VENTURA UNIFIED SCHOOL DISTICT

VETURA HIGH SCHOOL STADIUM UPGRADES AND SITE IMPROVEMENTS

BID # E14-25

09/25/2026

ADDENDUM #02

NOTICE TO BIDDERS:

The following revisions and/or clarifications shall be made to the bidding requirements and contract documents. Revise and amend the documents for the above-named project in accordance with this addendum. The bid shall reflect these addendum changes and each bidder shall refer in their bid to this addendum.

All bidding requirements and contract documents shall apply to this addendum as originally indicated in the applicable portions of the contract documents, unless otherwise modified by this addendum.

Contractors shall acknowledge this addendum at the space provided on the Bid Proposal.

REVISIONS, CLARIFICATIONS, & RESPONSES TO PRE-BID RFI'S:

1. Review attached bid addendum prepared by LPA. The following sheets have been revised: C1.01, C1.02, C2.01, C2.02, L0.01, L1.01, L1.02, L2.02, L3.01, L4.04, L5.01, L5.04, S6.03, E0.11, E0.12, E0.21, E0.22.
2. A Stormwater Pollution Prevention Plan (SWPPP) has been prepared by LPA and is included in this addendum for incorporation to contract documents. Contractor will be responsible for all requirements, maintenance and must include cost in base bid for a third party service to act as Qualified SWPPP Practitioner (QSP) as outlined in the document.
3. Responses to pre-bid RFIs will be issued to all bidders in an additional addendum prior to end of day next Friday 10/2/2026.
4. Contract Schedule dates have been revised to **November 30 2026 – June 18 2027** as shown in the following table. Owner-contracted track and field surfacing installation will occur **after** this contract's substantial completion date.

REVISED - Total Construction Schedule	**November 30 2026 - June 18 2027**
Track and field demolition (by FieldTurf/Beynon)	December 2026
Existing Site Demolition	December 2026
Electrical and SCE Work	**To be Confirmed**
Retaining wall, ramps, and stairs construction	January-March 2027
Storm Drain work	February - March 2027
Field Work	April-May 2027
Final grade and nailer board installation (7-10 days)	June 7th – June 18th 2027
Contract E14-25 Substantial Completion Date	**June 18th 2027**
OWNER CONTRACTED Field Turf Field (21 – 28 business days)	June 21 2027 – July 23rd 2027
OWNER CONTRACTED Beynon Track (21-28 business days)	July 26 2027 – August 27th 2027

REVISIONS TO THE PLANS: C1.01, C1.02, C2.01, C2.02, L0.01, L1.01, L1.02, L2.02, L3.01, L4.04, L5.01, L5.04, S6.03, E0.11, E0.12, E0.21, E0.22.

REVISIONS TO THE SPECIFICATIONS: Not Applicable

END OF ADDENDUM #01

Addendum: 2 Pages

ENCLOSURES: 301 Pages

Total Number of Pages: 303 Pages

IRVINE • SACRAMENTO • SAN DIEGO •SAN JOSE • DALLAS • SAN ANTONIO• AUSTIN

September 24, 2026

Bid Addendum No. B
To the contract documents for VENTURA HIGH SCHOOL TRACK AND FIELD REPLACEMENT
For the VENTURA UNIFIED SCHOOL DISTRICT

NOTICE TO BIDDERS

This bid addendum forms a part of the contract and modifies the original bidding documents dated July 01, 2026. It is intended that all work affected by the following modifications shall conform to related provisions and general conditions of the Contract of the original drawings and specifications. Modify the following items wherever appearing in any drawings or sections of the specifications. Acknowledge receipt of Bid Addendum No. B in the space provided on the Bid Form. Failure to do so may subject to disqualification.

General

Item No. 1 **Stormwater Pollution Prevention Plan (SWPPP)** issued for bid. This is a "living" document requiring modification through the life of the project, and any missing information is due to the current state of the project.

Changes to Specifications

None

Changes to Drawings

Item No. 2 **C1.01 – DEMOLITION PLAN** – Added concrete demolition near the proposed gates for the new stairs.

Item No. 3 **C1.02 – DEMOLITION PLAN** – Added concrete demolition near the proposed gates for the new stairs.

Item No. 4 **C2.01 – GRADING, PAVING & HORIZONTAL CONTROL PLAN**: Added concrete demolition near the proposed gates for the new stairs.

Item No. 5 **C2.02 – GRADING, PAVING & HORIZONTAL CONTROL PLAN**: Added concrete demolition near the proposed gates for the new stairs.

