous Waste Management, depending on the waste characteristics. Minimize use of solvents. Use of diesel for vehicle and equipment cleaning is prohibited.
- All vehicles and equipment that regularly enter and leave the construction site must be cleaned offsite.
- When vehicle and equipment washing and cleaning must occur onsite, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area should have the following characteristics:
  - Located away from storm drain inlets, drainage facilities, or watercourses
  - Paved with concrete or asphalt and bermed to contain wash waters and to prevent runoff and runoff
  - Configured with a sump to allow collection and disposal of wash water
  - No discharge of wash waters to storm drains or watercourses
  - Used only when necessary
- When cleaning vehicles and equipment with water:
  - Use as little water as possible. High-pressure sprayers may use less water than a hose and should be considered
  - Use positive shutoff valve to minimize water usage
  - Facility wash racks should discharge to a sanitary sewer, recycle system or other approved discharge system and must not discharge to the storm drainage system, watercourses, or to groundwater

## Costs

Cleaning vehicles and equipment at an offsite facility may reduce overall costs for vehicle and equipment cleaning by eliminating the need to provide similar services onsite. When onsite cleaning is needed, the cost to establish appropriate facilities is relatively low on larger, long-duration projects, and moderate to high on small, short-duration projects.

## Inspection and Maintenance

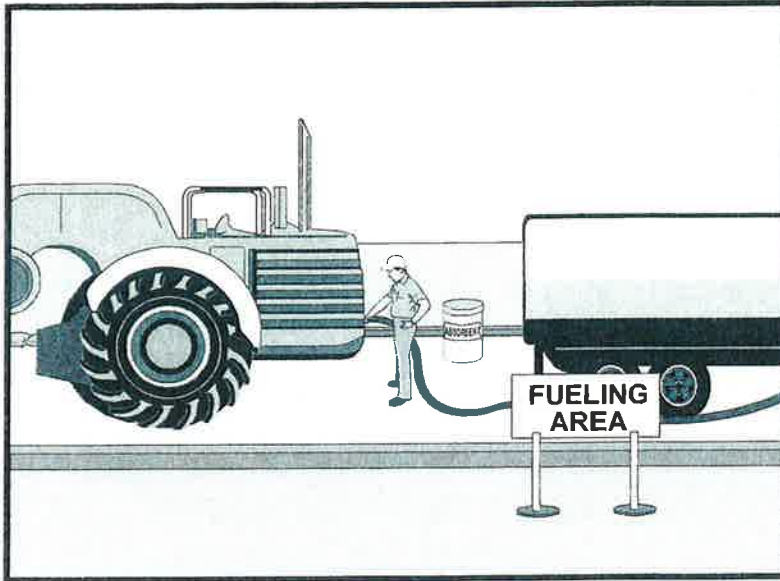
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Inspection and maintenance is minimal, although some berm repair may be necessary.
- Monitor employees and subcontractors throughout the duration of the construction project to ensure appropriate practices are being implemented.
- Inspect sump regularly and remove liquids and sediment as needed.
- Prohibit employees and subcontractors from washing personal vehicles and equipment on the construction site.

## References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Swisher, R.D. Surfactant Biodegradation, Marcel Decker Corporation, 1987.





## Description and Purpose

Vehicle equipment fueling procedures and practices are designed to prevent fuel spills and leaks, and reduce or eliminate contamination of stormwater. This can be accomplished by using offsite facilities, fueling in designated areas only, enclosing or covering stored fuel, implementing spill controls, and training employees and subcontractors in proper fueling procedures.

## Suitable Applications

These procedures are suitable on all construction sites where vehicle and equipment fueling takes place.

## Limitations

Onsite vehicle and equipment fueling should only be used where it is impractical to send vehicles and equipment offsite for fueling. Sending vehicles and equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/ Exit.

## Implementation

- Use offsite fueling stations as much as possible. These businesses are better equipped to handle fuel and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate fueling area at a site.
- Discourage “topping-off” of fuel tanks.
- Absorbent spill cleanup materials and spill kits should be available in fueling areas and on fueling trucks, and should

## Categories

<b>EC</b>	Erosion Control	
<b>SE</b>	Sediment Control	
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	
<b>NS</b>	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
<b>WM</b>	Waste Management and Materials Pollution Control	

## Legend:

- Primary Objective
- Secondary Objective

## Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

## Potential Alternatives

None



be disposed of properly after use.

- Drip pans or absorbent pads should be used during vehicle and equipment fueling, unless the fueling is performed over an impermeable surface in a dedicated fueling area.
- Use absorbent materials on small spills. Do not hose down or bury the spill. Remove the adsorbent materials promptly and dispose of properly.
- Avoid mobile fueling of mobile construction equipment around the site; rather, transport the equipment to designated fueling areas. With the exception of tracked equipment such as bulldozers and large excavators, most vehicles should be able to travel to a designated area with little lost time.
- Train employees and subcontractors in proper fueling and cleanup procedures.
- When fueling must take place onsite, designate an area away from drainage courses to be used. Fueling areas should be identified in the SWPPP.
- Dedicated fueling areas should be protected from stormwater runoff and runoff, and should be located at least 50 ft away from downstream drainage facilities and watercourses. Fueling must be performed on level-grade areas.
- Protect fueling areas with berms and dikes to prevent runoff, runoff, and to contain spills.
- Nozzles used in vehicle and equipment fueling should be equipped with an automatic shutoff to control drips. Fueling operations should not be left unattended.
- Use vapor recovery nozzles to help control drips as well as air pollution where required by Air Quality Management Districts (AQMD).
- Federal, state, and local requirements should be observed for any stationary above ground storage tanks.

## Costs

- All of the above measures are low cost except for the capital costs of above ground tanks that meet all local environmental, zoning, and fire codes.

## Inspection and Maintenance

- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Vehicles and equipment should be inspected each day of use for leaks. Leaks should be repaired immediately or problem vehicles or equipment should be removed from the project site.
- Keep ample supplies of spill cleanup materials onsite.

- Immediately clean up spills and properly dispose of contaminated soil and cleanup materials.

## References

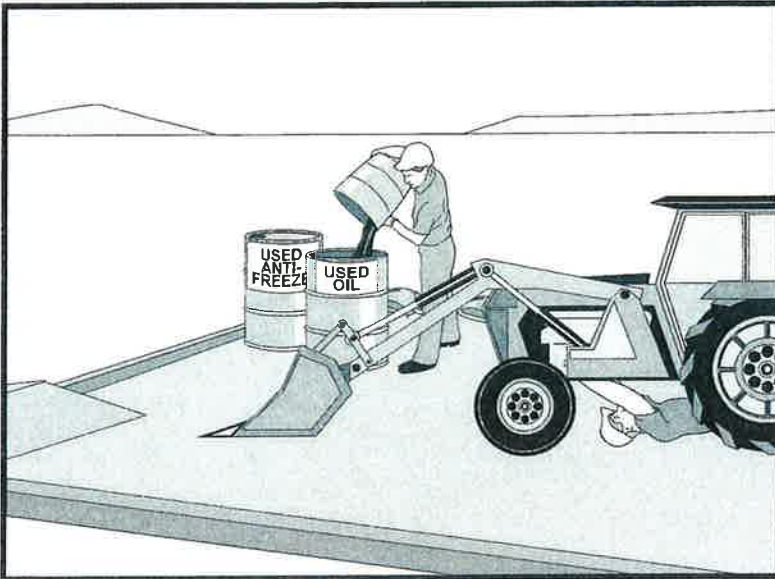
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

# Vehicle & Equipment Maintenance NS-10



## Description and Purpose

Prevent or reduce the contamination of stormwater resulting from vehicle and equipment maintenance by running a “dry and clean site”. The best option would be to perform maintenance activities at an offsite facility. If this option is not available then work should be performed in designated areas only, while providing cover for materials stored outside, checking for leaks and spills, and containing and cleaning up spills immediately. Employees and subcontractors must be trained in proper procedures.

## Suitable Applications

These procedures are suitable on all construction projects where an onsite yard area is necessary for storage and maintenance of heavy equipment and vehicles.

## Limitations

Onsite vehicle and equipment maintenance should only be used where it is impractical to send vehicles and equipment offsite for maintenance and repair. Sending vehicles/equipment offsite should be done in conjunction with TC-1, Stabilized Construction Entrance/Exit.

Outdoor vehicle or equipment maintenance is a potentially significant source of stormwater pollution. Activities that can contaminate stormwater include engine repair and service, changing or replacement of fluids, and outdoor equipment storage and parking (engine fluid leaks). For further information on vehicle or equipment servicing, see NS-8, Vehicle and Equipment Cleaning, and NS-9, Vehicle and

## Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	

## Legend:

- Primary Objective
- Secondary Objective

## Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

## Potential Alternatives

None



# Vehicle & Equipment Maintenance NS-10

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Equipment Fueling.

## Implementation

- Use offsite repair shops as much as possible. These businesses are better equipped to handle vehicle fluids and spills properly. Performing this work offsite can also be economical by eliminating the need for a separate maintenance area.
- If maintenance must occur onsite, use designated areas, located away from drainage courses. Dedicated maintenance areas should be protected from stormwater runoff and should be located at least 50 ft from downstream drainage facilities and watercourses.
- Drip pans or absorbent pads should be used during vehicle and equipment maintenance work that involves fluids, unless the maintenance work is performed over an impermeable surface in a dedicated maintenance area.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- All fueling trucks and fueling areas are required to have spill kits and/or use other spill protection devices.
- Use adsorbent materials on small spills. Remove the absorbent materials promptly and dispose of properly.
- Inspect onsite vehicles and equipment daily at startup for leaks, and repair immediately.
- Keep vehicles and equipment clean; do not allow excessive build-up of oil and grease.
- Segregate and recycle wastes, such as greases, used oil or oil filters, antifreeze, cleaning solutions, automotive batteries, hydraulic and transmission fluids. Provide secondary containment and covers for these materials if stored onsite.
- Train employees and subcontractors in proper maintenance and spill cleanup procedures.
- Drip pans or plastic sheeting should be placed under all vehicles and equipment placed on docks, barges, or other structures over water bodies when the vehicle or equipment is planned to be idle for more than 1 hour.
- For long-term projects, consider using portable tents or covers over maintenance areas if maintenance cannot be performed offsite.
- Consider use of new, alternative greases and lubricants, such as adhesive greases, for chassis lubrication and fifth-wheel lubrication.
- Properly dispose of used oils, fluids, lubricants, and spill cleanup materials.
- Do not place used oil in a dumpster or pour into a storm drain or watercourse.
- Properly dispose of or recycle used batteries.
- Do not bury used tires.

# Vehicle & Equipment Maintenance NS-10

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- Repair leaks of fluids and oil immediately.

Listed below is further information if you must perform vehicle or equipment maintenance onsite.

## ***Safer Alternative Products***

- Consider products that are less toxic or hazardous than regular products. These products are often sold under an “environmentally friendly” label.
- Consider use of grease substitutes for lubrication of truck fifth-wheels. Follow manufacturers label for details on specific uses.
- Consider use of plastic friction plates on truck fifth-wheels in lieu of grease. Follow manufacturers label for details on specific uses.

## ***Waste Reduction***

Parts are often cleaned using solvents such as trichloroethylene, trichloroethane, or methylene chloride. Many of these cleaners are listed in California Toxic Rule as priority pollutants. These materials are harmful and must not contaminate stormwater. They must be disposed of as a hazardous waste. Reducing the number of solvents makes recycling easier and reduces hazardous waste management costs. Often, one solvent can perform a job as well as two different solvents. Also, if possible, eliminate or reduce the amount of hazardous materials and waste by substituting non-hazardous or less hazardous materials. For example, replace chlorinated organic solvents with non-chlorinated solvents. Non-chlorinated solvents like kerosene or mineral spirits are less toxic and less expensive to dispose of properly. Check the list of active ingredients to see whether it contains chlorinated solvents. The “chlor” term indicates that the solvent is chlorinated. Also, try substituting a wire brush for solvents to clean parts.

## ***Recycling and Disposal***

Separating wastes allows for easier recycling and may reduce disposal costs. Keep hazardous wastes separate, do not mix used oil solvents, and keep chlorinated solvents (like, trichloroethane) separate from non-chlorinated solvents (like kerosene and mineral spirits). Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around. Provide cover and secondary containment until these materials can be removed from the site.

Oil filters can be recycled. Ask your oil supplier or recycler about recycling oil filters.

Do not dispose of extra paints and coatings by dumping liquid onto the ground or throwing it into dumpsters. Allow coatings to dry or harden before disposal into covered dumpsters.

Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries, even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

## **Costs**

All of the above are low cost measures. Higher costs are incurred to setup and maintain onsite maintenance areas.

# **Vehicle & Equipment Maintenance NS-10**

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## **Inspection and Maintenance**

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Keep ample supplies of spill cleanup materials onsite.
- Maintain waste fluid containers in leak proof condition.
- Vehicles and equipment should be inspected on each day of use. Leaks should be repaired immediately or the problem vehicle(s) or equipment should be removed from the project site.
- Inspect equipment for damaged hoses and leaky gaskets routinely. Repair or replace as needed.

## **References**

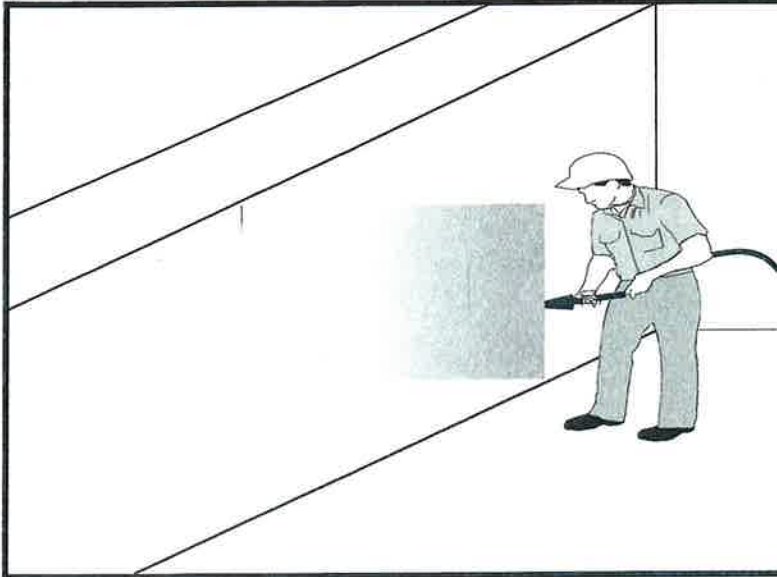
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

# Concrete Curing

NS-12



## Description and Purpose

Concrete curing is used in the construction of structures such as bridges, retaining walls, pump houses, large slabs, and structured foundations. Concrete curing includes the use of both chemical and water methods.

Concrete and its associated curing materials have basic chemical properties that can raise the pH of water to levels outside of the permitted range. Discharges of stormwater and non-stormwater exposed to concrete during curing may have a high pH and may contain chemicals, metals, and fines. The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Proper procedures and care should be taken when managing concrete curing materials to prevent them from coming into contact with stormwater flows, which could result in a high pH discharge.

## Suitable Applications

Suitable applications include all projects where Portland Cement Concrete (PCC) and concrete curing chemicals are placed where they can be exposed to rainfall, runoff from other areas, or where runoff from the PCC will leave the site.

## Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

## Legend:

- Primary Category
- Secondary Category

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

## Potential Alternatives

None





## Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

## Implementation

### *Chemical Curing*

- Avoid over spray of curing compounds.
- Minimize the drift by applying the curing compound close to the concrete surface. Apply an amount of compound that covers the surface, but does not allow any runoff of the compound.
- Use proper storage and handling techniques for concrete curing compounds. Refer to WM-1, Material Delivery and Storage.
- Protect drain inlets prior to the application of curing compounds.
- Refer to WM-4, Spill Prevention and Control.

### *Water Curing for Bridge Decks, Retaining Walls, and other Structures*

- Direct cure water away from inlets and watercourses to collection areas for evaporation or other means of removal in accordance with all applicable permits. See WM-8 Concrete Waste Management.
- Collect cure water at the top of slopes and transport to a concrete waste management area in a non-erosive manner. See EC-9 Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Utilize wet blankets or a similar method that maintains moisture while minimizing the use and possible discharge of water.

## Education

- Educate employees, subcontractors, and suppliers on proper concrete curing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete curing procedures.

## Costs

All of the above measures are generally low cost.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts uncured and partially cured concrete as required by the General Permit.
- Ensure that employees and subcontractors implement appropriate measures for storage, handling, and use of curing compounds.
- Inspect cure containers and spraying equipment for leaks.

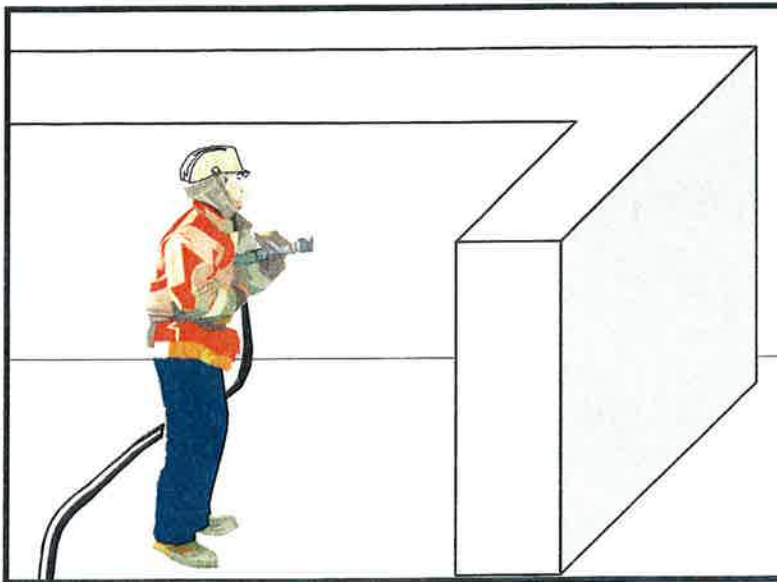
## References

Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non Point Source Pollution Control Program, 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.



## Categories

<b>EC</b>	Erosion Control	
<b>SE</b>	Sediment Control	
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	
<b>NS</b>	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
<b>WM</b>	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

## Legend:

- Primary Category**
- Secondary Category**

## Description and Purpose

Concrete finishing methods are used for bridge deck rehabilitation, paint removal, curing compound removal, and final surface finish appearances. Methods include sand blasting, shot blasting, grinding, or high pressure water blasting. Stormwater and non-stormwater exposed to concrete finishing by-products may have a high pH and may contain chemicals, metals, and fines. Proper procedures and implementation of appropriate BMPs can minimize the impact that concrete-finishing methods may have on stormwater and non-stormwater discharges.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Concrete and its associated curing materials have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows, which could lead to exceedances of the General Permit requirements.

## Suitable Applications

These procedures apply to all construction locations where concrete finishing operations are performed.

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	
Organics	<input checked="" type="checkbox"/>

## Potential Alternatives

None



## Limitations

- Runoff contact with concrete waste can raise pH levels in the water to environmentally harmful levels and trigger permit violations.

## Implementation

- Collect and properly dispose of water from high-pressure water blasting operations.
- Collect contaminated water from blasting operations at the top of slopes. Transport or dispose of contaminated water while using BMPs such as those for erosion control. Refer to EC-9, Earth Dikes and Drainage Swales, EC-10, Velocity Dissipation Devices, and EC-11, Slope Drains.
- Direct water from blasting operations away from inlets and watercourses to collection areas for infiltration or other means of removal (dewatering). Refer to NS-2 Dewatering Operations.
- Protect inlets during sandblasting operations. Refer to SE-10, Storm Drain Inlet Protection.
- Refer to WM-8, Concrete Waste Management for disposal of concrete debris.
- Minimize the drift of dust and blast material as much as possible by keeping the blasting nozzle close to the surface.
- When blast residue contains a potentially hazardous waste, refer to WM-6, Hazardous Waste Management.

## Education

- Educate employees, subcontractors, and suppliers on proper concrete finishing techniques to prevent contact with discharge as described herein.
- Arrange for the QSP or the appropriately trained contractor's superintendent or representative to oversee and enforce concrete finishing procedures.

## Costs

These measures are generally of low cost.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharges daily while non-stormwater discharges occur.
- Sample non-stormwater discharges and stormwater runoff that contacts concrete dust and debris as required by the General Permit.

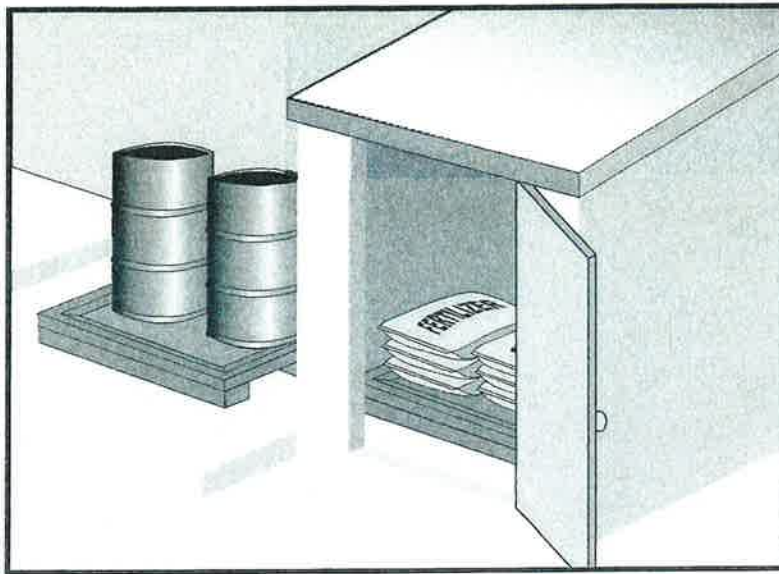
- Sweep or vacuum up debris from sandblasting at the end of each shift.
- At the end of each work shift, remove and contain liquid and solid waste from containment structures, if any, and from the general work area.
- Inspect containment structures for damage prior to use and prior to onset of forecasted rain.

## References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.



### Categories

<b>EC</b>	Erosion Control	
<b>SE</b>	Sediment Control	
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	
<b>NS</b>	Non-Stormwater Management Control	
<b>WM</b>	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

### Legend:

- Primary Category
- Secondary Category

### Description and Purpose

Prevent, reduce, or eliminate the discharge of pollutants from material delivery and storage to the stormwater system or watercourses by minimizing the storage of hazardous materials onsite, storing materials in watertight containers and/or a completely enclosed designated area, installing secondary containment, conducting regular inspections, and training employees and subcontractors.

This best management practice covers only material delivery and storage. For other information on materials, see WM-2, Material Use, or WM-4, Spill Prevention and Control. For information on wastes, see the waste management BMPs in this section.

### Suitable Applications

These procedures are suitable for use at all construction sites with delivery and storage of the following materials:

- Soil stabilizers and binders
- Pesticides and herbicides
- Fertilizers
- Detergents
- Plaster
- Petroleum products such as fuel, oil, and grease

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

### Potential Alternatives

None



- Asphalt and concrete components
- Hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Concrete compounds
- Other materials that may be detrimental if released to the environment

## Limitations

- Space limitation may preclude indoor storage.
- Storage sheds often must meet building and fire code requirements.

## Implementation

The following steps should be taken to minimize risk:

- Chemicals must be stored in water tight containers with appropriate secondary containment or in a storage shed.
- When a material storage area is located on bare soil, the area should be lined and bermed.
- Use containment pallets or other practical and available solutions, such as storing materials within newly constructed buildings or garages, to meet material storage requirements.
- Stack erodible landscape material on pallets and cover when not in use.
- Contain all fertilizers and other landscape materials when not in use.
- Temporary storage areas should be located away from vehicular traffic.
- Material Safety Data Sheets (MSDS) should be available on-site for all materials stored that have the potential to effect water quality.
- Construction site areas should be designated for material delivery and storage.
- Material delivery and storage areas should be located away from waterways, if possible.
  - Avoid transport near drainage paths or waterways.
  - Surround with earth berms or other appropriate containment BMP. See EC-9, Earth Dikes and Drainage Swales.
  - Place in an area that will be paved.
- Storage of reactive, ignitable, or flammable liquids must comply with the fire codes of your area. Contact the local Fire Marshal to review site materials, quantities, and proposed storage area to determine specific requirements. See the Flammable and Combustible Liquid Code, NFPA30.
- An up to date inventory of materials delivered and stored onsite should be kept.

- Hazardous materials storage onsite should be minimized.
- Hazardous materials should be handled as infrequently as possible.
- Keep ample spill cleanup supplies appropriate for the materials being stored. Ensure that cleanup supplies are in a conspicuous, labeled area.
- Employees and subcontractors should be trained on the proper material delivery and storage practices.
- Employees trained in emergency spill cleanup procedures must be present when dangerous materials or liquid chemicals are unloaded.
- If significant residual materials remain on the ground after construction is complete, properly remove and dispose of materials and any contaminated soil. See WM-7, Contaminated Soil Management. If the area is to be paved, pave as soon as materials are removed to stabilize the soil.

## ***Material Storage Areas and Practices***

- Liquids, petroleum products, and substances listed in 40 CFR Parts 110, 117, or 302 should be stored in approved containers and drums and should not be overfilled. Containers and drums should be placed in temporary containment facilities for storage.
- A temporary containment facility should provide for a spill containment volume able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest container within its boundary, whichever is greater.
- A temporary containment facility should be impervious to the materials stored therein for a minimum contact time of 72 hours.
- A temporary containment facility should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be collected and placed into drums. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. All collected liquids or non-hazardous liquids should be sent to an approved disposal site.
- Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.
- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Materials should be covered prior to, and during rain events.
- Materials should be stored in their original containers and the original product labels should be maintained in place in a legible condition. Damaged or otherwise illegible labels should be replaced immediately.



- Bagged and boxed materials should be stored on pallets and should not be allowed to accumulate on the ground. To provide protection from wind and rain throughout the rainy season, bagged and boxed materials should be covered during non-working days and prior to and during rain events.
- Stockpiles should be protected in accordance with WM-3, Stockpile Management.
- Materials should be stored indoors within existing structures or completely enclosed storage sheds when available.
- Proper storage instructions should be posted at all times in an open and conspicuous location.
- An ample supply of appropriate spill clean up material should be kept near storage areas.
- Also see WM-6, Hazardous Waste Management, for storing of hazardous wastes.

## ***Material Delivery Practices***

- Keep an accurate, up-to-date inventory of material delivered and stored onsite.
- Arrange for employees trained in emergency spill cleanup procedures to be present when dangerous materials or liquid chemicals are unloaded.

## ***Spill Cleanup***

- Contain and clean up any spill immediately.
- Properly remove and dispose of any hazardous materials or contaminated soil if significant residual materials remain on the ground after construction is complete. See WM-7, Contaminated Soil Management.
- See WM-4, Spill Prevention and Control, for spills of chemicals and/or hazardous materials.
- If spills or leaks of materials occur that are not contained and could discharge to surface waters, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

## **Cost**

- The largest cost of implementation may be in the construction of a materials storage area that is covered and provides secondary containment.

## **Inspection and Maintenance**

- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Keep storage areas clean and well organized, including a current list of all materials onsite.
- Inspect labels on containers for legibility and accuracy.

- Repair or replace perimeter controls, containment structures, covers, and liners as needed to maintain proper function.

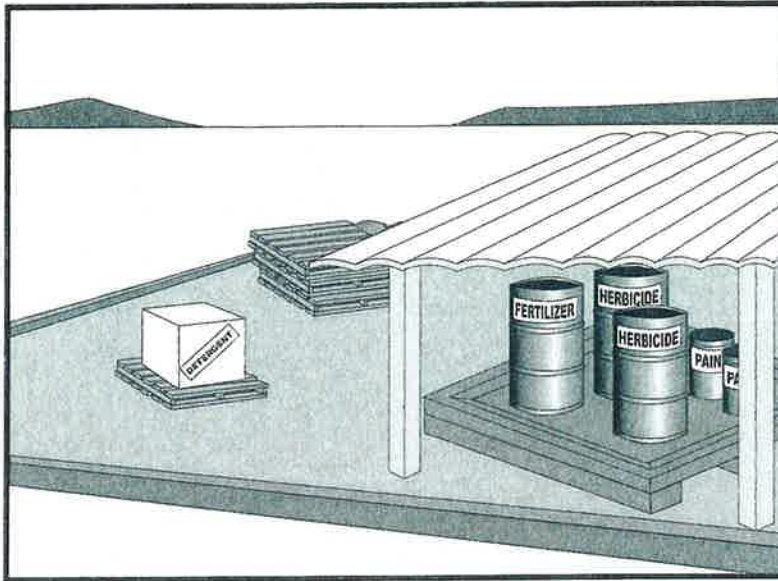
## References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



### Description and Purpose

Prevent or reduce the discharge of pollutants to the storm drain system or watercourses from material use by using alternative products, minimizing hazardous material use onsite, and training employees and subcontractors.

### Suitable Applications

This BMP is suitable for use at all construction projects. These procedures apply when the following materials are used or prepared onsite:

- Pesticides and herbicides
- Fertilizers
- Detergents
- Petroleum products such as fuel, oil, and grease
- Asphalt and other concrete components
- Other hazardous chemicals such as acids, lime, glues, adhesives, paints, solvents, and curing compounds
- Other materials that may be detrimental if released to the environment

### Categories

<b>EC</b>	Erosion Control	
<b>SE</b>	Sediment Control	
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	
<b>NS</b>	Non-Stormwater Management Control	
<b>WM</b>	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

### Legend:

- Primary Category**
- Secondary Category**

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

### Potential Alternatives

None



## Limitations

Safer alternative building and construction products may not be available or suitable in every instance.

## Implementation

The following steps should be taken to minimize risk:

- Minimize use of hazardous materials onsite.
- Follow manufacturer instructions regarding uses, protective equipment, ventilation, flammability, and mixing of chemicals.
- Train personnel who use pesticides. The California Department of Pesticide Regulation and county agricultural commissioners license pesticide dealers, certify pesticide applicators, and conduct onsite inspections.
- The preferred method of termiticide application is soil injection near the existing or proposed structure foundation/slab; however, if not feasible, soil drench application of termiticides should follow EPA label guidelines and the following recommendations (most of which are applicable to most pesticide applications):
  - Do not treat soil that is water-saturated or frozen.
  - Application shall not commence within 24-hours of a predicted precipitation event with a 40% or greater probability. Weather tracking must be performed on a daily basis prior to termiticide application and during the period of termiticide application.
  - Do not allow treatment chemicals to runoff from the target area. Apply proper quantity to prevent excess runoff. Provide containment for and divert stormwater from application areas using berms or diversion ditches during application.
  - Dry season: Do not apply within 10 feet of storm drains. Do not apply within 25 feet of aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds).
  - Wet season: Do not apply within 50 feet of storm drains or aquatic habitats (such as, but not limited to, lakes; reservoirs; rivers; permanent streams; marshes or ponds; estuaries; and commercial fish farm ponds) unless a vegetative buffer is present (if so, refer to dry season requirements).
  - Do not make on-grade applications when sustained wind speeds are above 10 mph (at application site) at nozzle end height.
  - Cover treatment site prior to a rain event in order to prevent run-off of the pesticide into non-target areas. The treated area should be limited to a size that can be backfilled and/or covered by the end of the work shift. Backfilling or covering of the treated area shall be done by the end of the same work shift in which the application is made.
  - The applicator must either cover the soil him/herself or provide written notification of the above requirement to the contractor on site and to the person commissioning the

application (if different than the contractor). If notice is provided to the contractor or the person commissioning the application, then they are responsible under the Federal Insecticide Fungicide, and Rodenticide Act (FIFRA) to ensure that: 1) if the concrete slab cannot be poured over the treated soil within 24 hours of application, the treated soil is covered with a waterproof covering (such as polyethylene sheeting), and 2) the treated soil is covered if precipitation is predicted to occur before the concrete slab is scheduled to be poured.

- Do not over-apply fertilizers, herbicides, and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over-application is expensive and environmentally harmful. Unless on steep slopes, till fertilizers into the soil rather than hydraulic application. Apply surface dressings in several smaller applications, as opposed to one large application, to allow time for infiltration and to avoid excess material being carried offsite by runoff. Do not apply these chemicals before predicted rainfall.
- Train employees and subcontractors in proper material use.
- Supply Material Safety Data Sheets (MSDS) for all materials.
- Dispose of latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths, when thoroughly dry and are no longer hazardous, with other construction debris.
- Do not remove the original product label; it contains important safety and disposal information. Use the entire product before disposing of the container.
- Mix paint indoors or in a containment area. Never clean paintbrushes or rinse paint containers into a street, gutter, storm drain, or watercourse. Dispose of any paint thinners, residue, and sludge(s) that cannot be recycled, as hazardous waste.
- For water-based paint, clean brushes to the extent practicable, and rinse to a drain leading to a sanitary sewer where permitted, or contain for proper disposal off site. For oil-based paints, clean brushes to the extent practicable, and filter and reuse thinners and solvents.
- Use recycled and less hazardous products when practical. Recycle residual paints, solvents, non-treated lumber, and other materials.
- Use materials only where and when needed to complete the construction activity. Use safer alternative materials as much as possible. Reduce or eliminate use of hazardous materials onsite when practical.
- Document the location, time, chemicals applied, and applicator's name and qualifications.
- Keep an ample supply of spill clean up material near use areas. Train employees in spill clean up procedures.
- Avoid exposing applied materials to rainfall and runoff unless sufficient time has been allowed for them to dry.
- Discontinue use of erodible landscape material within 2 days prior to a forecasted rain event and materials should be covered and/or bermed.

- Provide containment for material use areas such as masons' areas or paint mixing/preparation areas to prevent materials/pollutants from entering stormwater.

## Costs

All of the above are low cost measures.

## Inspection and Maintenance

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities.
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Ensure employees and subcontractors throughout the job are using appropriate practices.

## References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

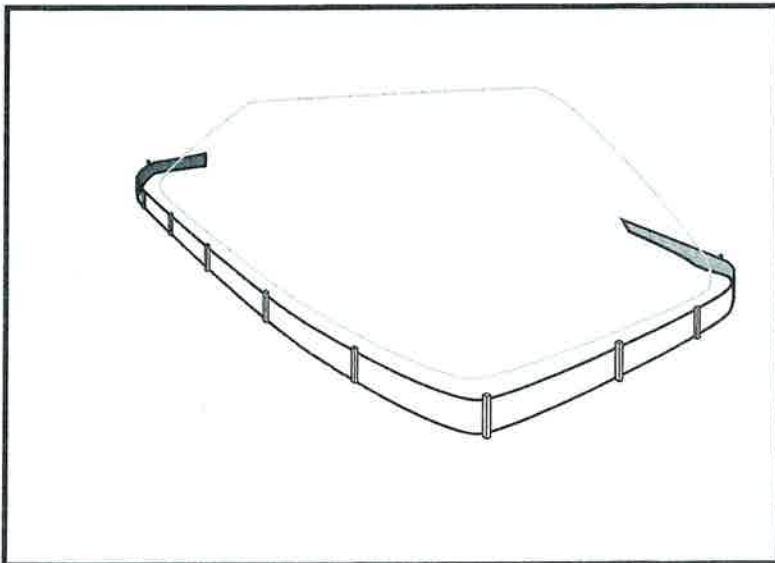
Comments on Risk Assessments Risk Reduction Options for Cypermethrin: Docket No. OPP-2005-0293; California Stormwater Quality Association (CASQA) letter to USEPA, 2006. Environmental Hazard and General Labeling for Pyrethroid Non-Agricultural Outdoor Products, EPA-HQ-OPP-2008-0331-0021; USEPA, 2008.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# Stockpile Management

# WM-3



## Description and Purpose

Stockpile management procedures and practices are designed to reduce or eliminate air and stormwater pollution from stockpiles of soil, soil amendments, sand, paving materials such as portland cement concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, asphalt minder (so called “cold mix” asphalt), and pressure treated wood.

## Suitable Applications

Implement in all projects that stockpile soil and other loose materials.

## Limitations

- Plastic sheeting as a stockpile protection is temporary and hard to manage in windy conditions. Where plastic is used, consider use of plastic tarps with nylon reinforcement which may be more durable than standard sheeting.
- Plastic sheeting can increase runoff volume due to lack of infiltration and potentially cause perimeter control failure.
- Plastic sheeting breaks down faster in sunlight.
- The use of plastic materials should be avoided when feasible and photodegradable plastics should not be used.

## Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

### Categories

EC	Erosion Control	
SE	Sediment Control	<input checked="" type="checkbox"/>
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

### Legend:

- Primary Category
- Secondary Category

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

### Potential Alternatives

None



- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- All stockpiles are required to be protected immediately if they are not scheduled to be used within 14 days.
- Protect all stockpiles from stormwater run-on using temporary perimeter sediment barriers such as compost berms (SE-13), temporary silt dikes (SE-12), fiber rolls (SE-5), silt fences (SE-1), sandbags (SE-8), gravel bags (SE-6), or biofilter bags (SE-14). Refer to the individual fact sheet for each of these controls for installation information.
- Implement wind erosion control practices as appropriate on all stockpiled material. For specific information, see WE-1, Wind Erosion Control.
- Manage stockpiles of contaminated soil in accordance with WM-7, Contaminated Soil Management.
- Place bagged materials on pallets and under cover.
- Ensure that stockpile coverings are installed securely to protect from wind and rain.
- Some plastic covers withstand weather and sunlight better than others. Select cover materials or methods based on anticipated duration of use.

### ***Protection of Non-Active Stockpiles***

Non-active stockpiles of the identified materials should be protected further as follows:

#### *Soil stockpiles*

- Cover and protect soil stockpiles with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Consider temporary vegetation for topsoil piles that will be stockpiled for extended periods.

#### *Stockpiles of Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, or aggregate sub base*

- Provide covers and protect these stockpiles with a temporary perimeter sediment barrier at all times.

#### *Stockpiles of "cold mix"*

- Cover cold mix stockpiles and place them on plastic sheeting (or comparable material) and surround the stockpiles with a berm all times.

#### *Stockpiles of fly ash, stucco, hydrated lime*

- Cover stockpiles of materials that may raise the pH of runoff (i.e., basic materials) with plastic and surround the stockpiles with a berm at all times.



*Stockpiles/Storage of wood (Pressure treated with chromated copper arsenate or ammoniacal copper zinc arsenate)*

- Cover treated wood with plastic sheeting (or comparable material) and surround with a berm at all times.

## **Protection of Active Stockpiles**

Active stockpiles of the identified materials should be protected as follows:

- All stockpiles should be covered and protected with a temporary linear sediment barrier prior to the onset of precipitation.
- Stockpiles of “cold mix” and treated wood, and basic materials should be placed on and covered with plastic sheeting or comparable material and surrounded by a berm prior to the onset of precipitation.
- The downstream perimeter of an active stockpile should be protected with a linear sediment barrier or berm and runoff should be diverted around or away from the stockpile on the upstream perimeter.

## **Costs**

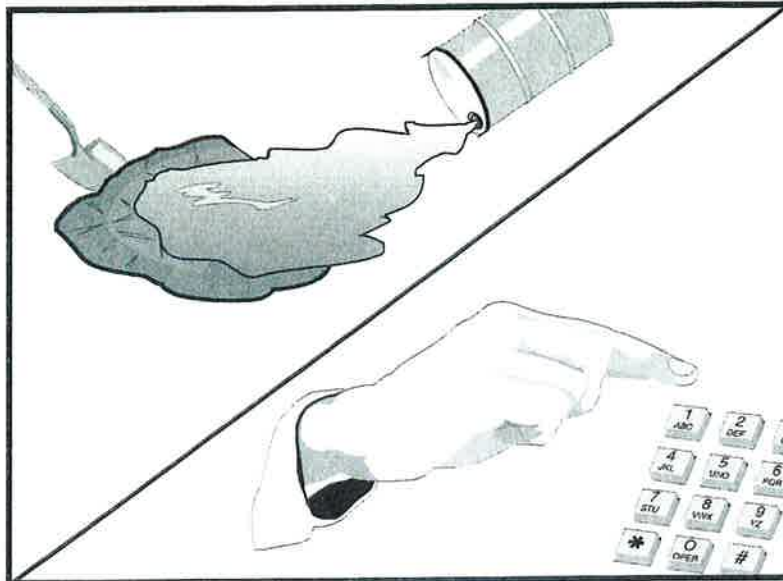
For cost information associated with stockpile protection refer to the individual erosion or sediment control BMP fact sheet considered for implementation (For example, refer to SE-1 Silt Fence for installation of silt fence around the perimeter of a stockpile.)

## **Inspection and Maintenance**

- Stockpiles must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- It may be necessary to inspect stockpiles covered with plastic sheeting more frequently during certain conditions (for example, high winds or extreme heat).
- Repair and/or replace perimeter controls and covers as needed to keep them functioning properly.
- Sediment shall be removed when it reaches one-third of the barrier height.

## **References**

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.



## Description and Purpose

Prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees.

This best management practice covers only spill prevention and control. However, WM-1, Materials Delivery and Storage, and WM-2, Material Use, also contain useful information, particularly on spill prevention. For information on wastes, see the waste management BMPs in this section.

## Suitable Applications

This BMP is suitable for all construction projects. Spill control procedures are implemented anytime chemicals or hazardous substances are stored on the construction site, including the following materials:

- Soil stabilizers/binders
- Dust palliatives
- Herbicides
- Growth inhibitors
- Fertilizers
- Deicing/anti-icing chemicals

## Categories

<b>EC</b>	Erosion Control	
<b>SE</b>	Sediment Control	
<b>TC</b>	Tracking Control	
<b>WE</b>	Wind Erosion Control	
<b>NS</b>	Non-Stormwater Management Control	
<b>WM</b>	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

## Legend:

- Primary Objective
- Secondary Objective

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

## Potential Alternatives

None



- Fuels
- Lubricants
- Other petroleum distillates

## **Limitations**

- In some cases it may be necessary to use a private spill cleanup company.
- This BMP applies to spills caused by the contractor and subcontractors.
- Procedures and practices presented in this BMP are general. Contractor should identify appropriate practices for the specific materials used or stored onsite

## **Implementation**

The following steps will help reduce the stormwater impacts of leaks and spills:

### ***Education***

- Be aware that different materials pollute in different amounts. Make sure that each employee knows what a “significant spill” is for each material they use, and what is the appropriate response for “significant” and “insignificant” spills.
- Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.
- Have contractor’s superintendent or representative oversee and enforce proper spill prevention and control measures.

### ***General Measures***

- To the extent that the work can be accomplished safely, spills of oil, petroleum products, substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- Store hazardous materials and wastes in covered containers and protect from vandalism.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- Train employees in spill prevention and cleanup.
- Designate responsible individuals to oversee and enforce control measures.
- Spills should be covered and protected from stormwater runoff during rainfall to the extent that it doesn’t compromise clean up activities.
- Do not bury or wash spills with water.

- Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with WM-10, Liquid Waste Management.
- Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- Place proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- Keep waste storage areas clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

## ***Cleanup***

- Clean up leaks and spills immediately.
- Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be sent to either a certified laundry (rags) or disposed of as hazardous waste.
- Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

## ***Minor Spills***

- Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- Use absorbent materials on small spills rather than hosing down or burying the spill.
- Absorbent materials should be promptly removed and disposed of properly.
- Follow the practice below for a minor spill:
  - Contain the spread of the spill.
  - Recover spilled materials.
  - Clean the contaminated area and properly dispose of contaminated materials.

## ***Semi-Significant Spills***

- Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

- Spills should be cleaned up immediately:
  - Contain spread of the spill.
  - Notify the project foreman immediately.
  - If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
  - If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
  - If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

### ***Significant/Hazardous Spills***

- For significant or hazardous spills that cannot be controlled by personnel in the immediate vicinity, the following steps should be taken:
  - Notify the local emergency response by dialing 911. In addition to 911, the contractor will notify the proper county officials. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
  - Notify the Governor's Office of Emergency Services Warning Center, (916) 845-8911.
  - For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110,119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
  - Notification should first be made by telephone and followed up with a written report.
  - The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
  - Other agencies which may need to be consulted include, but are not limited to, the Fire Department, the Public Works Department, the Coast Guard, the Highway Patrol, the City/County Police Department, Department of Toxic Substances, California Division of Oil and Gas, Cal/OSHA, etc.

### ***Reporting***

- Report significant spills to local agencies, such as the Fire Department; they can assist in cleanup.
- Federal regulations require that any significant oil spill into a water body or onto an adjoining shoreline be reported to the National Response Center (NRC) at 800-424-8802 (24 hours).

Use the following measures related to specific activities:

## ***Vehicle and Equipment Maintenance***

- If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
- Regularly inspect onsite vehicles and equipment for leaks and repair immediately
- Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- Place drip pans or absorbent materials under paving equipment when not in use.
- Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- Promptly transfer used fluids to the proper waste or recycling drums. Don't leave full drip pans or other open containers lying around
- Oil filters disposed of in trashcans or dumpsters can leak oil and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

## ***Vehicle and Equipment Fueling***

- If fueling must occur onsite, use designate areas, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
- Discourage "topping off" of fuel tanks.
- Always use secondary containment, such as a drain pan, when fueling to catch spills/ leaks.

## **Costs**

Prevention of leaks and spills is inexpensive. Treatment and/ or disposal of contaminated soil or water can be quite expensive.

## **Inspection and Maintenance**

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.
- Keep ample supplies of spill control and cleanup materials onsite, near storage, unloading, and maintenance areas.
- Update your spill prevention and control plan and stock cleanup materials as changes occur in the types of chemicals onsite.

## References

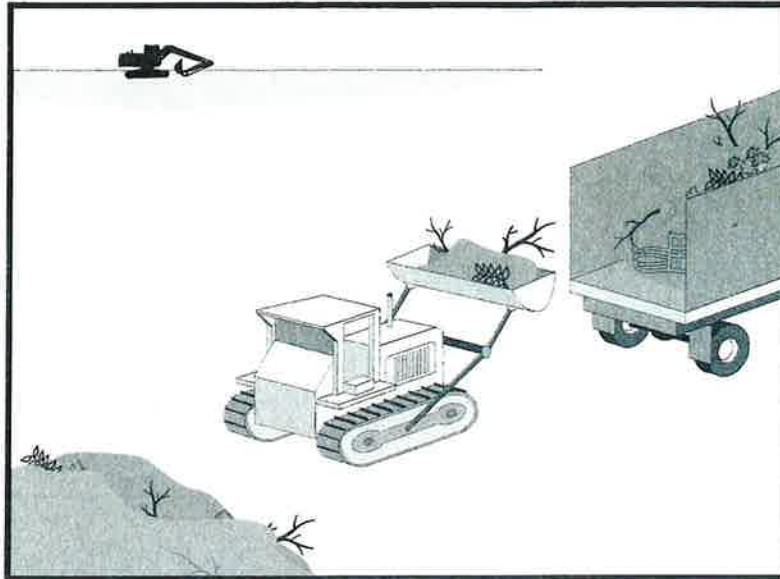
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

# Solid Waste Management

# WM-5



## Description and Purpose

Solid waste management procedures and practices are designed to prevent or reduce the discharge of pollutants to stormwater from solid or construction waste by providing designated waste collection areas and containers, arranging for regular disposal, and training employees and subcontractors.

## Suitable Applications

This BMP is suitable for construction sites where the following wastes are generated or stored:

- Solid waste generated from trees and shrubs removed during land clearing, demolition of existing structures (rubble), and building construction
- Packaging materials including wood, paper, and plastic
- Scrap or surplus building materials including scrap metals, rubber, plastic, glass pieces, and masonry products
- Domestic wastes including food containers such as beverage cans, coffee cups, paper bags, plastic wrappers, and cigarettes
- Construction wastes including brick, mortar, timber, steel and metal scraps, pipe and electrical cuttings, non-hazardous equipment parts, styrofoam and other materials used to transport and package construction materials
- Highway planting wastes, including vegetative material,

## Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

## Legend:

- Primary Objective
- Secondary Objective

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

## Potential Alternatives

None





plant containers, and packaging materials

## Limitations

Temporary stockpiling of certain construction wastes may not necessitate stringent drainage related controls during the non-rainy season or in desert areas with low rainfall.

## Implementation

The following steps will help keep a clean site and reduce stormwater pollution:

- Select designated waste collection areas onsite.
- Inform trash-hauling contractors that you will accept only watertight dumpsters for onsite use. Inspect dumpsters for leaks and repair any dumpster that is not watertight.
- Locate containers in a covered area or in a secondary containment.
- Provide an adequate number of containers with lids or covers that can be placed over the container to keep rain out or to prevent loss of wastes when it is windy.
- Cover waste containers at the end of each work day and when it is raining.
- Plan for additional containers and more frequent pickup during the demolition phase of construction.
- Collect site trash daily, especially during rainy and windy conditions.
- Remove this solid waste promptly since erosion and sediment control devices tend to collect litter.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Do not hose out dumpsters on the construction site. Leave dumpster cleaning to the trash hauling contractor.
- Arrange for regular waste collection before containers overflow.
- Clean up immediately if a container does spill.
- Make sure that construction waste is collected, removed, and disposed of only at authorized disposal areas.