Item No. 6 **L0.01 LANDSCAPE NOTES AND LEGENDS:**
- Materials Keynote 10 detail reference updated.
- Materials Keynote 23 detail reference updated.
- Materials Keynote 27 detail reference updated.
- Materials Keynote 29 added to legend.
- Updated Soccer Goal & Wheel Kit Model Number in the Sports Equipment Legend.

Item No. 7 **L1.01 MATERIALS PLAN:**
- Keynotes updated per L0.01.
- New Concrete Paving added behind the (2) Single Swing Gates at Guardrail in the center of the (e) Concrete Bleachers.

Item No. 8 L1.02 MATERIALS PLAN:
- Keynotes updated per L0.01.
- New Concrete Paving added behind the (2) Single Swing Gates at Guardrail in the center of the (e) Concrete Bleachers.
- New Concrete Paving behind the Gate in Guardrail w/ Panic Hardware – 180 Swing.

Item No. 9 L2.02 LAYOUT PLAN: Dimensions for the new Concrete Paving behind the two gates along the existing wall and existing concrete bleachers have been added.

Item No. 10 L3.01 MATERIALS ENLARGEMENT PLAN:
- Keynotes updated per L0.01.
- New Concrete Paving behind the Gate in Guardrail in enlargement 05. Dimensions for the new Concrete Paving added in enlargement 07.

Item No. 11 L4.04 SECTIONS AND ELEVATIONS:
- Updated elevation 02 to show cantilevered guardrail design.
- Updated elevation 04 to show the cantilevered guardrail panel.

Item No. 12 L5.01 CONSTRUCTION DETAILS:
- Detail 13 'Stone Monument Base and Footing' moved on the sheet and renumbered to be Detail 08. Detail 18 'Gate in Guardrail w/ Panic Hardware – 180 Swing' moved on the sheet and renumbered to be Detail 17.
- Detail 17 (formerly 18)Tube Steel and picket size, cantilevered guardrail panel design, and u bucket structural attachment updated.
- Detail 19 'Gate in Guardrail w/ Panic Hardware' added to sheet.
- Detail 21 'Weep Hole Tie-In' moved on the sheet and renumbered to be Detail 13.

Item No. 13 L5.04 CONSTRUCTION DETAILS:
- Detail 09 updated to show (2) Single Swing Gates in Guardrail w/ Panic Hardware showing a shared center post and the cantilevered guardrail panel design.
- Detail 14 tube steel sizes updated. Notes 'G' and 'H' added to detail.

Item No. 14 S6.03 TYPICAL SITE DETAILS: Detail 04 – 'Gate Post On (E) Retaining Wall Connection' added to sheet.

Item No. 15 E0.11 ELECTRICAL DEMOLITION SITE PLAN: Keynote 26.01, 26.02, 26.03, 26.05, 26.06, 26.07 revised to require demolition (instead of relocation) of existing electrical wires within the limit of work.

Item No. 16 E0.12 ELECTRICAL DEMOLITION SITE PLAN: Keynote 26.01, 26.02, 26.03, 26.05, 26.06, 26.07 revised to require demolition (instead of relocation) of existing electrical wires within the limit of work.