## Education

- Have the contractor's superintendent or representative oversee and enforce proper solid waste management procedures and practices.
- Instruct employees and subcontractors on identification of solid waste and hazardous waste.
- Educate employees and subcontractors on solid waste storage and disposal procedures.

- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Require that employees and subcontractors follow solid waste handling and storage procedures.
- Prohibit littering by employees, subcontractors, and visitors.
- Minimize production of solid waste materials wherever possible.

### ***Collection, Storage, and Disposal***

- Littering on the project site should be prohibited.
- To prevent clogging of the storm drainage system, litter and debris removal from drainage grates, trash racks, and ditch lines should be a priority.
- Trash receptacles should be provided in the contractor's yard, field trailer areas, and at locations where workers congregate for lunch and break periods.
- Litter from work areas within the construction limits of the project site should be collected and placed in watertight dumpsters at least weekly, regardless of whether the litter was generated by the contractor, the public, or others. Collected litter and debris should not be placed in or next to drain inlets, stormwater drainage systems, or watercourses.
- Dumpsters of sufficient size and number should be provided to contain the solid waste generated by the project.
- Full dumpsters should be removed from the project site and the contents should be disposed of by the trash hauling contractor.
- Construction debris and waste should be removed from the site biweekly or more frequently as needed.
- Construction material visible to the public should be stored or stacked in an orderly manner.
- Stormwater runoff should be prevented from contacting stored solid waste through the use of berms, dikes, or other temporary diversion structures or through the use of measures to elevate waste from site surfaces.
- Solid waste storage areas should be located at least 50 ft from drainage facilities and watercourses and should not be located in areas prone to flooding or ponding.
- Except during fair weather, construction and highway planting waste not stored in watertight dumpsters should be securely covered from wind and rain by covering the waste with tarps or plastic.
- Segregate potentially hazardous waste from non-hazardous construction site waste.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.

- For disposal of hazardous waste, see WM-6, Hazardous Waste Management. Have hazardous waste hauled to an appropriate disposal and/or recycling facility.
- Salvage or recycle useful vegetation debris, packaging and surplus building materials when practical. For example, trees and shrubs from land clearing can be used as a brush barrier, or converted into wood chips, then used as mulch on graded areas. Wood pallets, cardboard boxes, and construction scraps can also be recycled.

## Costs

All of the above are low cost measures.

## Inspection and Maintenance

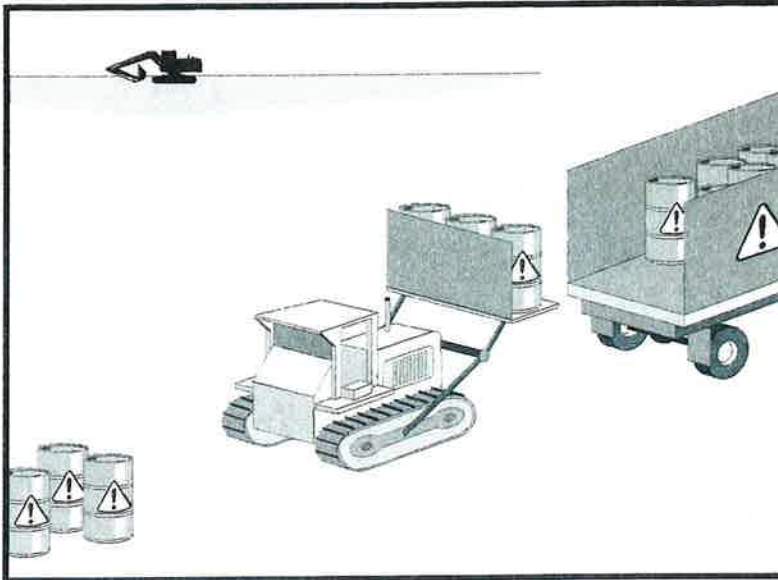
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Inspect construction waste area regularly.
- Arrange for regular waste collection.

## References

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



### Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

### Legend:

- Primary Objective
- Secondary Objective

### Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from hazardous waste through proper material use, waste disposal, and training of employees and subcontractors.

### Suitable Applications

This best management practice (BMP) applies to all construction projects. Hazardous waste management practices are implemented on construction projects that generate waste from the use of:

- Petroleum Products
- Concrete Curing Compounds
- Palliatives
- Septic Wastes
- Stains
- Wood Preservatives
- Asphalt Products
- Pesticides
- Acids
- Paints
- Solvents
- Roofing Tar
- Any materials deemed a hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261, or 302

### Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

### Potential Alternatives

None



In addition, sites with existing structures may contain wastes, which must be disposed of in accordance with federal, state, and local regulations. These wastes include:

- Sandblasting grit mixed with lead-, cadmium-, or chromium-based paints
- Asbestos
- PCBs (particularly in older transformers)

## Limitations

- Hazardous waste that cannot be reused or recycled must be disposed of by a licensed hazardous waste hauler.
- Nothing in this BMP relieves the contractor from responsibility for compliance with federal, state, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.
- This BMP does not cover aurally deposited lead (ADL) soils. For ADL soils refer to WM-7, Contaminated Soil Management.

## Implementation

The following steps will help reduce stormwater pollution from hazardous wastes:

### *Material Use*

- Wastes should be stored in sealed containers constructed of a suitable material and should be labeled as required by Title 22 CCR, Division 4.5 and 49 CFR Parts 172, 173, 178, and 179.
- All hazardous waste should be stored, transported, and disposed as required in Title 22 CCR, Division 4.5 and 49 CFR 261-263.
- Waste containers should be stored in temporary containment facilities that should comply with the following requirements:
  - Temporary containment facility should provide for a spill containment volume equal to 1.5 times the volume of all containers able to contain precipitation from a 25 year storm event, plus the greater of 10% of the aggregate volume of all containers or 100% of the capacity of the largest tank within its boundary, whichever is greater.
  - Temporary containment facility should be impervious to the materials stored there for a minimum contact time of 72 hours.
  - Temporary containment facilities should be maintained free of accumulated rainwater and spills. In the event of spills or leaks, accumulated rainwater and spills should be placed into drums after each rainfall. These liquids should be handled as a hazardous waste unless testing determines them to be non-hazardous. Non-hazardous liquids should be sent to an approved disposal site.
  - Sufficient separation should be provided between stored containers to allow for spill cleanup and emergency response access.

- Incompatible materials, such as chlorine and ammonia, should not be stored in the same temporary containment facility.
- Throughout the rainy season, temporary containment facilities should be covered during non-working days, and prior to rain events. Covered facilities may include use of plastic tarps for small facilities or constructed roofs with overhangs.
- Drums should not be overfilled and wastes should not be mixed.
- Unless watertight, containers of dry waste should be stored on pallets.
- Do not over-apply herbicides and pesticides. Prepare only the amount needed. Follow the recommended usage instructions. Over application is expensive and environmentally harmful. Apply surface dressings in several smaller applications, as opposed to one large application. Allow time for infiltration and avoid excess material being carried offsite by runoff. Do not apply these chemicals just before it rains. People applying pesticides must be certified in accordance with federal and state regulations.
- Paint brushes and equipment for water and oil based paints should be cleaned within a contained area and should not be allowed to contaminate site soils, watercourses, or drainage systems. Waste paints, thinners, solvents, residues, and sludges that cannot be recycled or reused should be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths should be disposed of as solid waste.
- Do not clean out brushes or rinse paint containers into the dirt, street, gutter, storm drain, or stream. "Paint out" brushes as much as possible. Rinse water-based paints to the sanitary sewer. Filter and reuse thinners and solvents. Dispose of excess oil-based paints and sludge as hazardous waste.
- The following actions should be taken with respect to temporary contaminant:
  - Ensure that adequate hazardous waste storage volume is available.
  - Ensure that hazardous waste collection containers are conveniently located.
  - Designate hazardous waste storage areas onsite away from storm drains or watercourses and away from moving vehicles and equipment to prevent accidental spills.
  - Minimize production or generation of hazardous materials and hazardous waste on the job site.
  - Use containment berms in fueling and maintenance areas and where the potential for spills is high.
  - Segregate potentially hazardous waste from non-hazardous construction site debris.
  - Keep liquid or semi-liquid hazardous waste in appropriate containers (closed drums or similar) and under cover.

- Clearly label all hazardous waste containers with the waste being stored and the date of accumulation.
- Place hazardous waste containers in secondary containment.
- Do not allow potentially hazardous waste materials to accumulate on the ground.
- Do not mix wastes.
- Use all of the product before disposing of the container.
- Do not remove the original product label; it contains important safety and disposal information.

## ***Waste Recycling Disposal***

- Select designated hazardous waste collection areas onsite.
- Hazardous materials and wastes should be stored in covered containers and protected from vandalism.
- Place hazardous waste containers in secondary containment.
- Do not mix wastes, this can cause chemical reactions, making recycling impossible and complicating disposal.
- Recycle any useful materials such as used oil or water-based paint.
- Make sure that toxic liquid wastes (used oils, solvents, and paints) and chemicals (acids, pesticides, additives, curing compounds) are not disposed of in dumpsters designated for construction debris.
- Arrange for regular waste collection before containers overflow.
- Make sure that hazardous waste (e.g., excess oil-based paint and sludge) is collected, removed, and disposed of only at authorized disposal areas.

## ***Disposal Procedures***

- Waste should be disposed of by a licensed hazardous waste transporter at an authorized and licensed disposal facility or recycling facility utilizing properly completed Uniform Hazardous Waste Manifest forms.
- A Department of Health Services certified laboratory should sample waste to determine the appropriate disposal facility.
- Properly dispose of rainwater in secondary containment that may have mixed with hazardous waste.
- Attention is directed to "Hazardous Material", "Contaminated Material", and "Aerially Deposited Lead" of the contract documents regarding the handling and disposal of hazardous materials.

## ***Education***

- Educate employees and subcontractors on hazardous waste storage and disposal procedures.
- Educate employees and subcontractors on potential dangers to humans and the environment from hazardous wastes.
- Instruct employees and subcontractors on safety procedures for common construction site hazardous wastes.
- Instruct employees and subcontractors in identification of hazardous and solid waste.
- Hold regular meetings to discuss and reinforce hazardous waste management procedures (incorporate into regular safety meetings).
- The contractor's superintendent or representative should oversee and enforce proper hazardous waste management procedures and practices.
- Make sure that hazardous waste is collected, removed, and disposed of only at authorized disposal areas.
- Warning signs should be placed in areas recently treated with chemicals.
- Place a stockpile of spill cleanup materials where it will be readily accessible.
- If a container does spill, clean up immediately.

## **Costs**

All of the above are low cost measures.

## ***Inspection and Maintenance***

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events..
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur
- Hazardous waste should be regularly collected.
- A foreman or construction supervisor should monitor onsite hazardous waste storage and disposal procedures.
- Waste storage areas should be kept clean, well organized, and equipped with ample cleanup supplies as appropriate for the materials being stored.
- Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.



- Hazardous spills should be cleaned up and reported in conformance with the applicable Material Safety Data Sheet (MSDS) and the instructions posted at the project site.
- The National Response Center, at (800) 424-8802, should be notified of spills of federal reportable quantities in conformance with the requirements in 40 CFR parts 110, 117, and 302. Also notify the Governors Office of Emergency Services Warning Center at (916) 845-8911.
- A copy of the hazardous waste manifests should be provided.

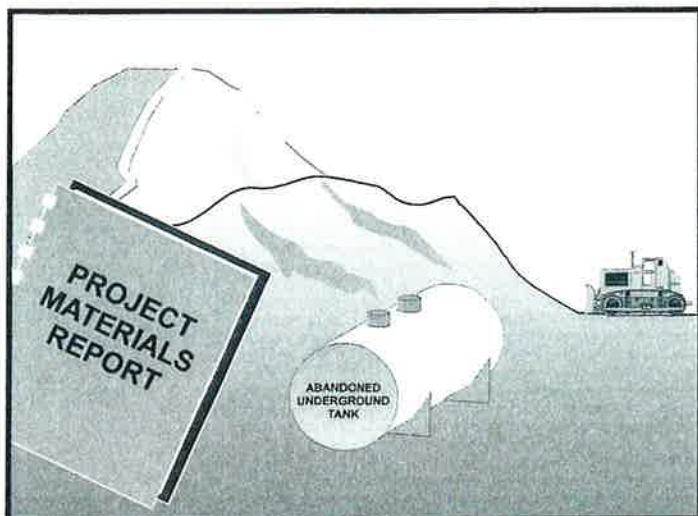
## References

Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



## Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

## Legend:

- Primary Objective
- Secondary Objective

## Description and Purpose

Prevent or reduce the discharge of pollutants to stormwater from contaminated soil and highly acidic or alkaline soils by conducting pre-construction surveys, inspecting excavations regularly, and remediating contaminated soil promptly.

## Suitable Applications

Contaminated soil management is implemented on construction projects in highly urbanized or industrial areas where soil contamination may have occurred due to spills, illicit discharges, aerial deposition, past use and leaks from underground storage tanks.

## Limitations

Contaminated soils that cannot be treated onsite must be disposed of offsite by a licensed hazardous waste hauler. The presence of contaminated soil may indicate contaminated water as well. See NS-2, Dewatering Operations, for more information.

The procedures and practices presented in this BMP are general. The contractor should identify appropriate practices and procedures for the specific contaminants known to exist or discovered onsite.

## Implementation

Most owners and developers conduct pre-construction environmental assessments as a matter of routine. Contaminated soils are often identified during project planning and development with known locations identified in the plans, specifications and in the SWPPP. The contractor should review applicable reports and investigate appropriate call-outs in the

## Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	<input checked="" type="checkbox"/>
Organics	<input checked="" type="checkbox"/>

## Potential Alternatives

None



plans, specifications, and SWPPP. Recent court rulings holding contractors liable for cleanup costs when they unknowingly move contaminated soil highlight the need for contractors to confirm a site assessment is completed before earth moving begins.

The following steps will help reduce stormwater pollution from contaminated soil:

- Conduct thorough, pre-construction inspections of the site and review documents related to the site. If inspection or reviews indicated presence of contaminated soils, develop a plan before starting work.
- Look for contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
- Prevent leaks and spills. Contaminated soil can be expensive to treat and dispose of properly. However, addressing the problem before construction is much less expensive than after the structures are in place.
- The contractor may further identify contaminated soils by investigating:
  - Past site uses and activities
  - Detected or undetected spills and leaks
  - Acid or alkaline solutions from exposed soil or rock formations high in acid or alkaline forming elements
  - Contaminated soil as evidenced by discoloration, odors, differences in soil properties, abandoned underground tanks or pipes, or buried debris.
  - Suspected soils should be tested at a certified laboratory.

## ***Education***

- Have employees and subcontractors complete a safety training program which meets 29 CFR 1910.120 and 8 CCR 5192 covering the potential hazards as identified, prior to performing any excavation work at the locations containing material classified as hazardous.
- Educate employees and subcontractors in identification of contaminated soil and on contaminated soil handling and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).

## ***Handling Procedures for Material with Aerially Deposited Lead (ADL)***

- Materials from areas designated as containing (ADL) may, if allowed by the contract special provisions, be excavated, transported, and used in the construction of embankments and/or backfill.
- Excavation, transportation, and placement operations should result in no visible dust.
- Caution should be exercised to prevent spillage of lead containing material during transport.

- Quality should be monitored during excavation of soils contaminated with lead.

## ***Handling Procedures for Contaminated Soils***

- Minimize onsite storage. Contaminated soil should be disposed of properly in accordance with all applicable regulations. All hazardous waste storage will comply with the requirements in Title 22, CCR, Sections 66265.250 to 66265.260.
- Test suspected soils at an approved certified laboratory.
- Work with the local regulatory agencies to develop options for treatment or disposal if the soil is contaminated.
- Avoid temporary stockpiling of contaminated soils or hazardous material.
- Take the following precautions if temporary stockpiling is necessary:
  - Cover the stockpile with plastic sheeting or tarps.
  - Install a berm around the stockpile to prevent runoff from leaving the area.
  - Do not stockpile in or near storm drains or watercourses.
- Remove contaminated material and hazardous material on exteriors of transport vehicles and place either into the current transport vehicle or into the excavation prior to the vehicle leaving the exclusion zone.
- Monitor the air quality continuously during excavation operations at all locations containing hazardous material.
- Procure all permits and licenses, pay all charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work, including registration for transporting vehicles carrying the contaminated material and the hazardous material.
- Collect water from decontamination procedures and treat or dispose of it at an appropriate disposal site.
- Collect non-reusable protective equipment, once used by any personnel, and dispose of at an appropriate disposal site.
- Install temporary security fence to surround and secure the exclusion zone. Remove fencing when no longer needed.
- Excavate, transport, and dispose of contaminated material and hazardous material in accordance with the rules and regulations of the following agencies (the specifications of these agencies supersede the procedures outlined in this BMP):
  - United States Department of Transportation (USDOT)
  - United States Environmental Protection Agency (USEPA)
  - California Environmental Protection Agency (CAL-EPA)

- California Division of Occupation Safety and Health Administration (CAL-OSHA)
- Local regulatory agencies

## ***Procedures for Underground Storage Tank Removals***

- Prior to commencing tank removal operations, obtain the required underground storage tank removal permits and approval from the federal, state, and local agencies that have jurisdiction over such work.
- To determine if it contains hazardous substances, arrange to have tested, any liquid or sludge found in the underground tank prior to its removal.
- Following the tank removal, take soil samples beneath the excavated tank and perform analysis as required by the local agency representative(s).
- The underground storage tank, any liquid or sludge found within the tank, and all contaminated substances and hazardous substances removed during the tank removal and transported to disposal facilities permitted to accept such waste.

## ***Water Control***

- All necessary precautions and preventive measures should be taken to prevent the flow of water, including ground water, from mixing with hazardous substances or underground storage tank excavations. Such preventative measures may consist of, but are not limited to, berms, cofferdams, grout curtains, freeze walls, and seal course concrete or any combination thereof.
- If water does enter an excavation and becomes contaminated, such water, when necessary to proceed with the work, should be discharged to clean, closed top, watertight transportable holding tanks, treated, and disposed of in accordance with federal, state, and local laws.

## **Costs**

Prevention of leaks and spills is inexpensive. Treatment or disposal of contaminated soil can be quite expensive.

## **Inspection and Maintenance**

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for contractor's Water Pollution Control Manager, foreman, and/or construction supervisor to monitor onsite contaminated soil storage and disposal procedures.
- Monitor air quality continuously during excavation operations at all locations containing hazardous material.
- Coordinate contaminated soils and hazardous substances/waste management with the appropriate federal, state, and local agencies.

- Implement WM-4, Spill Prevention and Control, to prevent leaks and spills as much as possible.

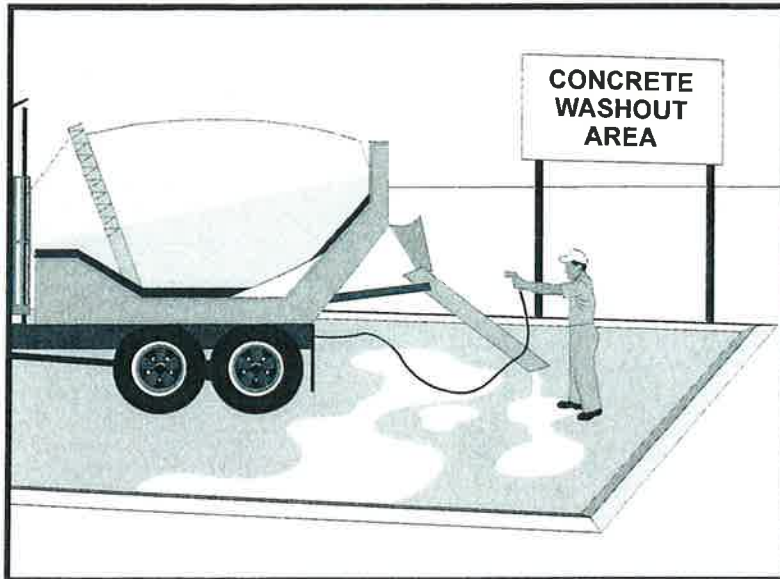
## References

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Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



## Description and Purpose

Prevent the discharge of pollutants to stormwater from concrete waste by conducting washout onsite or offsite in a designated area, and by employee and subcontractor training.

The General Permit incorporates Numeric Effluent Limits (NEL) and Numeric Action Levels (NAL) for pH (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Many types of construction materials, including mortar, concrete, stucco, cement and block and their associated wastes have basic chemical properties that can raise pH levels outside of the permitted range. Additional care should be taken when managing these materials to prevent them from coming into contact with stormwater flows and raising pH to levels outside the accepted range.

## Suitable Applications

Concrete waste management procedures and practices are implemented on construction projects where:

- Concrete is used as a construction material or where concrete dust and debris result from demolition activities.
- Slurries containing portland cement concrete (PCC) are generated, such as from saw cutting, coring, grinding, grooving, and hydro-concrete demolition.

## Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	<input checked="" type="checkbox"/>
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

## Legend:

- Primary Category
- Secondary Category

## Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	
Trash	
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	
Organics	

## Potential Alternatives

None



- Concrete trucks and other concrete-coated equipment are washed onsite.
- Mortar-mixing stations exist.
- Stucco mixing and spraying .
- See also NS-8, Vehicle and Equipment Cleaning.

## **Limitations**

- Offsite washout of concrete wastes may not always be possible.
- Multiple washouts may be needed to assure adequate capacity and to allow for evaporation.

## **Implementation**

The following steps will help reduce stormwater pollution from concrete wastes:

- Incorporate requirements for concrete waste management into material supplier and subcontractor agreements.
  - Store dry and wet materials under cover, away from drainage areas. Refer to WM-1, Material Delivery and Storage for more information.
  - Avoid mixing excess amounts of concrete.
  - Perform washout of concrete trucks in designated areas only, where washout will not reach stormwater.
  - Do not wash out concrete trucks into storm drains, open ditches, streets, streams or onto the ground. Trucks should always be washed out into designated facilities.
  - Do not allow excess concrete to be dumped onsite, except in designated areas.
  - For onsite washout:
    - On larger sites, it is recommended to locate washout areas at least 50 feet from storm drains, open ditches, or water bodies. Do not allow runoff from this area by constructing a temporary pit or bermed area large enough for liquid and solid waste.
    - Washout wastes into the temporary washout where the concrete can set, be broken up, and then disposed properly.
    - Washout should be lined so there is no discharge into the underlying soil.
  - Do not wash sweepings from exposed aggregate concrete into the street or storm drain. Collect and return sweepings to aggregate base stockpile or dispose in the trash.
  - See typical concrete washout installation details at the end of this fact sheet.
- ## **Education**
- Educate employees, subcontractors, and suppliers on the concrete waste management techniques described herein.



- Arrange for contractor's superintendent or representative to oversee and enforce concrete waste management procedures.
- Discuss the concrete management techniques described in this BMP (such as handling of concrete waste and washout) with the ready-mix concrete supplier before any deliveries are made.

### ***Concrete Demolition Wastes***

- Stockpile concrete demolition waste in accordance with BMP WM-3, Stockpile Management.
- Dispose of or recycle hardened concrete waste in accordance with applicable federal, state or local regulations.

### ***Concrete Slurry Wastes***

- PCC and AC waste should not be allowed to enter storm drains or watercourses.
- PCC and AC waste should be collected and disposed of or placed in a temporary concrete washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below).
- A foreman or construction supervisor should monitor onsite concrete working tasks, such as saw cutting, coring, grinding and grooving to ensure proper methods are implemented.
- Saw-cut concrete slurry should not be allowed to enter storm drains or watercourses. Residue from grinding operations should be picked up by means of a vacuum attachment to the grinding machine or by sweeping. Saw cutting residue should not be allowed to flow across the pavement and should not be left on the surface of the pavement. See also NS-3, Paving and Grinding Operations; and WM-10, Liquid Waste Management.
- Concrete slurry residue should be disposed in a temporary washout facility (as described in Onsite Temporary Concrete Washout Facility, Concrete Transit Truck Washout Procedures, below) and allowed to dry. Dispose of dry slurry residue in accordance with WM-5, Solid Waste Management.

### ***Onsite Temporary Concrete Washout Facility, Transit Truck Washout Procedures***

- Temporary concrete washout facilities should be located a minimum of 50 ft from storm drain inlets, open drainage facilities, and watercourses. Each facility should be located away from construction traffic or access areas to prevent disturbance or tracking.
- A sign should be installed adjacent to each washout facility to inform concrete equipment operators to utilize the proper facilities.
- Temporary concrete washout facilities should be constructed above grade or below grade at the option of the contractor. Temporary concrete washout facilities should be constructed and maintained in sufficient quantity and size to contain all liquid and concrete waste generated by washout operations.

- Temporary washout facilities should have a temporary pit or bermed areas of sufficient volume to completely contain all liquid and waste concrete materials generated during washout procedures.
- Temporary washout facilities should be lined to prevent discharge to the underlying ground or surrounding area.
- Washout of concrete trucks should be performed in designated areas only.
- Only concrete from mixer truck chutes should be washed into concrete wash out.
- Concrete washout from concrete pumper bins can be washed into concrete pumper trucks and discharged into designated washout area or properly disposed of or recycled offsite.
- Once concrete wastes are washed into the designated area and allowed to harden, the concrete should be broken up, removed, and disposed of per WM-5, Solid Waste Management. Dispose of or recycle hardened concrete on a regular basis.
- Temporary Concrete Washout Facility (Type Above Grade)
  - Temporary concrete washout facility (type above grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft; however, smaller sites or jobs may only need a smaller washout facility. With any washout, always maintain a sufficient quantity and volume to contain all liquid and concrete waste generated by washout operations.
  - Materials used to construct the washout area should conform to the provisions detailed in their respective BMPs (e.g., SE-8 Sandbag Barrier).
  - Plastic lining material should be a minimum of 10 mil in polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.
  - Alternatively, portable removable containers can be used as above grade concrete washouts. Also called a “roll-off”; this concrete washout facility should be properly sealed to prevent leakage, and should be removed from the site and replaced when the container reaches 75% capacity.
- Temporary Concrete Washout Facility (Type Below Grade)
  - Temporary concrete washout facilities (type below grade) should be constructed as shown on the details at the end of this BMP, with a recommended minimum length and minimum width of 10 ft. The quantity and volume should be sufficient to contain all liquid and concrete waste generated by washout operations.
  - Lath and flagging should be commercial type.
  - Plastic lining material should be a minimum of 10 mil polyethylene sheeting and should be free of holes, tears, or other defects that compromise the impermeability of the material.

- The base of a washout facility should be free of rock or debris that may damage a plastic liner.

## **Removal of Temporary Concrete Washout Facilities**

- When temporary concrete washout facilities are no longer required for the work, the hardened concrete should be removed and properly disposed or recycled in accordance with federal, state or local regulations. Materials used to construct temporary concrete washout facilities should be removed from the site of the work and properly disposed or recycled in accordance with federal, state or local regulations..
- Holes, depressions or other ground disturbance caused by the removal of the temporary concrete washout facilities should be backfilled and repaired.

## **Costs**

All of the above are low cost measures. Roll-off concrete washout facilities can be more costly than other measures due to removal and replacement; however, provide a cleaner alternative to traditional washouts. The type of washout facility, size, and availability of materials will determine the cost of the washout.

## **Inspection and Maintenance**

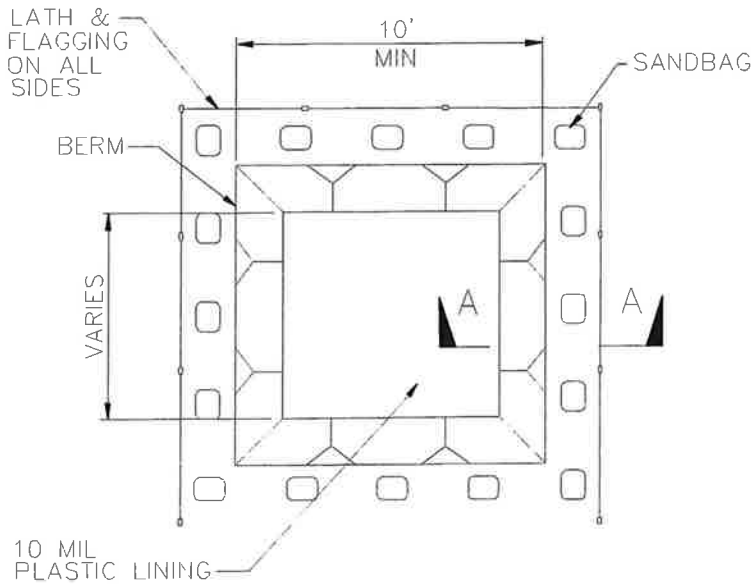
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Temporary concrete washout facilities should be maintained to provide adequate holding capacity with a minimum freeboard of 4 in. for above grade facilities and 12 in. for below grade facilities. Maintaining temporary concrete washout facilities should include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials should be removed and properly disposed or recycled in accordance with federal, state or local regulations.
- Washout facilities must be cleaned, or new facilities must be constructed and ready for use once the washout is 75% full.
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

## **References**

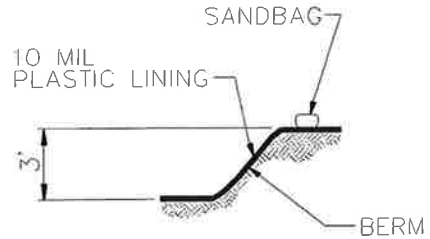
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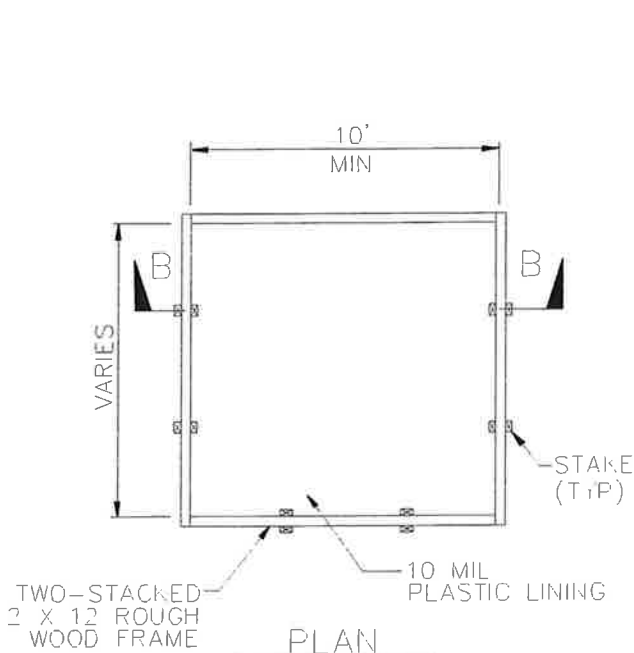
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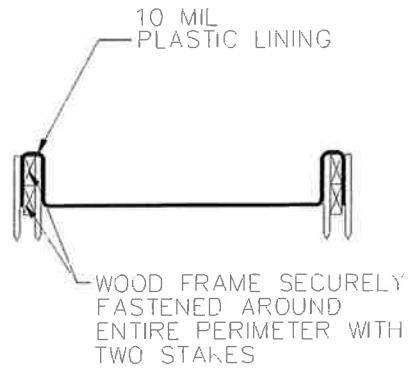
PLAN  
NOT TO SCALE  
TYPE "BELOW GRADE"



SECTION A-A  
NOT TO SCALE



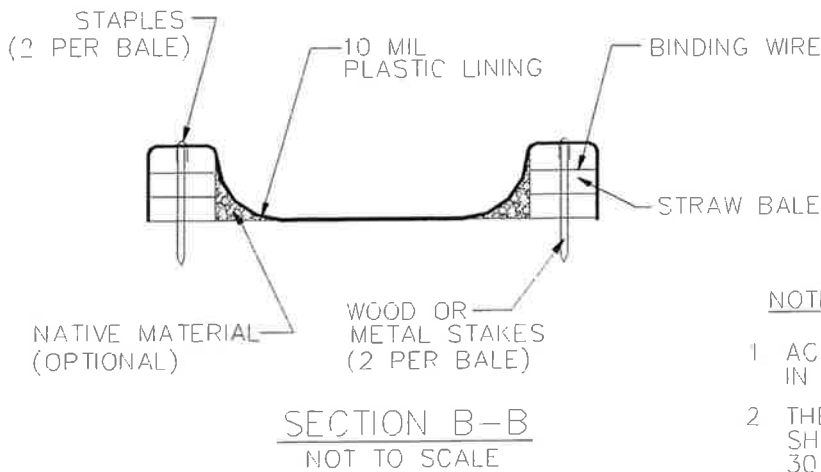
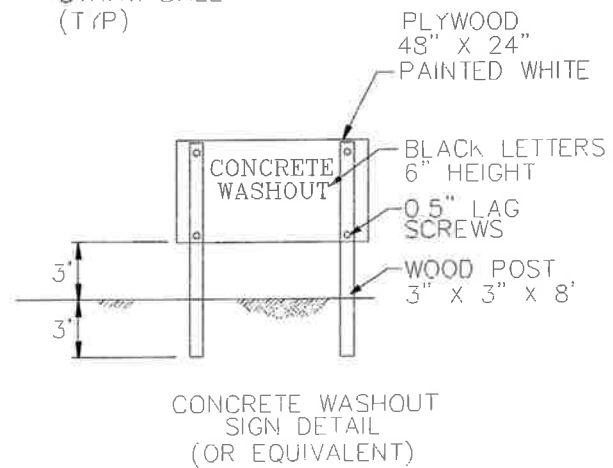
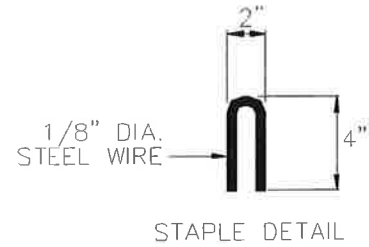
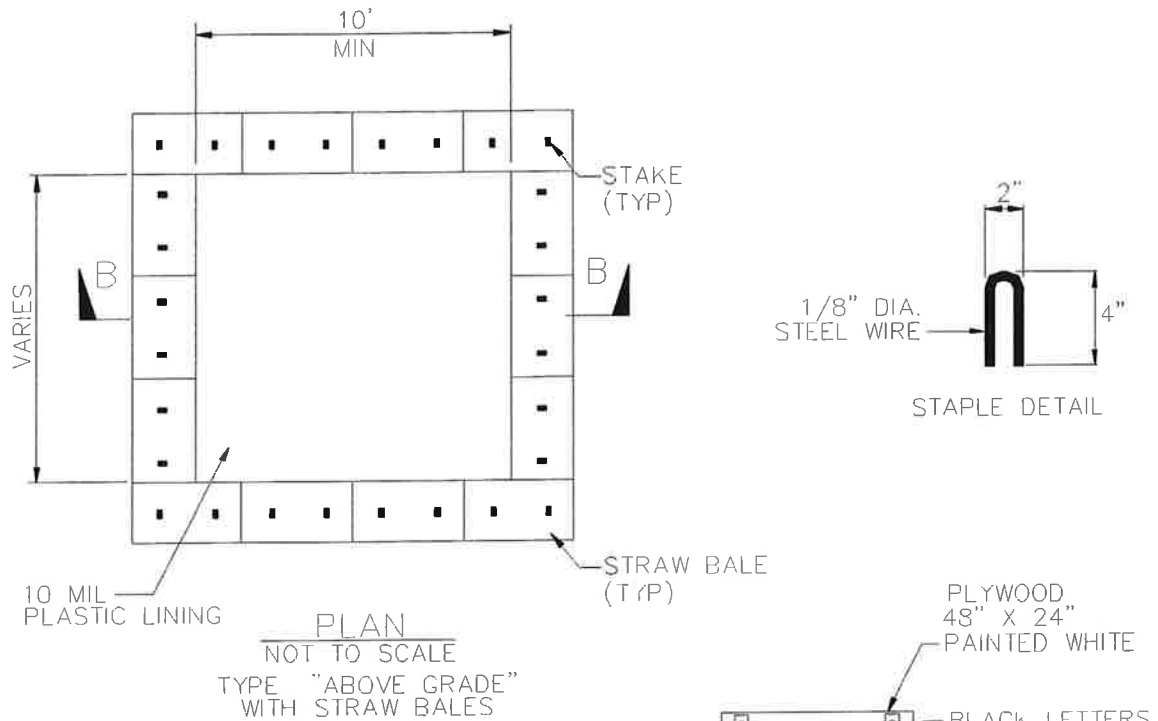
PLAN  
NOT TO SCALE  
TYPE "ABOVE GRADE"



SECTION B-B  
NOT TO SCALE

### NOTES

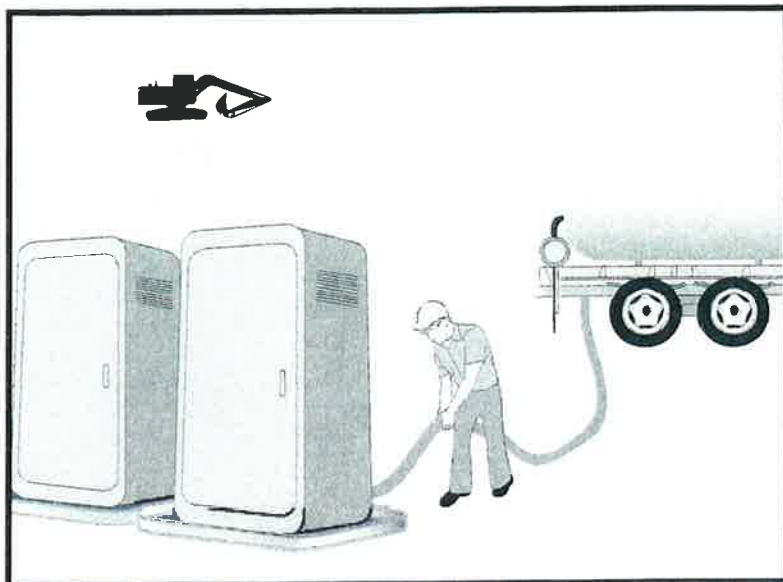
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



**NOTES**

- 1 ACTUAL LAYOUT DETERMINED IN FIELD.
- 2 THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

# Sanitary/Septic Waste Management WM-9



## Description and Purpose

Proper sanitary and septic waste management prevent the discharge of pollutants to stormwater from sanitary and septic waste by providing convenient, well-maintained facilities, and arranging for regular service and disposal.

## Suitable Applications

Sanitary septic waste management practices are suitable for use at all construction sites that use temporary or portable sanitary and septic waste systems.

## Limitations

None identified.

## Implementation

Sanitary or septic wastes should be treated or disposed of in accordance with state and local requirements. In many cases, one contract with a local facility supplier will be all that it takes to make sure sanitary wastes are properly disposed.

## Storage and Disposal Procedures

- Temporary sanitary facilities should be located away from drainage facilities, watercourses, and from traffic circulation. If site conditions allow, place portable facilities a minimum of 50 feet from drainage conveyances and traffic areas. When subjected to high winds or risk of high winds, temporary sanitary facilities should be secured to prevent overturning.

## Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

## Legend:

- Primary Category
- Secondary Category

## Targeted Constituents

Sediment	
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	
Bacteria	<input checked="" type="checkbox"/>
Oil and Grease	
Organics	<input checked="" type="checkbox"/>

## Potential Alternatives

None



# **Sanitary/Septic Waste Management WM-9**

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- Temporary sanitary facilities must be equipped with containment to prevent discharge of pollutants to the stormwater drainage system of the receiving water.
- Consider safety as well as environmental implications before placing temporary sanitary facilities.
- Wastewater should not be discharged or buried within the project site.
- Sanitary and septic systems that discharge directly into sanitary sewer systems, where permissible, should comply with the local health agency, city, county, and sewer district requirements.
- Only reputable, licensed sanitary and septic waste haulers should be used.
- Sanitary facilities should be located in a convenient location.
- Temporary septic systems should treat wastes to appropriate levels before discharging.
- If using an onsite disposal system (OSDS), such as a septic system, local health agency requirements must be followed.
- Temporary sanitary facilities that discharge to the sanitary sewer system should be properly connected to avoid illicit discharges.
- Sanitary and septic facilities should be maintained in good working order by a licensed service.
- Regular waste collection by a licensed hauler should be arranged before facilities overflow.
- If a spill does occur from a temporary sanitary facility, follow federal, state and local regulations for containment and clean-up.

## ***Education***

- Educate employees, subcontractors, and suppliers on sanitary and septic waste storage and disposal procedures.
- Educate employees, subcontractors, and suppliers of potential dangers to humans and the environment from sanitary and septic wastes.
- Instruct employees, subcontractors, and suppliers in identification of sanitary and septic waste.
- Hold regular meetings to discuss and reinforce the use of sanitary facilities (incorporate into regular safety meetings).
- Establish a continuing education program to indoctrinate new employees.

## **Costs**

All of the above are low cost measures.

# **Sanitary/Septic Waste Management WM-9**

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## **Inspection and Maintenance**

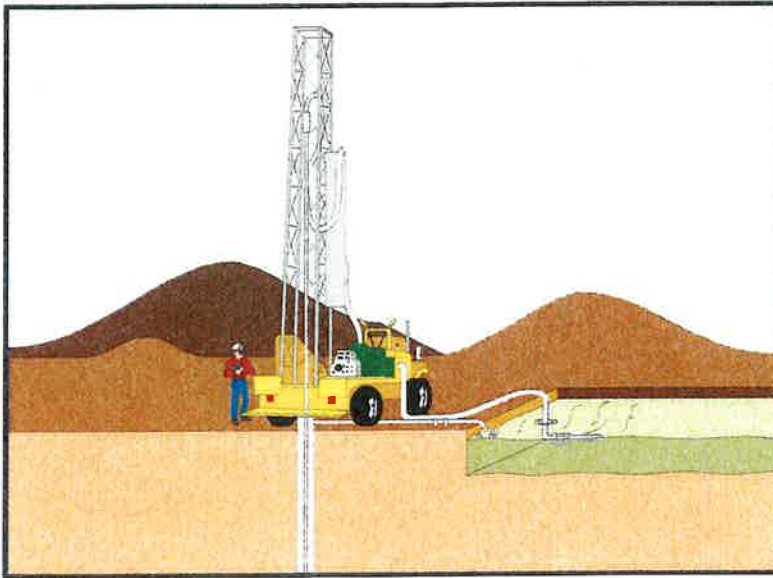
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange for regular waste collection.
- If high winds are expected, portable sanitary facilities must be secured with spikes or weighed down to prevent over turning.
- If spills or leaks from sanitary or septic facilities occur that are not contained and discharge from the site, non-visible sampling of site discharge may be required. Refer to the General Permit or to your project specific Construction Site Monitoring Plan to determine if and where sampling is required.

## **References**

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.





### Description and Purpose

Liquid waste management includes procedures and practices to prevent discharge of pollutants to the storm drain system or to watercourses as a result of the creation, collection, and disposal of non-hazardous liquid wastes.

### Suitable Applications

Liquid waste management is applicable to construction projects that generate any of the following non-hazardous by-products, residuals, or wastes:

- Drilling slurries and drilling fluids
- Grease-free and oil-free wastewater and rinse water
- Dredgings
- Other non-stormwater liquid discharges not permitted by separate permits

### Limitations

- Disposal of some liquid wastes may be subject to specific laws and regulations or to requirements of other permits secured for the construction project (e.g., NPDES permits, Army Corps permits, Coastal Commission permits, etc.).
- Liquid waste management does not apply to dewatering operations (NS-2 Dewatering Operations), solid waste management (WM-5, Solid Waste Management), hazardous wastes (WM-6, Hazardous Waste Management), or concrete slurry residue (WM-8, Concrete Waste

### Categories

EC	Erosion Control	
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
NS	Non-Stormwater Management Control	
WM	Waste Management and Materials Pollution Control	<input checked="" type="checkbox"/>

### Legend:

- Primary Objective
- Secondary Objective

### Targeted Constituents

Sediment	<input checked="" type="checkbox"/>
Nutrients	<input checked="" type="checkbox"/>
Trash	<input checked="" type="checkbox"/>
Metals	<input checked="" type="checkbox"/>
Bacteria	
Oil and Grease	<input checked="" type="checkbox"/>
Organics	

### Potential Alternatives

None



Management).

- Typical permitted non-stormwater discharges can include: water line flushing; landscape irrigation; diverted stream flows; rising ground waters; uncontaminated pumped ground water; discharges from potable water sources; foundation drains; irrigation water; springs; water from crawl space pumps; footing drains; lawn watering; flows from riparian habitats and wetlands; and discharges or flows from emergency fire fighting activities.

## **Implementation**

### ***General Practices***

- Instruct employees and subcontractors how to safely differentiate between non-hazardous liquid waste and potential or known hazardous liquid waste.
- Instruct employees, subcontractors, and suppliers that it is unacceptable for any liquid waste to enter any storm drainage device, waterway, or receiving water.
- Educate employees and subcontractors on liquid waste generating activities and liquid waste storage and disposal procedures.
- Hold regular meetings to discuss and reinforce disposal procedures (incorporate into regular safety meetings).
- Verify which non-stormwater discharges are permitted by the statewide NPDES permit; different regions might have different requirements not outlined in this permit.
- Apply NS-8, Vehicle and Equipment Cleaning for managing wash water and rinse water from vehicle and equipment cleaning operations.

### ***Containing Liquid Wastes***

- Drilling residue and drilling fluids should not be allowed to enter storm drains and watercourses and should be disposed of.
- If an appropriate location is available, drilling residue and drilling fluids that are exempt under Title 23, CCR § 2511(g) may be dried by infiltration and evaporation in a containment facility constructed in conformance with the provisions concerning the Temporary Concrete Washout Facilities detailed in WM-8, Concrete Waste Management.
- Liquid wastes generated as part of an operational procedure, such as water-laden dredged material and drilling mud, should be contained and not allowed to flow into drainage channels or receiving waters prior to treatment.
- Liquid wastes should be contained in a controlled area such as a holding pit, sediment basin, roll-off bin, or portable tank.
- Containment devices must be structurally sound and leak free.
- Containment devices must be of sufficient quantity or volume to completely contain the liquid wastes generated.

- Precautions should be taken to avoid spills or accidental releases of contained liquid wastes. Apply the education measures and spill response procedures outlined in WM-4, Spill Prevention and Control.
- Containment areas or devices should not be located where accidental release of the contained liquid can threaten health or safety or discharge to water bodies, channels, or storm drains.

### ***Capturing Liquid Wastes***

- Capture all liquid wastes that have the potential to affect the storm drainage system (such as wash water and rinse water from cleaning walls or pavement), before they run off a surface.
- Do not allow liquid wastes to flow or discharge uncontrolled. Use temporary dikes or berms to intercept flows and direct them to a containment area or device for capture.
- Use a sediment trap (SE-3, Sediment Trap) for capturing and treating sediment laden liquid waste or capture in a containment device and allow sediment to settle.

### ***Disposing of Liquid Wastes***

- A typical method to handle liquid waste is to dewater the contained liquid waste, using procedures such as described in NS-2, Dewatering Operations, and SE-2, Sediment Basin, and dispose of resulting solids per WM-5, Solid Waste Management.
- Methods of disposal for some liquid wastes may be prescribed in Water Quality Reports, NPDES permits, Environmental Impact Reports, 401 or 404 permits, and local agency discharge permits, etc. Review the SWPPP to see if disposal methods are identified.
- Liquid wastes, such as from dredged material, may require testing and certification whether it is hazardous or not before a disposal method can be determined.
- For disposal of hazardous waste, see WM-6, Hazardous Waste Management.
- If necessary, further treat liquid wastes prior to disposal. Treatment may include, though is not limited to, sedimentation, filtration, and chemical neutralization.

### **Costs**

Prevention costs for liquid waste management are minimal. Costs increase if cleanup or fines are involved.

### **Inspection and Maintenance**

- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect weekly during the rainy season and of two-week intervals in the non-rainy season to verify continued BMP implementation.
- Inspect BMPs subject to non-stormwater discharge daily while non-stormwater discharges occur.

- Remove deposited solids in containment areas and capturing devices as needed and at the completion of the task. Dispose of any solids as described in WM-5, Solid Waste Management.
- Inspect containment areas and capturing devices and repair as needed.