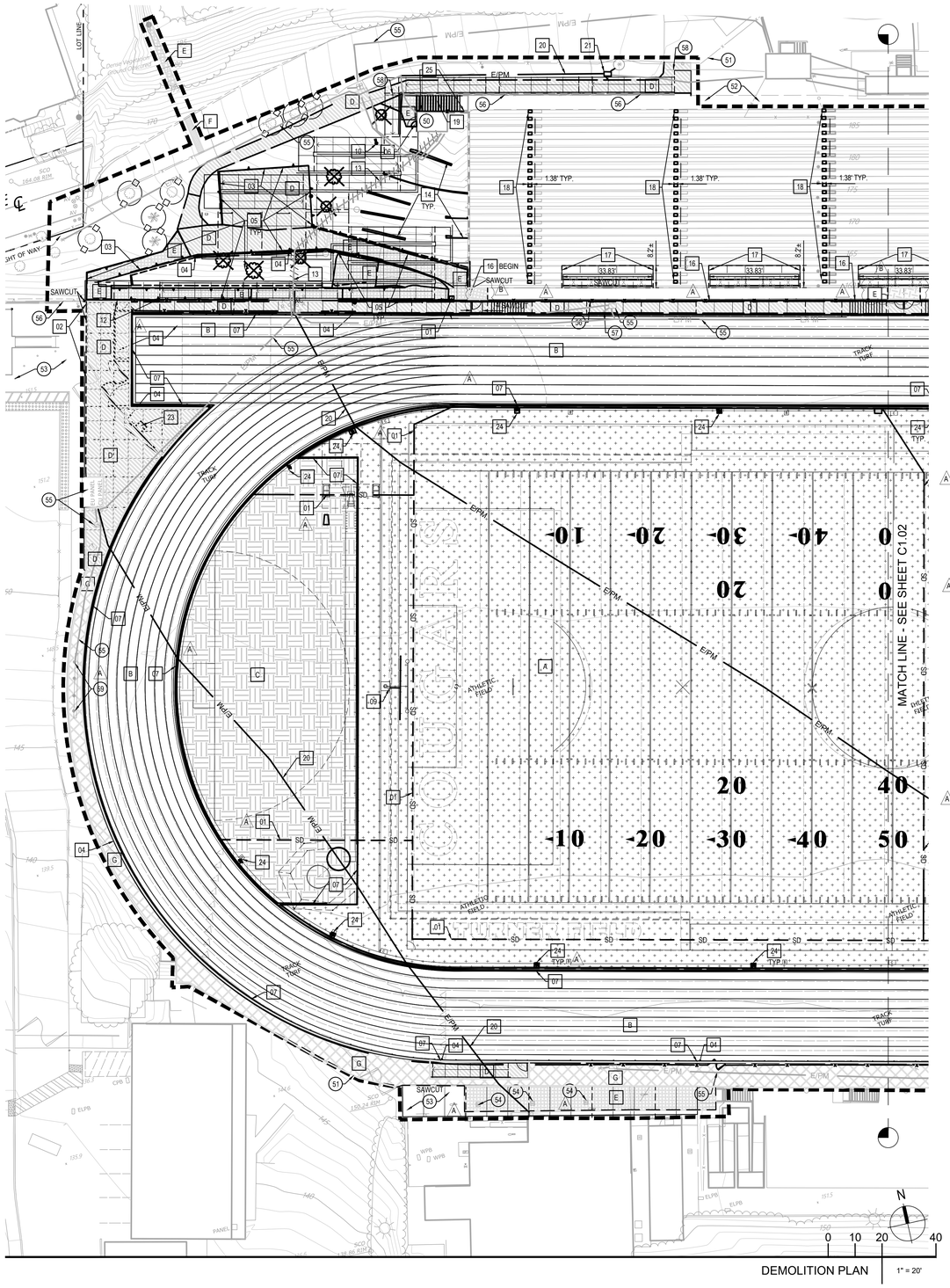
Item No. 17 E0.21 ELECTRICAL SITE PLAN:
- Keynote E-1103 revised to require new conduit & wiring (instead of relocation)
- Keynote E-1109 revised to require new pullbox (instead of relocation)
- Keynote E-1116 removed; it was not used on the plans
- Keynote E-1123 renumbered; used to be E-1120
- Keynote E-1124 added for new electrical conduit & wiring

Item No. 18 E0.22 ELECTRICAL SITE PLAN:
- Keynote E-1122 revised to omit reuse of existing.

End of Bid Addendum No. B

PROTECTION KEYNOTES

KEY NOTE	DESCRIPTION
50	PROTECT (E) BUILDING, FOUNDATION AND OTHER STRUCTURAL FEATURES AND BUILDING UTILITIES.
51	PROTECT (E) FENCE.
52	PROTECT (E) CONCRETE PAVEMENT/SIDEWALK.
53	PROTECT (E) AC PAVEMENT.
54	PROTECT (E) STORM DRAIN FACILITIES.
55	PROTECT (E) ELECTRICAL FACILITIES.
56	PROTECT (E) RETAINING WALL.
57	PROTECT (E) ELECTRIC VAULT AND MUSCO POLE UNLESS EXISTING FIELD CONDITIONS AT THE POLE BASE CONFLICTS WITH THE IMPROVEMENTS.
58	PROTECT (E) WATER SERVICE FACILITIES.
59	PROTECT (E) SCOREBOARD/FOOTINGS.



DEMOLITION NOTES

-SEE DEMOLITION NOTES, SHEET C0.01.