## References

Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

## OWNER FURNISHED ITEMS CONTRACTOR TO INSTALL

### **Spec Sheet information for interactive panels (classrooms)**

Classrooms: 75" Interactive panel - These pages shows inputs available

<https://www.viewsonic.com/global/products/viewboard/IFP7550-3>

<https://www.viewsonic.com/global/products/sheet/IFP7550-3>

Attachment: IFP7550-3\_Datasheet shows dimensions at scale

VESA Wall Mount 800x400mm

### **Office: 42" Commercial Display (for office use)**

**42" Tilt Mount:** (Requires flat mounting location)

<https://www.viewsonic.com/in/products/sheet/WMK-049>

### **Apple TV spec sheet:**

<https://www.apple.com/apple-tv-4k/specs/>

### **Apple TV Mount Spec sheet:**

<https://www.apple.com/shop/product/HQGK2ZM/A>

Per Specification Section 10 80 00 - TOILET AND BATH ACCESSORIES, refer to the list below

- Soap Dispenser : District Supplied Contractor to install
- Seat Cover Dispensers District Supplied Contractor to install
- Multifold Paper Towel Dispensers: District Supplied Contractor to install
- Dual Roll Toilet Tissue Holders: District Supplied Contractor to install
- Surface Mount Paper Towel/Waste Unites: District Supplied Contractor to install

Microwave: LG NeoChef 2.0 Cu ft Countertop

MPR projector: see attached

AD 6-38a  
S&B Elementary  
02-116800

# WUXGA 3LCD Laser Projector with 4K Enhancement



## Premium, compact large-venue laser projector with 4K Enhancement

The EB-PU1008W offers larger-than-life images from a sleek, powerful projector. As the most compact within Epson's Pro Series, it's compatible with a wide range of lenses, including a zero offset, .35 ultra short-throw lens.

Delivering best-in-class color brightness<sup>2</sup>, with 8,500 lumens of color brightness and white brightness<sup>3</sup>, this 3-chip, 3LCD projector features a virtually maintenance-free laser light source and air filter<sup>4</sup>.

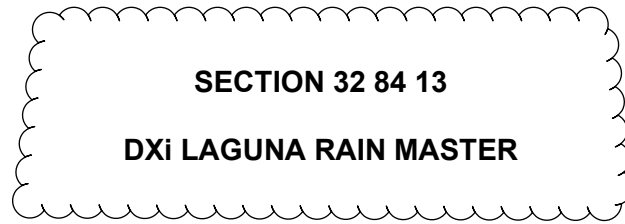
Full HD WUXGA resolution and 4K Enhancement Technology<sup>1</sup> (1920 x 1200) delivers lifelike images. Built-in NFC function<sup>5</sup> reduces the time to install and commission. A clip-on optional external camera allows access to powerful automated tools including screen matching of multiple projectors<sup>7</sup>, tiling assist for edge blends<sup>8</sup>, and the

NOTE: Camera, lens and mount accessories sold separately.

- 8,500 lumens color/white brightness<sup>3</sup>
- Native WUXGA with 4K Enhancement Technology<sup>1</sup>
- Laser light source — up to 20,000 hours<sup>4</sup> of use
- 11 optional powered lenses
- NFC function built-in

**Model:** V11HA33920





AD 6-39a  
s&b Elementary  
02-116800

The DXi™ irrigation controller shall be manufactured by The Toro Company. The controller shall have the following features and functions:

### 1.0 - Hardware Features

- 1.1 Available in painted or stainless steel wall mount cabinet, stainless steel single and double wide pedestal and plastic pedestal.
- 1.2 Conventional station configurations options range from 8 to 96\* in multiples of 8, 2-Wire configurations and Hybrid systems range from 1 to 200 stations (48 conventional & 152 2-Wire). Dedicated outputs for three configurable NO/NC master valves and two dedicated outputs for pumps.  
  
\*Note conventional station counts above 48 requires specific enclosure.
- 1.3 Connectivity for three flow sensors, three pulse input type devices e.g. anemometer, rain bucket & ET and three alarm input (open/closed) devices.
- 1.4 4.4" QVGA HR-TFT reflective TFT LCD monochrome display and backlight.
- 1.5 Built-in remote control jack for ProMax™. Permanent internal remote mount available.
- 1.6 Built-in transient protection.
- 1.7 Built-in lightning protection.
- 1.8 Audible tones and illuminating overlay for user feedback.
- 1.9 Lifetime retention of the user's program data without the use of batteries.
- 1.10 All outputs are protected from field wiring short circuits.
- 1.11 Built in amperage meter to accurately measure and diagnose valve solenoid electrical problems.
- 1.12 Modular architecture. Modular output boards (8-station) facilitate maintenance and eliminates total controller down time. Modular wireless communication options available for connection to central software.
- 1.13 Accessible power junction box with GFCI protected dual 120 VAC outlet and power switch for irrigation controller maintenance.

## **2.0 - Scheduling Capabilities**

- 2.1** Operation of 16 conventional programs with 12 start times and up to 200 ISC (individual station control) or a combination of each.
- 2.2** Watering based on 14-day calendar, 31-day calendar, odd/even or interval water schedules.
- 2.3** Continuous cycling of programs based upon user established start and end times, with a programmable delay/soak time.
- 2.4** Water budget per program from 0 to 999% in 1% increments for adjustment of program run times.
- 2.5** Program by time.
- 2.6** Programmable monthly water total terminates over budget irrigation.
- 2.7** Quick station programming allows groups of stations to be programmed with the same runtime.
- 2.8** Programmable water window.
- 2.9** Two establishment programs for grow in schedules.
- 2.10** Programable rain delay.
- 2.11** Manual rain shut-off.

## **3.0 - Program Setup Options**

- 3.1** Program overlap protection or concurrent operation.
- 3.2** Irrigation programs, lighting programs, security, etc. (Non-irrigation programs are independent of rain shutdown mode.)
- 3.3** Inter station delay from 0 to 255 seconds.
- 3.4** Runtimes from 1 second to 24 hours programmable in hours/minutes or minutes/seconds.
- 3.5** Master valve selections: 3 configurable NO/NC with programmable delay from 0 - 600 seconds.
- 3.6** Program review options to view schedules by program, controller, day, week and month at a glance.



#### **4.0 - Maintenance and Alarm Diagnostic Capabilities**

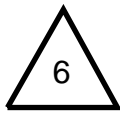
- 4.1 Flow monitoring. Automatic alarm processing (which provides station and/or master valve shut down and program advance as required) diagnosing and reporting station underflow and overflow, mainline breaks, and unscheduled flows.
- 4.2 Electrical field wire monitoring. Automatic alarm processing (which provides station shutdown and program advance) for station over current, short circuits, broken field wiring or faulty solenoids.
- 4.3 Power monitoring. Automatic alarm processing/reporting for power outages and power restoration. Intelligent program resumption for all outages or power glitches, no lost cycles or water window violations.
- 4.4 Communication monitoring. Automatic alarm generation/reporting for lost communications or restoration when using hard wire communications. Automatic fault isolation of communication wiring problems to wire path between controllers.
- 4.5 Diagnostic lights (LEDs) for system power and all station outputs as well as the dedicated outputs: MV1, MV2, MV3, PUMP1 and PUMP2. Lights indicate when 24 VAC is at output terminal.
- 4.6 Built-in test (BIT) functions allow selected controller circuitry to be field-tested.
- 4.7 Manual test mode. Allows user to automatically advance from station to station using manual run time while displaying valve solenoid electrical current for each station as well as station flow in gallons per minute (GPM).
- 4.8 Manual station and manual multi-station modes. Turns on any station for user entered runtime and automatically selects usage of the proper master valve and/or pump for this station. Multi-station mode allows any single station or output to be turned on individually or in combination with any other station(s). Valve solenoid electrical current is displayed.
- 4.9 Manually entered program. Allows user to enter a one-time program to be run immediately or scheduled for later in the day. The manual program is independent of automatic programs and shall start only one time.
- 4.10 Manual start of automatic programs (1-16). Start any program independent of the scheduled start time and water day.
- 4.11 Interior lighting (fridge light) for service & maintenance.
- 4.12 Pivoting brackets (Pivotech™) for ease of field wiring connections.

## **5.0 - Miscellaneous Features**

- 5.1** Central control capable with Laguna™ Software.
- 5.2** Operates as a standalone.
- 5.3** Automatic limit setup (learn mode) for flow and current. Global percentage adjust for limit establishment.
- 5.4** ProMax Connect™ smartphone application compatible for cellular, Ethernet and WiFi connect controllers.
- 5.5** Compatible with up to 3 Toro® AC flow decoders (TW-DAC-FLOW) per controller. For use with most pulsed output 2 and 3 wire flow sensors.
- 5.6** Compatible with up to 16 Toro AC moisture decoders (TW-DAC-SOIL) per controller. For soil moisture and temperature monitoring and evaluation.
- 5.7** 365-day calendar for selecting watering restriction days. Up to 48 omit days allowed.
- 5.8** Flow Max - This exclusive feature allows controllers with a single point of connection to share pumps, master valves, and flow meters without the need for peripheral wiring/relays. All flow limits are dynamically managed as stations across controllers transition off and on. Features include:
  - A. Automatic protection and report for main line breaks, unscheduled flow, station high and low flow
  - B. Read flow at any controller
  - C. Dynamic monitor shows system status at all times
  - D. Pump protection during exception conditions
- 5.9** EPA WaterSense® certified.
- 5.10** Underwriters Laboratories (UL) listed.
- 5.11** 5-year limited warranty.

## **6.0 - Electrical Specifications**

- 6.1** Input Power Required: 120 VAC +/- 15%, 60 HZ.
- 6.2** Maximum load current per station, master valve or pump output: 2.5 AMP.
- 6.3** Maximum combined load current: 2.75 AMPS.
- 6.4** No batteries required.
- 6.5** ADD tracer wire to all new irrigation main lines. Provide 10 gauge solid BLUE #10 wire.



# Addendum 06 additions, clarifications, revisions to all SB Bid Packages

**INSTRUCTIONS: ALL BIDDERS READ THIS SHEET.**

**PRINT, INITIAL, AND INCLUDE WITH BID DOCUMENTS.**

AD 6-40a  
S&B Elementary  
02-116800

**NOTICE: THE PRESCHOOL MODULAR BUILDING AND ITS FOUNDATION HAS BEEN DELETED.**

**WET AND DRY UTILITIES FOR THE FUTURE PRESCHOOL MODULAR REMAIN IN THE PROJECT**

## CONCRETE SCOPE clarifications additions SB 1:

**SB 1 SITE & OFF SITE/UNDERGROUND UTILITIES CONCRETE WORK INCLUDES:**

- ALL CONCRETE WORK SHOWN ON THE SITE AND OFF-SITE DRAWINGS
- CURBS, GUTTERS, SIDEWALKS, WALKWAYS, PATIOS, AMPHITHEATRE
- *MOWSTRIPS*
- BASEBALL AND SOFTBALL FIELD CONCRETE DUGOUTS AND CONCRETE WORK SHOWN AT THE BASEBALL AND SOFTBALL FIELDS
- *OUTDOOR COMPASS IN BOMANITE TOPPING SYSTEM PER ADDENDUM 5 Items 5-06 & 5.07*
- PROVIDE THE WORK PER DIVISION 03 CONCRETE AS APPLIES.

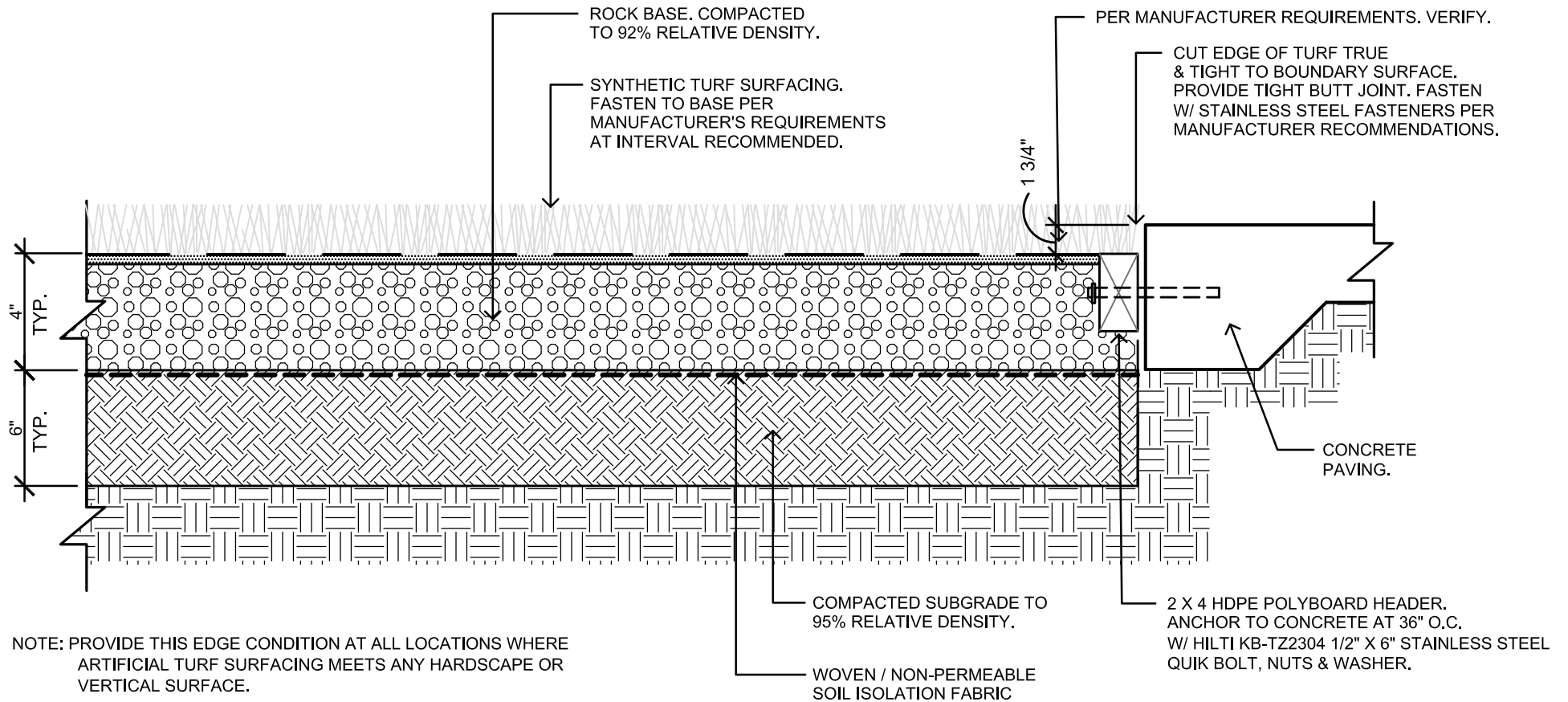
## CONCRETE SCOPE clarifications SB 2:

**SB 2 GENERAL TRADES / BUILDING STRUCTURE CONCRETE WORK INCLUDES:**

- ALL CONCRETE WORK SHOWN ON THE DRAWINGS FOR BUILDINGS
- FOUNDATIONS, BUILDING SLABS
- FOUNDATIONS FOR ALL CMU WALLS & FENCES EITHER IN THE BUILDINGS OR ON SITE.
- PROVIDE THE WORK PER DIVISION 03 CONCRETE AS APPLIES.
- TOPICAL POLISHED CONCRETE SYSTEM PER ADDENDUM 05 ITEM 5-05, PER **03 35 43**
- PROVIDE AND MAINTAIN A PROTECTIVE COVER ON THE POLISHED CONCRETE FLOOR

**SB 11 SWPPP** notice two (2) new documents issued in Addendum 06 namely; the Water Pollution Control Drawing provided by QK dated 6/29/2018 and the California Stormwater Handbook

Initial \_\_\_\_\_  
Acceptance of Entire Bid Package,  
No Additions, No Omissions



## SYNTHETIC TURF SURFACING

AT

1 1/2"=1'-0"

June 1, 2023

**Shields & Brawley Elementary School**

**RESPONDED RFC's  
Total pages including COVER  
SHEET**

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. 02**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 001**

FIRM NAME: Kitchell DATE: May 2, 2023

SENDER/CONTACT NAME: Garry Clark e-MAIL: gclark@kitchell.com

MAILING ADDRESS 2344 Tulare Street, Suite 102

BUSINESS PHONE: 559.288.3712 FAX NUMBER: \_\_\_\_\_

DWG. No.: 94 & 98 / A.5 Spec. Section: T B D

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

What is the **manufacturer and model number** for the fiberglass window indicated in Details 94 & 98 titled "ULTRA WINDOW HEAD" on A8.5?

RESPONSE:

**MILGARD, Ultra Picture Window Retro System. Horizontal mullion, Series ~~5974~~**

  
05/04/2023

**5.5.23 correction: MILGARD, Ultra Picture Window Retro System. Horizontal mullion, Series C650**

**5.5.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

This form may be removed from the project specifications and/or reproduced as needed.



**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 003**

FIRM NAME: ATASCADERO GLASS DATE: May 16, 2023

SENDER/CONTACT NAME: SHANE PAYTON e-MAIL: spayton@atascaderoglass.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 805.466.2644 x24 CELL NO: 805.674.5074

DWG. No.:	<u>A6.1, A6.3, B/A7.1, F/A7.2,</u>	<u>Spec.</u>	<u>FIBERGLASS WINDOWS, ALUMINUM</u>
	<u>158/A8.8,</u>	<u>261,</u>	<u>STOREFRONTS &amp; ENTRANCE</u>
	<u>265,267/A8.14,</u>	<u>106/A8.6,</u>	<u>DOORS, 08/71 00</u>
	<u>A8.5</u>		

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

**Attached find a set of 8 questions from ATASCADERO GLASS regarding:**

- Specifications, *(Fiberglass Window and Aluminum Storefront specs are absent.)*
- Title 24 performance values for the aluminum storefront system (required performance values)
- Clarifications on various drawings and details

I have already notified Shane that his *question No. 2 of 8 is answered* in Addendum 02 Item No. 2.02

Shayne said that he would welcome your call to discuss his questions.

Garry Clark  
Project Superintendent, Kitchell

RESPONSE:

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

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**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 005**

FIRM NAME: ATASCADERO GLASS DATE: May 16, 2023

SENDER/CONTACT NAME: SHANE PAYTON e-MAIL: spayton@atascaderoglass.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 805.466.2644 x24 CELL NO: 805.674.5074

DWG. No.: D,P,Q/A2.3 & A,D,E/A2.6 Spec. 08 80 00  
Section: \_\_\_\_\_

QUESTION: *(Type or print question in the space provided. Attach sketches if necessary.)*

**Question from ATASCADERO GLASS:**

1. Window Types D,P,Q/A2.3 and A,D,E/A2.6 have shading with the note “Cross Hatch Indicates Spandrel Glass”. No spandrel make-up is listed on the plans or in the glazing spec section 08 80 00. Is spandrel glass required as shown on the window schedule elevations and types listed above? If so, what type and color is required?


Garry Clark  
Project Superintendent, Kitchell

RESPONSE:

**response:**

**Spandrel Guardian Glass is required: match as close to low-E, PPG solarban 70 glazing color, cermic brick.**

**Only note as mentioned above noted "Cross Hatch indicates Spandrel Glass.**

 5.18.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 006**

FIRM NAME: ATASCADERO GLASS DATE: May 16, 2023

SENDER/CONTACT NAME: SHANE PAYTON e-MAIL: spayton@atascaderoglass.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 805.466.2644 x24 CELL NO: 805.674.5074

DWG. No.: Addendum 01 Spec. 08 87 13  
Section: \_\_\_\_\_

QUESTION: *(Type or print question in the space provided. Attach sketches if necessary.)*

**Question from ATASCADERO GLASS:**

Solar Control Film was added in Addendum #1 via Section 08 87 13. Please confirm:

- a. What type of tint film is required for this project. 08 87 13 lists a manufacturer but no material type; 3M offers numerous applied tint films.
- b. Where does the tint film occur (which window #'s)?

Garry Clark  
Project Superintendent, Kitchell

**RESPONSE:**

**response:**  
a. opaque film material, provide THREE (3) standard material type during submittal review.  
b. intention are all restroom exterior windows for trade to provide & install solar control film, on 1st or 2nd floor. notify architect immediately of a window was missed.

**MAIN BLDG:**  
1st floor: 106; 107; 116; 117  
2nd floor: 224; 225

**MPR BLDG:**  
308; 309; 310; 311

  
05/18/2023

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 9**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 007**

FIRM NAME: ELITE LANDSCAPING DATE: MAY 16, 2023

SENDER/CONTACT NAME: KRISTOPHER SARNOWSKY e-MAIL: kriss@eliteteamoffices.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.558.4737 CELL NO: 559.387.0492

DWG. No.: Addendum 01 Spec. Section: 32 84 00

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Addendum #1-SB-1 Site & Offsite Work & Underground Utilities Bid Package Scope of Work: Section B, inclusions #5 States this Bid Package is responsible for Irrigation Backflow Preventer and Irrigation Booster Pump.  
However, the applicable Specifications, Plans, and Details are shown under the SB-9 Irrigation and Landscape Specifications and Plans.

Which Package is responsible for the Irrigation Backflow Preventer, Irrigation Booster Pump and the Concrete Pads?

RESPONSE:

In an upcoming Addendum, the Bid package descriptions for **SB-1** and **SB-9** will be revised to state that the **SB-9 Bid Package is responsible for the Irrigation Backflow Preventer, Irrigation Booster Pump and the Concrete Pads.**

Garry Clark  
Senior Project Superintendent  
Kitchell  
**5.18.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

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**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 008**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: Gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: \_\_\_\_\_ Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Project spec book does not include specification sections for the following:  
a. Fiberglass windows  
b. Aluminum storefronts & entrance doors  
Please provide specifications for these scope items.

RESPONSE:

**response:**

**refer to addendum for the following**  
**SECTION 08 41 00 Aluminum Entrances and Storefront**  
**&**  
**SECTION 08 54 13 Fiberglass Windows**

 **5.18.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 009**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: \_\_\_\_\_ Spec. Section: 08 71 00

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Door Hardware spec section 08 71 00 – Door Hardware is crossed out with a red ‘X’ on each page. Is a new door hardware section going to be released or should we use the existing one despite the redline ‘X’?

RESPONSE:

**response:**  
**not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.**  
**refer to Addendum, replaced SECTION 08 71 00 Door Hardware in it's entirety**

 **5.22.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 10**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: A6.1, A6.3, F/A7.2, B/A7.1, Spec. Section:  
F/A7.2, 158/A8.8

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Building elevations appear to show integral sunshades at aluminum storefront windows (A6.1, A6.3). Section cut B/A7.1 does not show these sunshades. Section F/A7.2 does show them. Roof plans show a decorative metal awning (Keynote 27), referencing Det. 158/A8.8.

- a. The section cut appears to show an awning attached to a structural member which bisects the window into two (larger lower window and shorter upper window)
- b. Det. 158/A8.8 shows the awning attached to a wall condition w/out any adjacent window.
- c. Window schedule does not show any awnings and does not show the windows segmented into two w/a structural member for awning attachment.

Please confirm that the awnings are not integral with the storefront and that they attach above the window system to the wall, similar to det. 158/A8.8.

RESPONSE:

response:

not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.

Please explain your meaning of sunshades. Garry Clark or original author of this question mentioned decorative metal awnings within the same question. Refer to exterior elevation sheets for counts and locations of decorative metal awnings or dtl. 11/S8.5 you should get a better clarification. I am only guessing on the question. if this is not the case please clarify immediately if this is not the case.

Most of not all decorative metal awnings straddle fiberglass window systems, do not understand statement "at aluminum storefront window" reference.

The windows (approximately 7-foot wide) are not interrupted by the awning supports and straddle window system(s).

 5.22.23

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 011**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: \_\_\_\_\_ Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

No NRCC-PRF-01-E Form was included with the bid plans to provide whole system Title 24 performance values for the aluminum storefront system. Please provide this form for the project or specify what performance values are required.

RESPONSE:

**response:**  
**not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.**

**contractor to refer to page 2 of 2**

 **5.22.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 012**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: A2.3, A2.6, A8.5, Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

1. Window Type A (A2.3) and Window Types A, D, E (A2.6) exceed the manufacturer's wind load performance limitations for center-glazed storefront which is detailed in Det. 90, 91, 92/A8.5. Systems will need to be curtainwall. Given heights and tributary areas of Type E, please review the wind load charts below and confirm if window types A, D, E should be bid as 7 ½" or 10 ½" curtainwall.

**SEE ATTACHED KAWNEER 1600 SERIES 10" & 7 ½" CURTAINWALL:**

RESPONSE:

reponse:

not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.

Sheet T2, architectural notes, deferred items, 2: This question is a DSA deferred item. Contractor responsible for it's OWN window engineer to decipher thickness of currentwall to be acceptable to DSA.

 5.22.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am



PBK / LEAF Engineers Response:\

(cont from RFC 12)

Refer to Energy Compliance sheet EC5, at lower left for Fenestration Assembly Summary of Glazing. Also refer to T-24 book page 8.

Values per below.

Project Name:	Shields and Brawley ES - Main Building	NRCC-PRF-01-E	Page 8 of 49								
Project Address:	Main Building Fresno	Calculation Date/Time:	16:17, Tue, May 29, 2018								
Compliance Scope:	NewComplete	Input File Name:	18-1024 Shields and Brawley ES Main Building v7 with LTG.cibd16x								
<b>J. FENESTRATION ASSEMBLY SUMMARY</b>								<b>§ 110.6</b>		<b>Confirmed</b>	
1.	2.	3.	4.	5.	6.	7.	8.	9.	Pass	Fail	
Fenestration Assembly Name / Tag or I.D.	Fenestration Type / Product Type / Frame Type	Certification Method <sup>1</sup>	Assembly Method	Area ft <sup>2</sup>	Overall U-factor	Overall SHGC	Overall VT	Status <sup>2</sup>			
PPG Sungate 500 Bronze	VerticalFenestration FixedWindow N/A	NFRC Rated	Manufactured	3212	0.27	0.30	0.50	N	<input type="checkbox"/>	<input type="checkbox"/>	
Door Glass	VerticalFenestration GlazedDoor N/A	NFRC Rated	SiteBuilt	294	0.27	0.30	0.50	N	<input type="checkbox"/>	<input type="checkbox"/>	
Skylight Glass	Skylight FixedWindow N/A	NFRC Rated	Manufactured	998	0.29	0.27	0.50	N	<input type="checkbox"/>	<input type="checkbox"/>	

<sup>1</sup> Newly installed fenestration shall have a certified NFRC Label Certificate or use the CEC default tables found in Table 110.6-A and Table 110.6-B. Center of Glass (COG) values are for the glass-only, determined by the manufacturer, and are shown for ease of verification. Site-built fenestration values are calculated per Nonresidential Appendix NA6 and are used in the analysis.

<sup>2</sup> Status: N - New, A - Altered, E - Existing

**SECTION 1 REQUEST & SUGGESTED SOLUTION**

<b>Project Name:</b>	<b>Shields &amp; Brawley Elementary School</b>		
<b>Sent To:</b>	<b>Luz Gonzalez</b>		
<b>Requestor:</b>	<b>Antonio Fornes</b>	<b>Schedule Impact:</b>	<b>Cost Impact:</b>
<b>Subject:</b>	<b>Kitchen Hood Clarification</b>		

The new kitchen hood is scheduled and detailed on the food service equipment hood plan sheet K5.0. The kitchen hood is also detailed on mechanical drawings sheet M11. The kitchen hood is not scheduled in the mechanical equipment schedule, yet the bid package SB-7, outlined in addendum 1, calls for the mechanical contractor to furnish and install the kitchen hood.

Please clarify who will be providing and installing the kitchen hood.

**SECTION 2**

<b>Received by:</b>	<b>Date:</b>
---------------------	--------------

contractor to refer to bid package summaries or contact Construction Manager (Kitchell) for responsibility.

 5.18.23

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB - 9**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 41**

FIRM NAME: ELITE LANDSCAPE CONSTRUCTION DATE: May 23, 2023

SENDER/CONTACT NAME: Kris Sarnowski E-MAIL: kriss@eliteteamoffices.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.387.0492 CELL NUMBER: same

DWG. No.: LS.4.4 Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

**“Skinned infield, Refer to Architectural drawings”** appears on LS.4.4 regarding the baseball infield. There is no information on the Architectural drawings or in the specifications. What is the mix of soil for the baseball infield surface?

RESPONSE:

Provide and place four inch (4") thick layer of clay infield mix as supplied by Rosenbalm's Rockery, Fresno. Provide mix that is 60 percent (60%) sand and 40 percent (40%) clay. Place and compact to 90% relative density. Fine grade to drain.

R V / Boro 5 / 30 / 23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

This form may be removed from the project specifications and/or reproduced as needed.

# Kitchell RFC 48



Karsyn Construction Inc.  
 4697 W. Jacquelyn Ave.  
 Fresno, Ca. 93722  
 PH: 559.271.2900  
 FX: 559.271.2908

## REQUEST FOR INFORMATION

RFI #: 3  
 GC RFI#:  
 DATE: 5/23/2023  
 PHONE:  
 FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales	<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908	INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>FROM:</b> Jason Coronado		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
				DECREASE TIME
				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:**

**SPECIFICATION #:** 92900

**SUBJECT:** Drywall Installation Height

**INFORMATION NEEDED:**

Niether specification 092900 or plans clarify how high drywall is required to be installed at non-rated walls

Please clarify which non-rated walls are to receive full height drywall.  
Please also include which interior side of exterior walls are to receive full height drywall.

**response:**

the last question is a loaded question. this is the best PBK can answer for bid purposes.

**MAIN BLDG:**

- Admin offices and conference room and nurse and nurse to restroom interior walls - full ht
- interior gyp. bd classroom to classroom - full ht
- interior gyp. bd. restroom to restroom - full ht
- restroom plumbing chase walls - 6" above ceiling ht
- classroom to restroom - full ht
- perimeter walls 6: above t-bar
- perimeter exterior wall full height

**MPR BLDG:**

- demising wall to main room to kitchen - full ht
- staff lounge to dish washer and locker room - full ht

*[Signature]* 5.26.23

# Kitchell RFC 53

## REQUEST FOR INFORMATION



Karsyn Construction Inc.  
 4697 W. Jacquelyn Ave.  
 Fresno, Ca. 93722  
 PH: 559.271.2900  
 FX: 559.271.2908

RFI #: 8  
 GC RFI#:   
 DATE: 5/23/2023  
 PHONE:   
 FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales		INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
<b>FROM:</b> Jason Coronado				DECREASE TIME
				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:** A3.2 & S4.2

**SPECIFICATION #:**

**SUBJECT:** Main Bldg - Foyer Interior Soffit

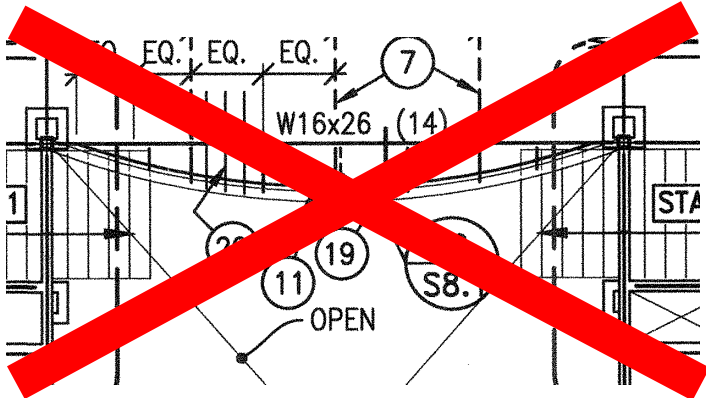
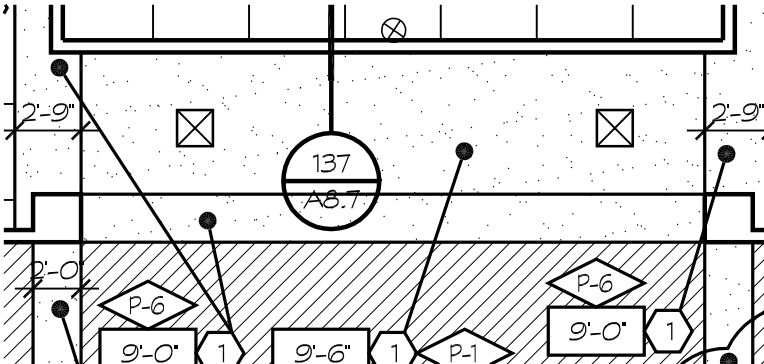
**INFORMATION NEEDED:**

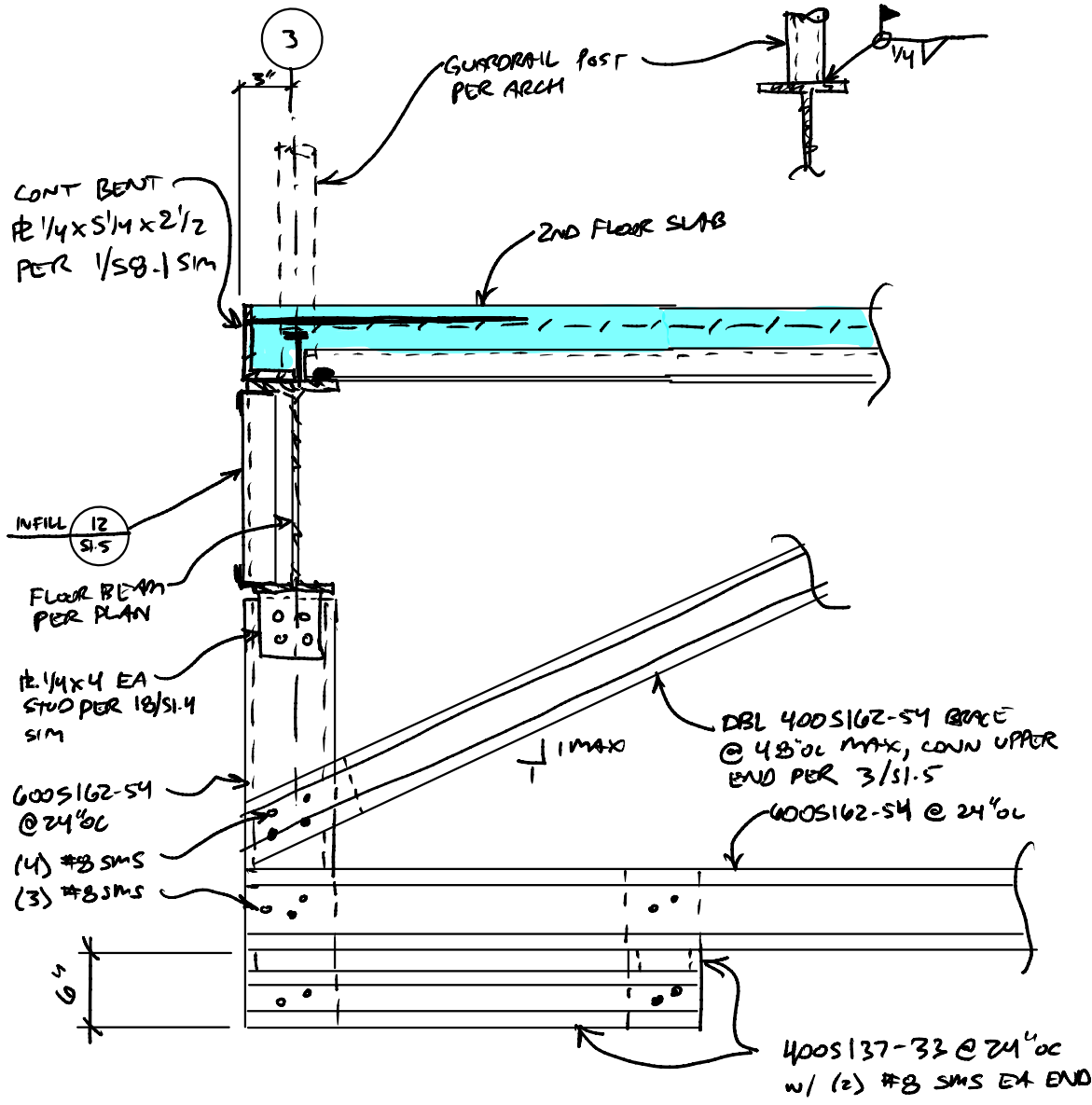
Architecturally shown on RCP A3.2, interior soffit at Main Bldg at gridline 3 between F & E shows soffit to be straight.  
 Per structural drawing S4.2, this soffit appears to be at a radius.

Please confirm soffit at this location is to be built per Architectural plan on A3.2.

**NOTE:**  
 sheet n XS-2 pending DSA approval

*Signature* 5.31.23





REVISED BALCONY EDGE DETAIL

REF: RFC #053; ORIGINAL DET 19/SB.1 RFC 53 DWG

NOTE: EDGE OF SLAB SHALL BE STRAIGHT/CONSTANT PER ARCH DWGS (NOT CURVED).

XS-2

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 13**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: A2.3, A8.14 Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Window Type D, A2.3 is an aluminum storefront window but the details on the schedule are 261, 265, 267/A8.14 which are for fiberglass windows. Type D is too big to build in fiberglass and we assume the aluminum storefront material call-out is correct. Please correct details to reflect aluminum storefront, not fiberglass windows.

RESPONSE:

**response:**


**not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.**

**The design intent is for type D window to be aluminum storefront window in lieu of fiberglass window**

**in lieu of detail 265/ A8.14 2, replace with detail 90/A8.5 (Storefront Window HEAD)**

**in lieu of detail 265/ A8.14 2, replace with detail 91/A8.5 (Storefront Window JAMB)**

**in lieu of detail 265/ A8.14 2, replace with detail 92/A8.5 (Storefront Window SILL)**

 **5.22.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 14**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: A2.3, A8.6 Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Window type A, A2.3 is shown with a standard sill member, but the sill detail noted on the schedule (106/A8.6) shows a special height 10” sill profile. This 10” sill profile will add significant additional cost and will be subject to dings/dents/abuse at its ground-floor lobby location. Please confirm that the sill is to be a standard 2” member as indicated on the elevations. In the absence of further direction, Atascadero Glass will assume 2” unless notified otherwise by architect or CM.

RESPONSE:

**response:**

**not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.**

**The design intent needs to be higher than two inches what is the alternative in lieu of 10 inches, please provide**

 **5.22.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am



**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 15**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: A8.5 Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

1. Window details for fiberglass windows A8.5 show operable windows, but window schedule does not denote operable window configurations. Please denote operable configuration on the window schedule elevations if any windows are required to be operable. Absent window elevation notation, we will assume all windows are fixed.

RESPONSE:

response:

not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.

in scope of work, no OPERABLE WINDOWS, all windows to provide and install to be FIXED per Title 24.

 5.22.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 16**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: Garry Clark e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: A1.3 doors #165 & 167 Spec. Section: \_\_\_\_\_


QUESTION: *(Type or print question in the space provided. Attach sketches if necessary.)*

A1.3, doors #165 and #167 appear to have sidelights but do not show sidelight window call-outs. Please confirm if these doors have sidelights and if so, confirm the window type.

RESPONSE:

response:  
not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.

Door 165 and door 167 to have sidelights and reflect door I/A2.2. Revise door schedule on sheet A.2. to reflect door Type 1 for both. Omit cornerguard from door 167 window

 5.22.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
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**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 17**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: Garry Clark e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: A2.7 Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print question in the space provided. Attach sketches if necessary.)*

Window #306, A2.7 is called out on the window schedule as a fiberglass nail-on window (Window Type G, Material Type FG). Window details referenced on the window schedule show hollow metal frame with glass. HM frame w/glass would be typical for interior installation rather than fiberglass nail-on. Please confirm that Window #306 is hollow metal.

RESPONSE:

**response:**

**not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.**

**Window 306 (type E): and door 324 have been relocated to added new kitchen office #314. Do not understand where window Type G came from. Window details 261/A8.14; 265/A8.14; 267/ A8.14 are correct please provide and install.**

 **5.22.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 18**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: \_\_\_\_\_ Spec. Section: 05 40 00

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Specs 05 40 00 Item 2.07 E/3.01B call for Closed-cell Neoprene Foam ¼” on the bottom and rim of track members.

No Detail in the plans for the locations occurs.

Does this apply to all walls, or just exterior walls?

(From David Silva, Estimator AMG Associates)

RESPONSE:

**response:**

**not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.**

**Spec SECION 05 40 00, PART 2, 2.07, E reads, Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from Manufacture's standard widths to match width of bottom track **OR** rim track members in lieu of **AND** as stated in the question above.**

**refer to PART 1, 10.01, A**

 **5.22.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 19**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: \_\_\_\_\_ Spec. Section: 09 29 00 Gyp Board

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Spec 09 29 00 Gypsum Board 2.02C calls for the use of Silent Noise Reducing Gypsum Board to occur at the common walls adjacent to each other: C105, C110, C113 ... No C Rooms exist.

Please provide locations for this product.

(From David Silva, Estimator AMG Associates)

RESPONSE:

**response:**  
**not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.**

**Spec SECTION 09 29 00, PART 2, 2.02, C: omit all references to SilentFX Noise-Reducing Gypsum Board.**

 **5.22.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 20**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: A7.2 Section F (fire rated assembly) Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Sheet A7.2 Section F Corridor 155 & 201 detail 101/109 on A8.63 call for the fire rated ceiling in the corridor.

No other sections reference these details.

Please clarify the locations for this detail.


(From David Silva, Estimator AMG Associates)

RESPONSE:

**response:**

**not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.**

**corridors 155; 157; 158; 201 running east to west or north to south to be fire rated corridors. notify architect immediately if trades finds architect has missed a corridor.**

 **5.22.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 21**

FIRM NAME: KITCHELL CEM DATE: May 17, 2023

SENDER/CONTACT NAME: GARRY CLARK e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NO: same

DWG. No.: \_\_\_\_\_ Spec. Section: 09 29 00

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Abuse Board is called out in the Gypsum Board Specs 09 29 00 2.02H.

Specs or Plans do not clarify its location.

Please provide the locations for this product.

(From David Silva, Estimator AMG Associates)

RESPONSE:

response:

not sure why the firm name and information changed from first SIX (6) pre-bid questions. for future references please provide original trade information.

Spec SECTION 09 29 00, PART 2, 2.02 gypsum board, H: no abuse board & no gymnasium in scope of work.

 5.22.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 22**

FIRM NAME: KITCHELL DATE: May 18, 2023

SENDER/CONTACT NAME: Garry Clark e-MAIL: gclark@kitchell.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559.288.3712 CELL NUMBER: SAME

DWG. No.: C2.1, C6.9 Spec. Section: Division 2 CMU Masonry

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

What is the **color and texture** of CMU for the 6' Block wall along the West property line?

Is it to be the **same pattern as the service yard?**

RESPONSE:

response;  
precision Type CMU and radius concrete cap with City of Fresno, Public Works detail P-93, C (off-set 12" footing) Wall Section. Paint wall on school side (Navajo White). Residential wood fencing to remain.

SERVICE YARD CMU not the same pattern as west CMU property line,  
REFER TO RFC 40

 5.24.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_



**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No.   2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No.   023**

FIRM NAME:   Ceiling Experts Inc.   DATE:   5/18/2023  

SENDER/CONTACT NAME:   Alex Shatokhin   e-MAIL:   alex@ceilingexpertsinc.com  

MAILING ADDRESS   1340 Main Ave, Sacramento, CA 95838  

BUSINESS PHONE:   916-527-8007   CELL NUMBER:   916-559-4386  

DWG. No.: \_\_\_\_\_ Spec. 09 51 23 Acoustical Wood Fiber  
Section: \_\_\_\_\_ Panels

**QUESTION: (Type or print one question in the space provided. Attach sketches if necessary.)**

1. Addendum 1 added Spec Section 095123 Acoustical Wood Fiber Panels that calls for different Tectum products. We could not find any Tectum product on the drawings.
  - a) 2.01.B.1 Tectum V-Line Wall Panels Direct Attach - this product was discontinued; couldn't find on drawings, - please advise.
  - b) 2.01.B.2 Tectum Lay-In Ceiling Panels - we couldn't find on drawings, - please advise.
  - c) 2.01.B.3 Tectum Direct Attach Ceiling Panels - we couldn't find on drawings, - please advise.Please confirm there is no Tectum product in this project.
  
2. If Tectum panels are shown on the drawings, no one bid package lists this 095123 Section. Please clarify under what bid package it is included.

**RESPONSE:**

- 1.
2. Specification Section 095123 Acoustical Wood Fiber Panels will be included in bid package SB-2.

**response:**

**The intent of the design team is not to use section 09 51 23 acoustical wood fiber panel at this time, do not include in bid. however do not omit this section is it could be used in the future.**

 **5.24.23**

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am



**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No.   2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No.   025**

FIRM NAME:   Ceiling Experts Inc.   DATE:   5/18/2023  

SENDER/CONTACT NAME:   Alex Shatokhin   e-MAIL:   alex@ceilingexpertsinc.com  

MAILING ADDRESS   1340 Main Ave, Sacramento, CA 95838  

BUSINESS PHONE:   916-527-8007   CELL NUMBER:   916-559-4386  

DWG. No.: \_\_\_\_\_ Spec. Section:   095113 Acoustical Panel Ceilings  

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Spec Section 095113, 2.02.C 1.b calls for BLACK Ultima High-NRC at Stage. Our Armstrong rep says that Armstrong doesn't make Ultima High-NRC in BLACK. The closest tile to Ultima High-NRC that can be in BLACK is Calla (2x4' - #2821BK, 2x2' - #2820BK). Please clarify which one to choose.

RESPONSE:

response:  
The design intent is to have it as the darkest color as possible, prefer 2 x 4 grid and tile.

 5.22.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No.   2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No.   026**

FIRM NAME:   Ceiling Experts Inc.   DATE:   5/18/2023  

SENDER/CONTACT NAME:   Alex Shatokhin   e-MAIL:   alex@ceilingexpertsinc.com  

MAILING ADDRESS   1340 Main Ave, Sacramento, CA 95838  

BUSINESS PHONE:   916-527-8007   CELL NUMBER:   916-559-4386  


DWG. No.: \_\_\_\_\_ Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Seems all ACT in Multi-Purpose room #301 are designed to be sloped clouds. Please advise if a 4" Axiom trim should be used around the perimeter of each cloud?