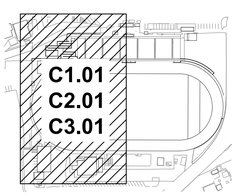
DEMOLITION LEGEND

LABEL	DESCRIPTION
A	REMOVE (E) SYNTHETIC TURF. SEE LANDSCAPE PLANS FOR IMPROVEMENTS.
B	REMOVE AND REPLACE (E) TRACK. SEE LANDSCAPE PLANS FOR IMPROVEMENTS.
C	REMOVE AND REPLACE (E) D-ZONE. SEE LANDSCAPE PLANS FOR IMPROVEMENTS.
D	REMOVE (E) ASPHALT PAVEMENT/SIDEWALK.
E	REMOVE (E) CONCRETE.
F	REMOVE (E) LANDSCAPING.
G	GRIND AND OVERLAY EXISTING PAVEMENT. LIMITS SHOWN ARE APPROXIMATE. DEPTH PER GEOTECHNICAL ENGINEER'S RECOMMENDATION.
	REMOVE (E) TREE, SEE DEMOLITION NOTE 5 SHEET C0.01.
	(E) TREE TO REMAIN AND BE PROTECTED, SEE DEMOLITION NOTE 5 SHEET C0.01.
	SAWCUT (E) PAVEMENT/RET WALL, SEE DEMOLITION NOTE 6 AND 10 SHEET C0.01.
	APPROXIMATE LIMIT OF WORK LINE.
	RELOCATE (E) UTILITY, SEE DEMOLITION NOTES 2, 4, 8, AND 9 SHEET C0.01.

DEMOLITION KEYNOTES

KEY NOTE	DESCRIPTION
01	REMOVE (E) STORM DRAIN PIPE AND APPURTENANCES. SEE UTILITY PLAN FOR IMPROVEMENTS.
02	REMOVE AND REINSTALL (E) FENCE ON TOP OF PROPOSED CURB PER LANDSCAPE DETAIL 01 SHEET L5.04.
03	REMOVE (E) HANDRAIL / HANDRAIL AND FOOTING.
04	REMOVE (E) FENCE AND FOOTINGS.
05	REMOVE (E) RETAINING WALL AND FOOTING.
06	REMOVE (E) DOOR TO ELECTRICAL ROOM.
07	REMOVE (E) CURB.
08	REMOVE (E) GATE FENCE/POST AND FOOTINGS.
09	REMOVE (E) GOAL POST AND FOOTING.
10	REMOVE (E) UTILITY POLE.
11	REMOVE (E) TRACK.
12	REMOVE AND RELOCATE (E) WALL PLAQUES PER SCHOOL DISTRICT DIRECTION.
13	RELOCATE (E) ELECTRIC LINE.
14	REMOVE (E) PLANTER WALL.
15	REMOVE/RELOCATE (E) CONDUIT PER ELECTRICAL PLANS.
16	REMOVE (E) GUARDRAIL AND (E) +/- 3" CURB ON TOP OF RET. WALL. SAWCUT TO BE FLUSH WITH (E) WALKWAY ELEVATIONS.
17	REMOVE (E) BLEACHER FOR ADA SEATING.
18	ROUGHEN (E) BLEACHER SURFACE FOR STAIR WIDENING. SEE DETAIL 20 SHEET L5.02.
19	REMOVE AND REPLACE (E) STAIRS.
20	RELOCATE (E) ELECTRICAL CONDUITS AND WIRES. SEE ELECTRICAL PLANS.
21	RELOCATE (E) ELECTRIC BOX 2.5' NORTH AND EXTEND/RELOCATE ELECTRIC LINES INTO BOX.
22	SAWCUT AND REMOVE (E) 3" VERTICAL CURB. THEN SAW CUT ADDITIONAL 4" DOWN INTO (E) RETAINING WALL TO MAKE OPENING TO POUR NEW CONCRETE LANDING FOR PROPOSED STAIRS.
23	(E) MONUMENT TO BE SALVAGED AND PROTECTED. OFFSITE BY OWNER DURING CONSTRUCTION. RELOCATE TO NEW LOCATION. SEE LANDSCAPE MATERIALS PLAN L1.01
24	REMOVE (E) IRRIGATION SYSTEM UTILITY.
25	REMOVE (E) HANDRAIL MOUNTED TO WALL.