RESPONSE:

response:  
4-inch perimeter trim seems excessive, is there an option this be reduced to two or three inches

 5.22.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am



**HOWE Electric**  
Construction, Inc.  
License # 898737 Class B, C10, C46

**Kitchell RFC #27**  
**Request For Direction**

RFD Number: 001

To: Kitchell Corporation  
\_\_\_\_\_  
\_\_\_\_\_

Date: 05/18/23  
Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez

Priority:  Normal  Expedite  Urgent

Request Due To:	
<input checked="" type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference: <u>E2.2</u>
<input type="checkbox"/> Interpretation of Contract Documents	_____
<input type="checkbox"/> Conflict in Contract Documents	Specification Reference: _____
	_____

**Subject: PG&E Rule 16/20 Information**  
Key Note #1, Drawing E2.2 identifies a proposed point of connection for PG&E electrical service and states in part *"The contractor shall obtain a copy of the Title 24 Documents for verification, and include in the bid the extension shown on those documents."*, we believe this should have read *"a copy of the PG&E Rule 16/20 documents"*. Are PG&E Rule 16/20 documents available, if so please provide. If not, can an allowance value be assigned for inclusion with the bid? Please advise. - Thank You

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

**response:**  
**refer to Addendum for drawings**  
 **5.22.23**

Reply  
By: \_\_\_\_\_ Date: \_\_\_\_\_



**HOWE Electric**  
Construction, Inc.  
License # 898737 Class B, C10, C46

# Request For Direction

RFD Number: 002

To: Kitchell Corporation  
\_\_\_\_\_  
\_\_\_\_\_

Date: 05/18/23  
Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez

Priority:  Normal  Expedite  Urgent

Request Due To:	
<input checked="" type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference: <u>E2.2</u>
<input type="checkbox"/> Interpretation of Contract Documents	_____
<input type="checkbox"/> Conflict in Contract Documents	Specification Reference: _____
	_____

**Subject: Size For PG&E Pull Box**  
 Key Note #2, Drawing E2.2 identifies a proposed PG&E pull box and states in part *"...Pull hole per PG&E Rules"*, however the pull box size is not indicated. Please provide required size of PG&E pull box. - Thank You

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

**Reply:**  
 Keynote 2 is a proposed pull box/hole location. Actual PG&E service conduits and substructures shall be per the Rule 16 documents. My understanding is these have been issued.  
 Scott D. HDE 5/22/23

Reply  
 By: \_\_\_\_\_ Date: \_\_\_\_\_



**HOWE Electric**  
 Construction, Inc.  
 License # 898737 Class B, C10, C46

**Kitchell RFC #029**  
**Request For Direction**

RFD Number: 003

To: Kitchell Corporation  
 \_\_\_\_\_  
 \_\_\_\_\_

Date: 05/18/23  
 Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez

Priority:  Normal  Expedite  Urgent

Request Due To:			
<input checked="" type="checkbox"/>	Direction Not Given In Contract Documents	Drawing Reference:	<u>E0.5</u>
<input type="checkbox"/>	Interpretation of Contract Documents		_____
<input type="checkbox"/>	Conflict in Contract Documents	Specification Reference:	_____
			_____

**Subject: PG&E Secondary Service Conduit From PG&E Transformer to MSB**  
 Drawing E0.5 identifies Main Switchboard MSB as a 2000A with primary feeder conduits from the PG&E service transformer as (6) 5" conduits. Please confirm primary conduits shall be (7) 5" per PG&E requirements. - Thank You

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

**Reply:**  
 (7) 5" conduits are required as shown on the single line diagram. Looks like the site plan has a typo.  
 Scott D. HDE 5/22/23

Reply  
 By: \_\_\_\_\_ Date: \_\_\_\_\_



**HOWE Electric**  
 Construction, Inc.  
 License # 898737 Class B, C10, C46

**Kitchell RFC #030**  
**Request For Direction**

RFD Number: 004

To: Kitchell Corporation  
 \_\_\_\_\_  
 \_\_\_\_\_

Date: 05/18/23  
 Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez


Priority:  Normal  Expedite  Urgent

Request Due To:			
<input checked="" type="checkbox"/>	Direction Not Given In Contract Documents	Drawing Reference:	<u>E2.2</u>
<input type="checkbox"/>	Interpretation of Contract Documents		_____
<input type="checkbox"/>	Conflict in Contract Documents	Specification Reference:	_____

**Subject: AT&T Service Drawings**  
 Key Note #11, Drawing E2.2 identifies a proposed point of connection for AT&T telephone service and states in part ***"The contractor shall obtain a set of AT&T service drawings for verification, and include in the bid the extension shown on those documents."*** . Are AT&T service drawings available, if so please provide. If not, can an allowance value be assigned for inclusion with the bid? Please advise. - Thank You

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

**response:**  
**AT&T Service Drawings forthcoming in Addendum**

 5.25.23





**HOWE Electric**  
Construction, Inc.  
License # 898737 Class B, C10, C46

**Kitchell RFC 031**  
**Request For Direction**

RFD Number: 005

To: Kitchell Corporation  
\_\_\_\_\_  
\_\_\_\_\_

Date: 05/18/23  
Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez


Priority:  Normal  Expedite  Urgent

Request Due To:	
<input checked="" type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference: _____
<input type="checkbox"/> Interpretation of Contract Documents	_____
<input type="checkbox"/> Conflict in Contract Documents	Specification Reference: <u>Addendum #1</u>
	_____

**Subject: Specification Section 274100 MPR Audio-Video System & 274200 Classroom AV System**  
Revised Table of Contents, Addendum #1, Item AD 1-04, notes the addition of Specification Sections 274100 MPR Audio-Video System and 274200 Classroom AV System, however no new specification section have been provided. Please confirm referenced specification sections are part of the project SOW, if so please provide specification sections. - Thank You

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

**response:**  
**Spec SECTION 27 41 00 MPR Audio-Video System shall be in Addendum 03**

 5.22.23

Reply  
By: \_\_\_\_\_ Date: \_\_\_\_\_



**HOWE Electric**  
Construction, Inc.  
License # 898737 Class B, C10, C46

**Kitchell RFC 032**  
**Request For Direction**

RFD Number: 006

To: Kitchell Corporation  
\_\_\_\_\_  
\_\_\_\_\_

Date: 05/18/23  
Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez


Priority:  Normal  Expedite  Urgent

Request Due To:	
<input type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference: <u>E2.1</u>
<input checked="" type="checkbox"/> Interpretation of Contract Documents	
<input type="checkbox"/> Conflict in Contract Documents	Specification Reference: <u>Addendum #1</u>

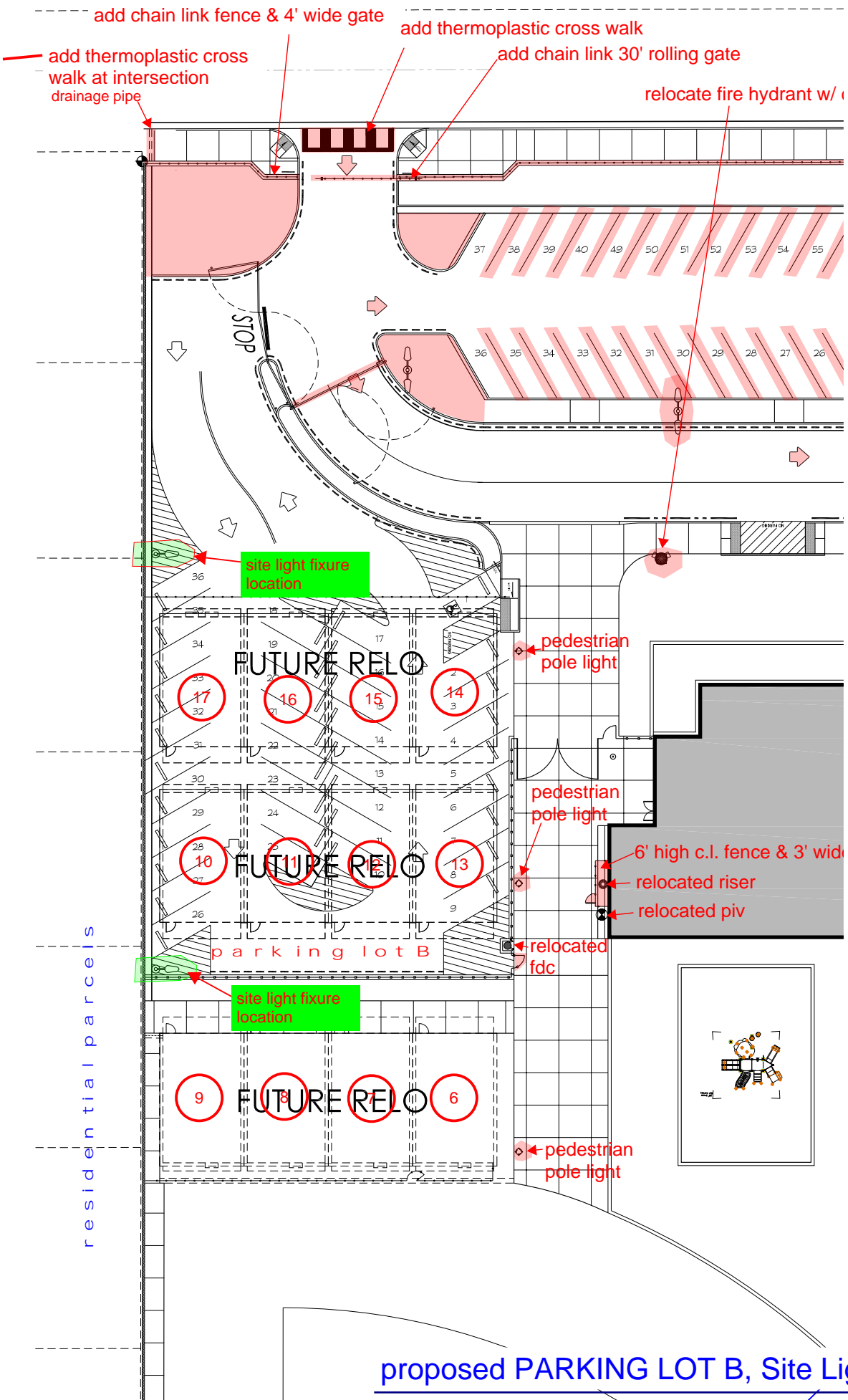
**Subject: Parking Lot B Deductive Bid Alternate #1**  
Addendum #1, Specification Section 012300-3.02 states in part to Omit "TWO (2) site lighting fixtures at west parcel perimeter by residential property line". These two (2) light fixtures appeared to be depicted on Alternate #1 - Map, however the subject two (2) light fixtures are not reflected on the base bid, Lighting Site Plan, drawing E2.1. Should the two (2) lighting fixtures referenced on the Alternate #1 - Map be included in the base bid? Please advise. - Thank You

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

**response:**  
Omitting the two site light fixtures in are only for the Deductive Alternate #. the base bid does not have any light fixtures due IF Parking Lot 'B IS ACCEPTED'.

 5.24.23

Reply  
By: \_\_\_\_\_ Date: \_\_\_\_\_



residential parcels



proposed PARKING LOT B, Site Light Fixtures  
 SOB, Partial Site Plan



**HOWE Electric**  
Construction, Inc.  
License # 898737 Class B, C10, C46

**Kitchell RFC 033**  
**Request For Direction**

RFD Number: 007

To: Kitchell Corporation  
\_\_\_\_\_  
\_\_\_\_\_

Date: 05/18/23  
Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez


Priority:  Normal  Expedite  Urgent

Request Due To:	
<input type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference: <u>E2.2</u>
<input checked="" type="checkbox"/> Interpretation of Contract Documents	_____
<input type="checkbox"/> Conflict in Contract Documents	Specification Reference: _____
	_____

**Subject: Relocatable Building Electrical Work**  
Key Note #26, Drawing E2.2 indicates reconnection of relocatable building sections separated prior to transport. Please confirm these reconnections will be provided for by the relocatable building provider. In addition, key note also indicates to provide interior improvements per detail 10/E0.6. Please confirm relocatable building manufacture will provide all in-wall rough-in. - Thank You

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

**response**  
All relocatable classroom buildings shall be deleted from scope of work until further notice.  
**CLARIFICATION: FUTURE RELOCATABLE BUILDINGS**  
TWELVE (12) 24 x 40 (west campus); FIVE (5) 24 x 40 (east campus), ONE (1) 36 x 40 (pre-school).  
  
Contractor shall provide and install all underground infrastructure for these future portable buildings (including but not limited to power, low-voltage, fire sprinklers (if applicable), fdc, piv, riser connection, etc.)

 5.24.23

# Kitchell RFC 52

## REQUEST FOR INFORMATION



Karsyn Construction Inc.  
4697 W. Jacquelyn Ave.  
Fresno, Ca. 93722

PH: 559.271.2900  
FX: 559.271.2908

RFI #: 7  
GC RFI#:  
DATE: 5/23/2023  
PHONE:  
FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales		INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
				DECREASE TIME
<b>FROM:</b> Jason Coronado				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:**

**SPECIFICATION #:**

**SUBJECT:** Scope of Work - SB 2 Package

**INFORMATION NEEDED:**

Note 13 on inclusions for SB 2 bid package, states "The Construction Manager may opt to use, Mold and Abuse gyp board in order to keep and maintain the project bid schedule.

There is a substantial price difference in labor/material to install abuse board and substantial material price difference between regular gyp board and abuse/mold board.

For bidding purposes, please identify locations or amount of regular gypsum board which is to be substituted with Abuse gyp. Bd. And how much is to be substituted with mold gyp bd.

**RECOMMENDATION:**

**Kitchell will revise SB-2 language to remove mold and abuse gyp board.**  
**5.24.23**

---

---

**From:** [Donata Starr](#)  
**To:** [Luz Gonzalez](#)  
**Subject:** RFI SB 9 Landscape and Irrigation - Shields and Brawley ES  
**Date:** Wednesday, May 17, 2023 4:26:26 PM  
**Attachments:** [image001.png](#)  
**Importance:** High

You don't often get email from dstarr@marinaco.com. [Learn why this is important](#)

**EXTERNAL EMAIL**

Hi Luz,

After review of the bid docs, we have the following questions:

1. Please provide location(s) for the Tree Grates shown on sheet LS 2.0. [Duplicate, see RFC 39.](#)
2. Please provide a construction schedule including all phases. [Milestone Schedule issued Addenda 3.](#)
3. Please provide location and depth of required import soil in landscape areas.

Thank you,

Grading and drainage plans and earthwork specification set finish grades for landscape spaces. Finish grade at planting areas shall be 2" down from surrounding paving / curb, etc. Turf areas shall be 1/2" down from surrounding paving, concrete, etc. Sandy loam fill dirt will be required where landscape areas do not comply with grading plans where positive drainage is not evident. Contractor coordination required. **KITCHELL 5.24.23**

**RFC 35**



landscape construction  
landscape maintenance  
landscape architecture  
erosion control  
design build

3707 W. Garden Grove Blvd. Orange, CA 92868 | T: [714.939.6600](tel:714.939.6600) | F: [714.935.1199](tel:714.935.1199) | [www.marinaco.com](http://www.marinaco.com)



**CENCAL**  
**S E R V I C E S**  
**ABATEMENT • DEMOLITION • CIVIL**

5/17/2023

To: Kitchell  
Project: Shields & Brawley Elem. School  
RFI#: 001

Subject: Polished Concrete

Question:

There are multiply areas on the finish schedule(s) A2.1, A2.4, & A2.7 that call for polished concrete. There is no spec. section for polished concrete and no mention of polished concrete in the summary of work. Please advise.

response:

added Spec SECTION 03 80 00 & 03 80 13, to be in forthcoming Addendum

 5.25.23

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. SB 2**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 37**

FIRM NAME: Erdman Door & Specialty, Inc. DATE: May 23, 2023

SENDER/CONTACT NAME: Dustin Porter e-MAIL: dustin@erdmandoor.com

MAILING ADDRESS 1615 Commerce Way, Paso Robles 93446

BUSINESS PHONE: 661.808.3292 CELL NUMBER: 661.808.3292

DWG. No.: \_\_\_\_\_ Spec. Section: 08 11 13 & 08 71 00

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

Erdman Door & Specialty Company wishes to know:

- Is it acceptable to bid / provide a complete Allegion package for the hardware on the doors?
- For the Hollow Metal door frames is Steelcraft an acceptable manufacturer?

RESPONSE:

**response:**  
**contractor required to submit and complete 01 25 00 SUBSTITUTION PROCEDURES form.**  
**provide bid for specified door hardware and hollow metal doors.**

 5.25.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

This form may be removed from the project specifications and/or reproduced as needed.





**REQUEST FOR INFORMATION**

**DORFMEIER MASONRY INC.**

4685 E. Hedges Ave.  
Fresno, Ca. 93703

Phone: (559) 255-9760

Fax: (559) 252-5508

PROJECT:	Sheilds & Brawley ES	RFI #:	1
TO:	Kitchell Corporation	DATE:	5/22/2023
		REPLY BY:	
		SPECS:	
Email:	lgonzalez@kitchell.com	PLANS:	
DMI JOB #		TIME IMPACT	
		COST IMPACT	

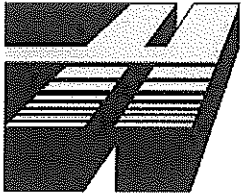
Detail A/A8.12 shows that the field CMU is split face A-81. Is the A-81 CMU at the Service Yard and Break Room Patio at the Multi-Purpose Room split face 1 sides or 2 sides?

PREPARED BY:	Wendi Jensen	DATE:	5/22/2023
--------------	--------------	-------	-----------

**RESPONSE:**

response:  
design intent for Service Yard (single exterior only split-face) & Staff Lounge outdoor Patio (exterior and interior split-face).  
if material is NOT available the architect may entertain one side (exterior) only.

 5.23.23



**HOWE Electric**  
 Construction, Inc.  
 License # 898737 Class B, C10, C46

**Request For Direction**

RFD Number: 008

To: Kitchell Corporation  
 \_\_\_\_\_  
 \_\_\_\_\_

Date: 05/23/23  
 Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez

Priority:  Normal  Expedite  Urgent

Request Due To:	
<input type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference: _____
<input checked="" type="checkbox"/> Interpretation of Contract Documents	Specification Reference: <u>Addendum #1</u>
<input type="checkbox"/> Conflict in Contract Documents	<u>Electrical SOW</u>
	<u>BP8</u>

**Subject: Bid Package #8 - Electrical SOW**  
 Addendum #1, Electrical Scope of Work for Bid Package #8, Inclusions Item #1, states in part "It is the intent of this bid package that the Trade Contractor includes all electrical for the project complete, including but not limited to...Off-Site traffic signal light controls and fixtures." The project does not appear to include a scope related to traffic signals. Please confirm note shall be changed to include off-site street lighting and not traffic signals - Thank You

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

Reply:  
THIS CONFIRMS THAT THE NOTE SHALL BE CHANGED TO INCLUDES OFF-SITE STREET LIGHTING AND NOT TRAFFIC SIGNALS **KITCHELL 5.23.23**

Reply  
 By: GARRY CLARK KITCHELL Date: 5/23/2023

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. \_\_\_\_\_**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 43**

FIRM NAME: San Joaquin Glass DATE: 5/23/2023

SENDER/CONTACT NAME: Greg Blackburn e-MAIL: greg@sjglass.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559-268-7646 CELL NUMBER: 559-268-33-21

DWG. No.: A2.7 Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

1. Please confirm hardware groups in Door Schedule on page A2.7 are wrong and we should use hardware group numbers that match the door numbers in the hardware spec.

RESPONSE:

response:  
door hardware GROUPS forthcoming in Addendum

 5.25.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

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**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. \_\_\_\_\_**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 44**

FIRM NAME: San Joaquin Glass DATE: 5/23/2023

SENDER/CONTACT NAME: Greg Blackburn e-MAIL: greg@sjglass.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559-268-7646 CELL NUMBER: 559-268-33-21

DWG. No.: \_\_\_\_\_ Spec. Section: \_\_\_\_\_

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

1. Please confirm doors 106 & 109 will be HM doors in Alum frames.

RESPONSE:

response:

Doors 106 & 109 are kindergarten (south) exterior doors. YES hollow metal doors with storefront doors. please let us know if this is not a good idea, due to do to storefront frames will not take the wear and tear of a hollow metal door.

 5.25.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

**DOCUMENT 00110**  
**CONTRACTOR REQUEST FOR CLARIFICATION**  
**PROJECT: Central Unified School District – Shields & Brawley Bid Package No. \_\_\_\_\_**

e-Mail form to [lgonzalez@kitchell.com](mailto:lgonzalez@kitchell.com)

**RFC No. 45**

FIRM NAME: San Joaquin Glass DATE: 5/23/2023

SENDER/CONTACT NAME: Greg Blackburn e-MAIL: greg@sjglass.com

MAILING ADDRESS \_\_\_\_\_

BUSINESS PHONE: 559-268-7646 CELL NUMBER: 559-268-33-21


DWG. No.: \_\_\_\_\_ Spec. Section: 08 51 33

QUESTION: *(Type or print one question in the space provided. Attach sketches if necessary.)*

1. Please indicate where 085133 Aluminum Service Windows will be used.

RESPONSE:

response:  
Spec SECTION 08 51 33 ALUMINUM SERVICING WINDOWS refer to sheet A5.17, INTERIOR ELEVATION, MPR, keynote 25 (roll-up door). there are TWO (2) different sizes. color selected by Architect.

 5.25.23

Response by: \_\_\_\_\_ Date: \_\_\_\_\_

Included in Addenda No. \_\_\_\_\_ Date: \_\_\_\_\_

Date Received: \_\_\_\_\_ Time Received \_\_\_\_\_ am

Kitchell RFC 46



Karsyn Construction Inc.
4697 W. Jacquelyn Ave.
Fresno, Ca. 93722
PH: 559.271.2900
FX: 559.271.2908

REQUEST FOR INFORMATION

RFI #: 1
GC RFI#:
DATE: 5/23/2023
PHONE:
FAX:

Table with 4 columns: TO, REASON FOR REQUEST, ACTION REQUESTED, PROBABLE EFFECT. Rows include contact info for Luz Gonzales and Jason Coronado, and a list of reasons for request such as 'INSUFFICIENT INFORMATION' and 'ENGINEERING CONFLICT'.

REFERENCE: Shields & Brawley E.S.

DRAWING #:

SPECIFICATION #: 092236.23 & 092400

SUBJECT: Metal Lath

INFORMATION NEEDED:

Both specification sections 092236.23 & 092400 mention metal lath.

Please clarify if specification 092236.23 applies to this project.
If so, please clarify which specification to use for metal lath requirements.

RECOMMENDATION:

response:
omit 09 22 36.23 METAL LATH SECTION.
refer to 09 24 00 CEMENT PLASTERING SECTION

Handwritten signature and date 5.23.23

# Kitchell RFC 47



Karsyn Construction Inc.  
4697 W. Jacquelyn Ave.  
Fresno, Ca. 93722  
PH: 559.271.2900  
FX: 559.271.2908

## REQUEST FOR INFORMATION

RFI #: 2  
GC RFI#:  
DATE: 5/23/2023  
PHONE:  
FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales		INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
				DECREASE TIME
<b>FROM:</b> Jason Coronado				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:**

**SPECIFICATION #:** 92900

**SUBJECT:** Silent Board

**INFORMATION NEEDED:**

Silent board is referenced in 092900 item 2.02.c and to be installed in rooms C105, C110, C112, C113, C114, C115, C119 & C120

Please clarify if this applies to this project.

If so, please locate rooms where silent board is to be installed.

response:  
duplicate to RFC 19, refer to RFC 19 response  
NO Silent Board in scope of work

 5.23.23



# Kitchell RFC 49



Karsyn Construction Inc.  
4697 W. Jacquelyn Ave.  
Fresno, Ca. 93722

PH: 559.271.2900  
FX: 559.271.2908

## REQUEST FOR INFORMATION

RFI #: 4  
GC RFI#:  
DATE: 5/23/2023  
PHONE:  
FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
ATTN:	Luz Gonzales	INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
PHONE:	559.271.2900	<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
FAX:	559.271.2908			DECREASE TIME
FROM:	Jason Coronado			UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:** A8.6/114

**SPECIFICATION #:** 9300

**SUBJECT:** Tile Substrate

### INFORMATION NEEDED:

Specification section 09300 indicates options for solid backing for wall tile installation. Options include plaster, wood, masonry or gypsum board.

Detail 114 on A8.6 shows cementitious backer units behind wall tile.

Please clarify which substrate for wall tile is to be used on this project.

### RECOMMENDATION:

response:

Substrate wall tile material, provide WATER RESISTANT GYP. BOARD in lieu of cementitious backer board

 5.25.23

# Kitchell RFC 50



Karsyn Construction Inc.  
4697 W. Jacquelyn Ave.  
Fresno, Ca. 93722

PH: 559.271.2900  
FX: 559.271.2908

## REQUEST FOR INFORMATION

RFI #: 5  
GC RFI#:  
DATE: 5/23/2023  
PHONE:  
FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales		INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
				DECREASE TIME
<b>FROM:</b> Jason Coronado				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:** A8.10/190

**SPECIFICATION #:**

**SUBJECT:** 1" Dens. Glass

**INFORMATION NEEDED:**

Detail 190 on A8.10 indicates "1" DENS. GLAS" at exterior wall. Densglass does not come in 1" thickness.

Please clarify if 1" is required at this location. If so, please clarify if 1" shaftliner or (2) layers of 1/2" exterior sheathing will be required.

response:

113/A8.6 119/A8.6 calls out for Dens-Glas GOLD. Architect would have to check on Title 24 Compliance. contractor to bid TWO (2) LAYERS OF 1/2" dens-glas GOLD.

 5.25.23

# Kitchell RFC 51



Karsyn Construction Inc.  
4697 W. Jacquelyn Ave.  
Fresno, Ca. 93722

PH: 559.271.2900  
FX: 559.271.2908

## REQUEST FOR INFORMATION

RFI #: 6  
GC RFI#:  
DATE: 5/23/2023  
PHONE:  
FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales		INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
				DECREASE TIME
<b>FROM:</b> Jason Coronado				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:**

**SPECIFICATION #:**

**SUBJECT:** Construction Schedule

**INFORMATION NEEDED:**

Will there be a schedule issued showing approx construction start date for this project?

**RECOMMENDATION:**

**Milestone schedule to be issued in Addenda 3.  
5.24.23**

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# Kitchell RFC 53

## REQUEST FOR INFORMATION



Karsyn Construction Inc.  
 4697 W. Jacquelyn Ave.  
 Fresno, Ca. 93722  
 PH: 559.271.2900  
 FX: 559.271.2908

RFI #: 8  
 GC RFI#:   
 DATE: 5/23/2023  
 PHONE:   
 FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales		INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
<b>FROM:</b> Jason Coronado				DECREASE TIME
				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:** A3.2 & S4.2

**SPECIFICATION #:**

**SUBJECT:** Main Bldg - Foyer Interior Soffit

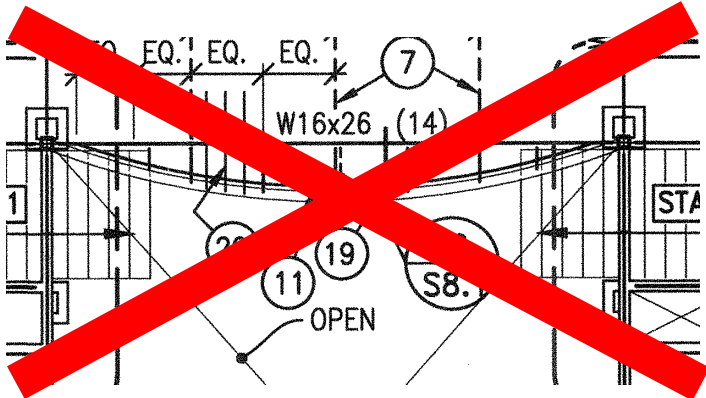
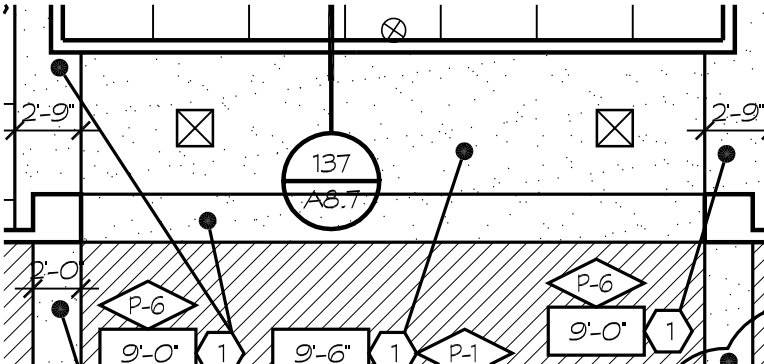
**INFORMATION NEEDED:**

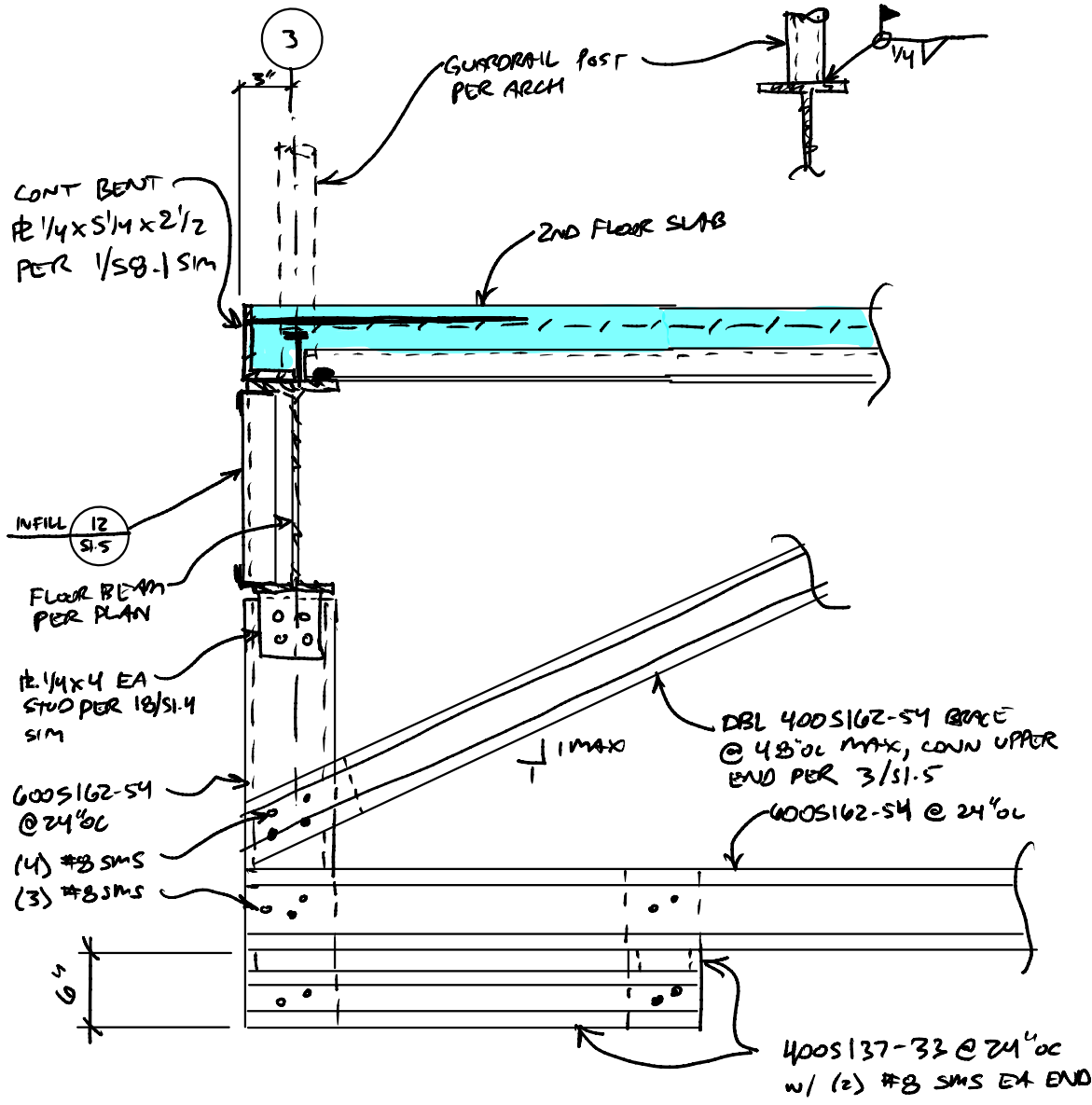
Architecturally shown on RCP A3.2, interior soffit at Main Bldg at gridline 3 between F & E shows soffit to be straight.  
 Per structural drawing S4.2, this soffit appears to be at a radius.

Please confirm soffit at this location is to be built per Architectural plan on A3.2.

**NOTE:**  
 sheet n XS-2 pending DSA approval

*John* 5.31.23





REVISED BALCONY EDGE DETAIL

14/11-06  
 REF: RFC #053; ORIGINAL DET 19/58.1 RFC 053 DWG

NOTE: EDGE OF SLAB SHALL BE STRAIGHT/CONSTANT PER ARCH  
 DWGS (NOT CURVED).

XS-2



Karsyn Construction Inc.  
 4697 W. Jacquelyn Ave.  
 Fresno, Ca. 93722  
 PH: 559.271.2900  
 FX: 559.271.2908

# Kitchell RFC 54

## REQUEST FOR INFORMATION

RFI #: 9  
 GC RFI#:   
 DATE: 5/23/2023  
 PHONE:   
 FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales		INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME
				DECREASE TIME
<b>FROM:</b> Jason Coronado				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**response:**  
 for bid proposes now, contractor to refer to sheet T2, ARCHITECTURAL NOTES, GENERAL NOTES, #19. If contractor is awarded a contract we can bring up this in discussion after bid.

**DRAWING #:**

**SPECIFICATION #:**

**SUBJECT:** Addenda 1 & 2 Plan Sheets - Scales

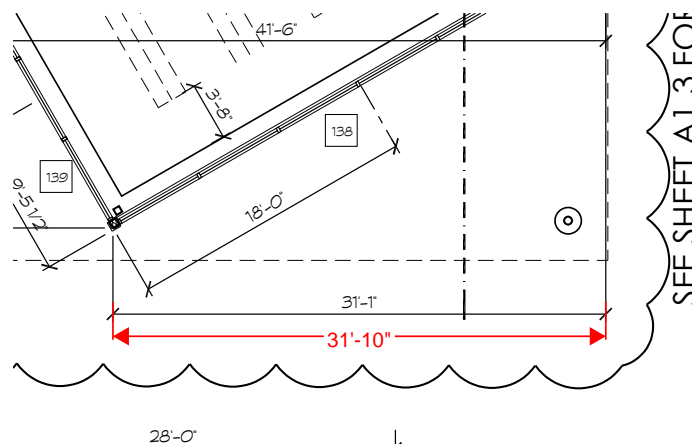
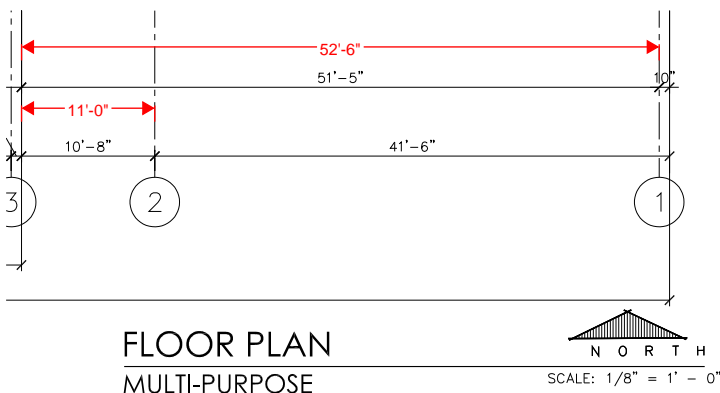
*Signature* 5.25.23

**INFORMATION NEEDED:**

It appears that some of plans issued on addenda 1 & 2 scales to not match with noted dimensions.

Please clarify which scales or plan sheets are to be used, or if new plan sheets will be issued in forthcoming addenda?

Please note, this occurs on both addenda and both buildings.



# Kitchell RFC 55



Karsyn Construction Inc.  
4697 W. Jacquelyn Ave.  
Fresno, Ca. 93722  
PH: 559.271.2900  
FX: 559.271.2908

## REQUEST FOR INFORMATION

RFI #: 10  
GC RFI#:  
DATE: 5/23/2023  
PHONE:  
FAX:

TO:	Kitchell Corporation	REASON FOR REQUEST	ACTION REQUESTED	PROBABLE EFFECT
<b>ATTN:</b> Luz Gonzales		INSUFFICIENT INFORMATION	CLARIFICATION	INCREASE COST
		ENGINEERING CONFLICT	DIRECTION	DECREASE COST
		ALTERNATE PROPOSAL	APPROVAL	UNKOWN COST
<b>PHONE:</b> 559.271.2900 <b>FAX:</b> 559.271.2908		<b>RESPONSE REQUIRED BY:</b>		INCREASE TIME  DECREASE TIME
<b>FROM:</b> Jason Coronado				UNKOWN

**REFERENCE:** Shields & Brawley E.S.

**DRAWING #:** S5.4, S7.8/18

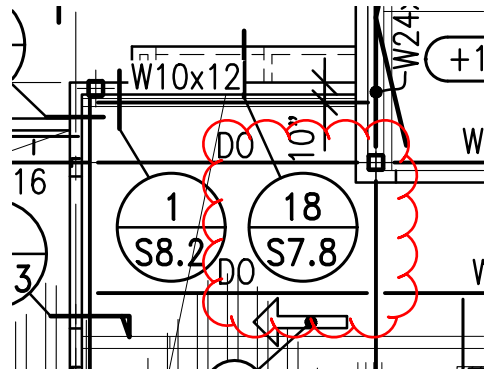
**SPECIFICATION #:**

**SUBJECT:** Structural Detail Callout

### INFORMATION NEEDED:

On S5.4, near gridline D between 8 and 6, detail 18 on S7.8 is called out. This detail and page cannot be located.

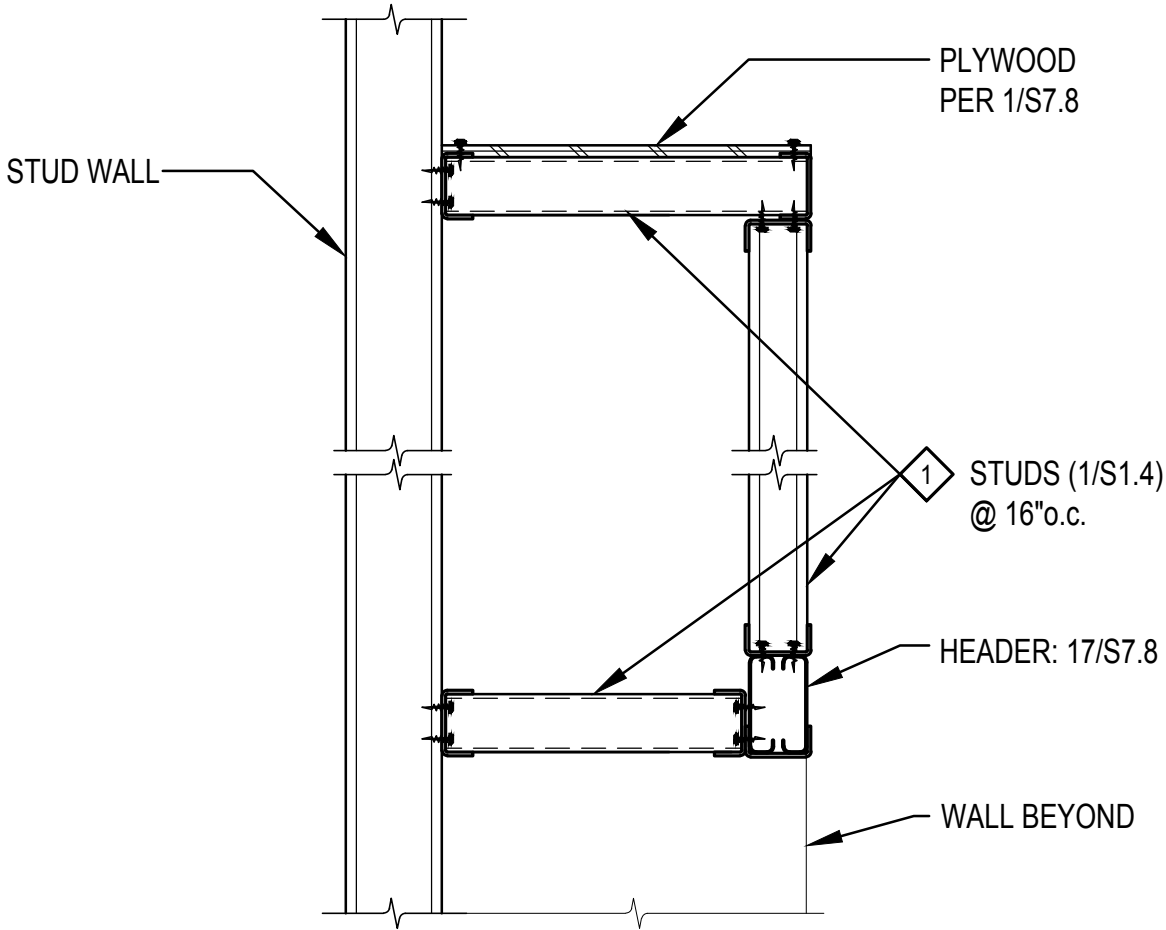
Please clarify or locate correct page/detail for this location.



### RECOMMENDATION:

[ASDi response:](#)  
See new detail XS-1 (PENDING DSA APPROVAL).

Jack Brewer, SE  
5-25-2023



**DET. AT DRINKING FOUNTAIN**  
 1" ~ 1'-0" RFC 055 DWG

REF: KITCHELL RFC #55

SCOPE: DETAIL AT DRINKING FOUNTAIN WAS NOT INCLUDED IN DSA APPROVED SET.

*Jack D. Brewer*  
 REGISTERED PROFESSIONAL ENGINEER  
 JACK D. BREWER  
 No. S5792  
 Exp. 6-30-25  
 STRUCTURAL  
 STATE OF CALIFORNIA



7790 NORTH PALM AVENUE  
 FRESNO, CALIFORNIA 93711  
 T559.448.8400  
 F559.448.8467  
 www.sim-pbk.com

PROJECT SHIELDS & BRAWLEY ELEMENTARY SCHOOL		PROJECT No. 17-67
SHEET DESCRIPTION DETAIL AT DRINKING FOUNTAIN		SCALE AS NOTED
DATE 5/25/2023	SHEET No. <b>XS-1</b>	
PROJECT COORDINATOR JEFF URABE		





Karsyn Construction Inc.  
 2740 N Sunnyside Ave.  
 Fresno, CA 93727  
 PH: 559.271.2900  
 FX: 559.271.2908

# Kitchell RFC 57 REQUEST FOR INFORMATION

RFI #: 12  
 GC RFI#:  
 Date: 5-23-2023  
 Phone:  
 Fax:

<b>To: Kitchell Corporation</b>	REASON FOR REQUEST		ACTION REQUESTED	PROBABLE EFFECT
<b>Attn: Luz Gonzales</b>  <b>Phone: 559.271.2900</b> <b>Fax: 559.271.2908</b>  <b>From: ANTON WILSON</b>	<input checked="" type="radio"/> Insufficient Information <input type="radio"/> Engineering Conflict <input type="radio"/> Alternate Proposal	<input checked="" type="radio"/> Clarification <input type="radio"/> Direction <input type="radio"/> Approval	<input type="radio"/> Increase Cost <input type="radio"/> Decrease <input checked="" type="radio"/> Unknown Cost	
<b>RESPONSE REQUIRED BY:</b>			<input type="radio"/> Increase Time <input type="radio"/> Decrease Time <input checked="" type="radio"/> Unknown	

**REFERENCE: Shields & Brawley E.S.**

**DRAWING: Exterior Elevations**

**SPECIFICATION: 092400**

**SUBJECT: Plaster Reveals**

**INFORMATION NEEDED:**

Exterior Elevations call for a 4" foam Plant On horizontally @ the bottom of first floor windows. It seems as if there is a Plant On in line with the top of the second-floor windows as well.

Please verify if this is to be a Plant On or possibly a Reveal Screed per 110/A8.6.

**RECOMMENDATION:**

response:  
 call-out shows on A6.3, PARTIAL SOUTH ELEVATION.

 5.23.23



**HOWE Electric**  
Construction, Inc.  
License # 898737 Class B, C10, C46

Request For Direction

RFD Number: 010

To: Kitchell Corporation  
\_\_\_\_\_  
\_\_\_\_\_

Date: 05/23/23  
Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez

Priority:  Normal  Expedite  Urgent

Request Due To:	
<input type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference: _____
<input checked="" type="checkbox"/> Interpretation of Contract Documents	Specification Reference: <u>Addendum #1</u>
<input type="checkbox"/> Conflict in Contract Documents	<u>Electrical SOW</u>
	<u>BP8</u>

**Subject: Future Marquis Signs**  
 Addendum #1, Electrical Scope of Work for Bid Package #8, Inclusions Item #53, states in part to furnish low voltage for mechanical equipment, while Addendum #1, Mechanical Scope of Work for Bid Package #7, Item #13, states in part to furnish conduit pathways and wiring requirements for HVAC controls and elsewhere as applies. Please confirm all mechanical controls shall be provided for under Mechanical, Bid Package #7. - Thank You.

**response:**  
 do not understand subject title or mention of Marquee sign. do not understand electrical, mechanical, HVAC controls concerns. if the response from Kitchell has answered the question sorry for the confusion. However the Marquee has been relocated (further to the east) closer to Brawley Ave and contractor to install conduits for power and low-voltage underground infrastructure.

Submitted  
 By: Nick Brown Impacts: unknown Impacts: unknown

05/24/2023

Reply:  
 I DID NOT SEE ANYTHING ABOUT LOW VOLTAGE IN ITEM 53 HOWEVER IT IS CORRECT THAT SB 7 MECHANICAL WILL BE RESPONSIBLE FOR PROVIDING CONDUIT PATHWAYS AND WIRING REQUIREMENTS FOR HVAC CONTROLS

Reply  
 By: Gary Clark KITCHELL Date: \_\_\_\_\_

KITCHELL RFL 60



**HOWE Electric**  
Construction, Inc.  
License # 898737 Class B, C10, C46

Request For Direction

RFD Number: 011

To: Kitchell Corporation  
\_\_\_\_\_  
\_\_\_\_\_

Date: 05/23/23  
Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez

Priority:  Normal  Expedite  Urgent

Request Due To:

<input type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference:	<u>LS.1.0</u>
<input checked="" type="checkbox"/> Interpretation of Contract Documents	Specification Reference:	<u>Addendum #1</u>
<input type="checkbox"/> Conflict in Contract Documents		<u>Electrical SOW</u>
		<u>BP8</u>

**Subject: Landscape Control Conduit & Wiring**

Addendum #1, Electrical Scope of Work for Bid Package #8, Inclusions Item #<sup>18</sup>16, states in part to "Install electrical/low voltage and final terminations required for landscaping / irrigations scopes...Reference Landscape drawings for electrical scope". Please confirm low voltage control conduits and wiring (example: Drawing LS.1.0, Irrigation Notes #6 and #13) shall be furnished and installed by landscape contractor. - Thank You.

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

Reply:

ITEM 18 IN BID PAC 8 WILL BE MODIFIED TO DELETE "LOW VOLTAGE AND FINAL TERMINATIONS" AND CLARIFY THAT BID-PAC 8 WILL PROVIDE POWER REQUIRED.  
THIS CONFIRMS THAT LOW VOLTAGE CONTROLS, CONDUITS & WIRING WILL BE PROVIDED BY THE LANDSCAPE CONTR.

Reply By: *Samy Cloud* Date: 5/23/2023

# REQUEST FOR INFORMATION Kitchell RFC 38

RFI# \_\_\_\_\_

Date: \_\_\_\_\_

Job Name:

Information Required:

\_\_\_\_\_

\_\_\_\_\_

Job# \_\_\_\_\_

Priority:

To:

Urgent

\_\_\_\_\_

Expedite

\_\_\_\_\_

Normal

Attn:

\_\_\_\_\_

Subject: \_\_\_\_\_

Category:

Contract Drawings Ref. \_\_\_\_\_

Information not shown on contract documents

Shop Drawings Ref. \_\_\_\_\_

Interpretation of contract requirements

Conflict in contract requirements

Possible Cost Impact: \_\_\_\_\_

Coordination problem

Possible Time Impact: \_\_\_\_\_

Message:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

By: \_\_\_\_\_

Reply:

~~response:~~ \_\_\_\_\_

refer to forthcoming Addendum. refer to attached E2.2 sheet.

Scott Davidson HDE 5.30.23

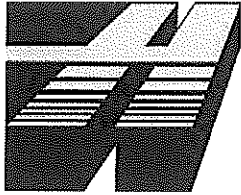
CC: \_\_\_\_\_

Answered By: \_\_\_\_\_

Date: \_\_\_\_\_

\_\_\_\_\_

RFC 58



**HOWE Electric**  
Construction, Inc.  
License # 898737 Class B, C10, C46

Request For Direction

RFD Number: 009

To: Kitchell Corporation  
\_\_\_\_\_  
\_\_\_\_\_

Date: 05/23/23  
Project Name: Shields & Brawley Elementary School

Attn: Luz Gonzalez

Priority:  Normal  Expedite  Urgent

Request Due To:

<input type="checkbox"/> Direction Not Given In Contract Documents	Drawing Reference:	_____
<input checked="" type="checkbox"/> Interpretation of Contract Documents	Specification Reference:	<u>Addendum #1</u>
<input type="checkbox"/> Conflict in Contract Documents		<u>Electrical SOW</u>
		<u>BP8</u>

**Subject: Future Marquis Signs**

Addendum #1, Electrical Scope of Work for Bid Package #8, Inclusions Item #18 & #47, state to provide infrastructure (power, low voltage) for future maquis sign(s), however, electrical drawings do not indicate a location or requirements for a future signs(s). Please provide quantity, location and infrastructure requirements (power and low voltage) requirements for future signs. - Thank You.

THE C 2.1 SITE PLAN INDICATES LOCATIONS OF MARQUIS SIGNS. THE ELECTRICAL DWGS DO NOT  
*J. Clark*

Submitted	Possible Cost	Possible Time
By: <u>Nick Brown</u>	Impacts: <u>unknown</u>	Impacts: <u>unknown</u>

**response:**

Future Marquee Sign has been relocated (further to the east) closer to Brawley Ave. and contractor to install conduits for power and low-voltage underground infrastructure.

*J. Clark* 5.29.23

refer to forthcoming Addendum. refer to E2.2 sheet  
Scott Davidson HDE 5.30.23

Reply  
By: \_\_\_\_\_ Date: \_\_\_\_\_