KEYMAP



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VENTURA HIGH SCHOOL
TRACK AND FIELD REPLACEMENT AND BLEACHER UPGRADES

2 NORTH CATALINA STREET
VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

Revision	Date
A ADDENDUM A	08/14/2026
B ADDENDUM B	09/23/2026

Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/11/2025
50% CONSTRUCTION DOCS	07/25/2025
100% CONSTRUCTION DOCS	09/01/2025
DSA BACKCHECK	11/03/2025
DSA BACKCHECK	07/01/2026

Job Number	32321
Checked By	AW,MM
Scale	1" = 20'

DEMOLITION PLAN

C1.01

PROTECTION KEYNOTES

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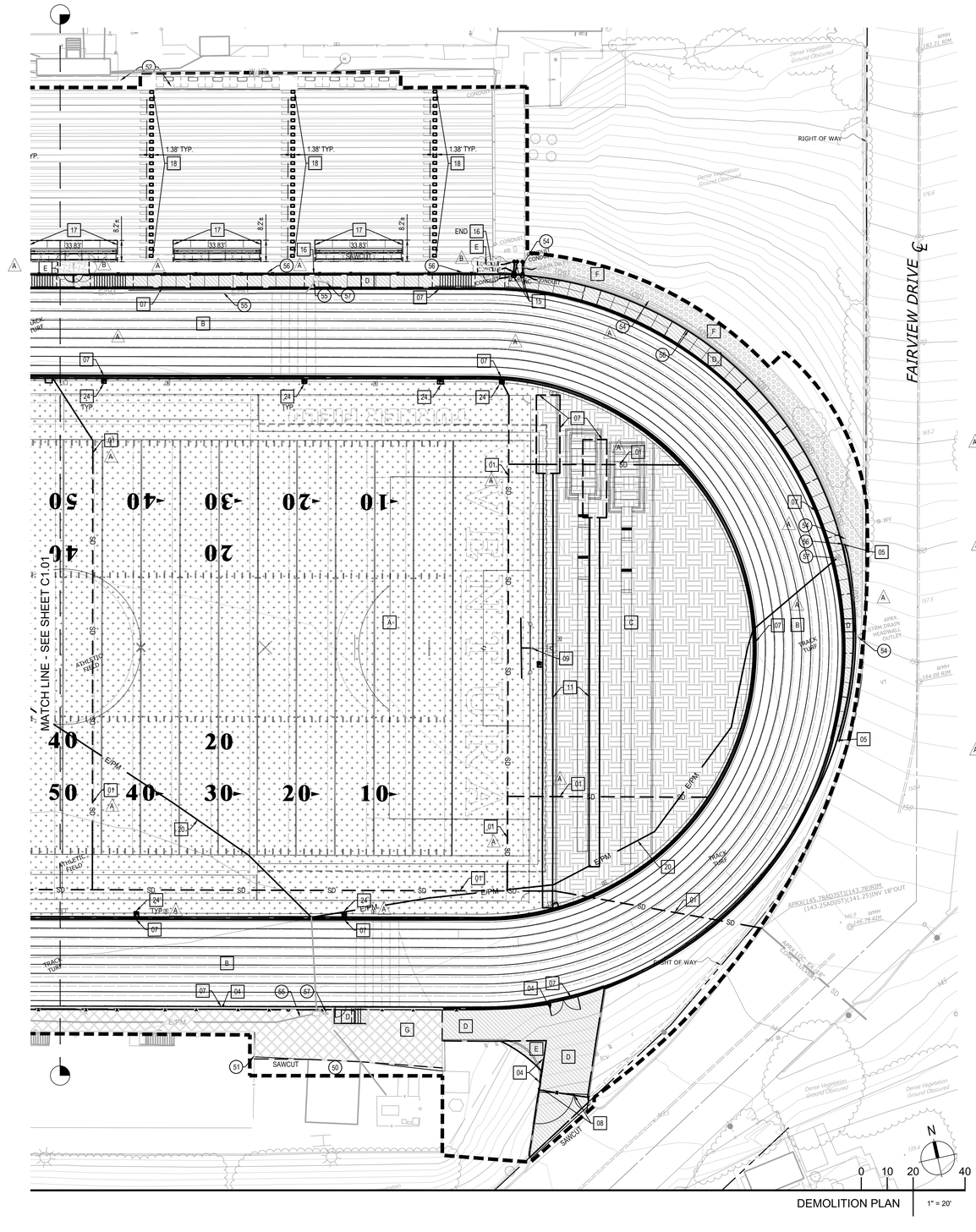

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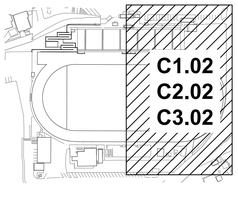

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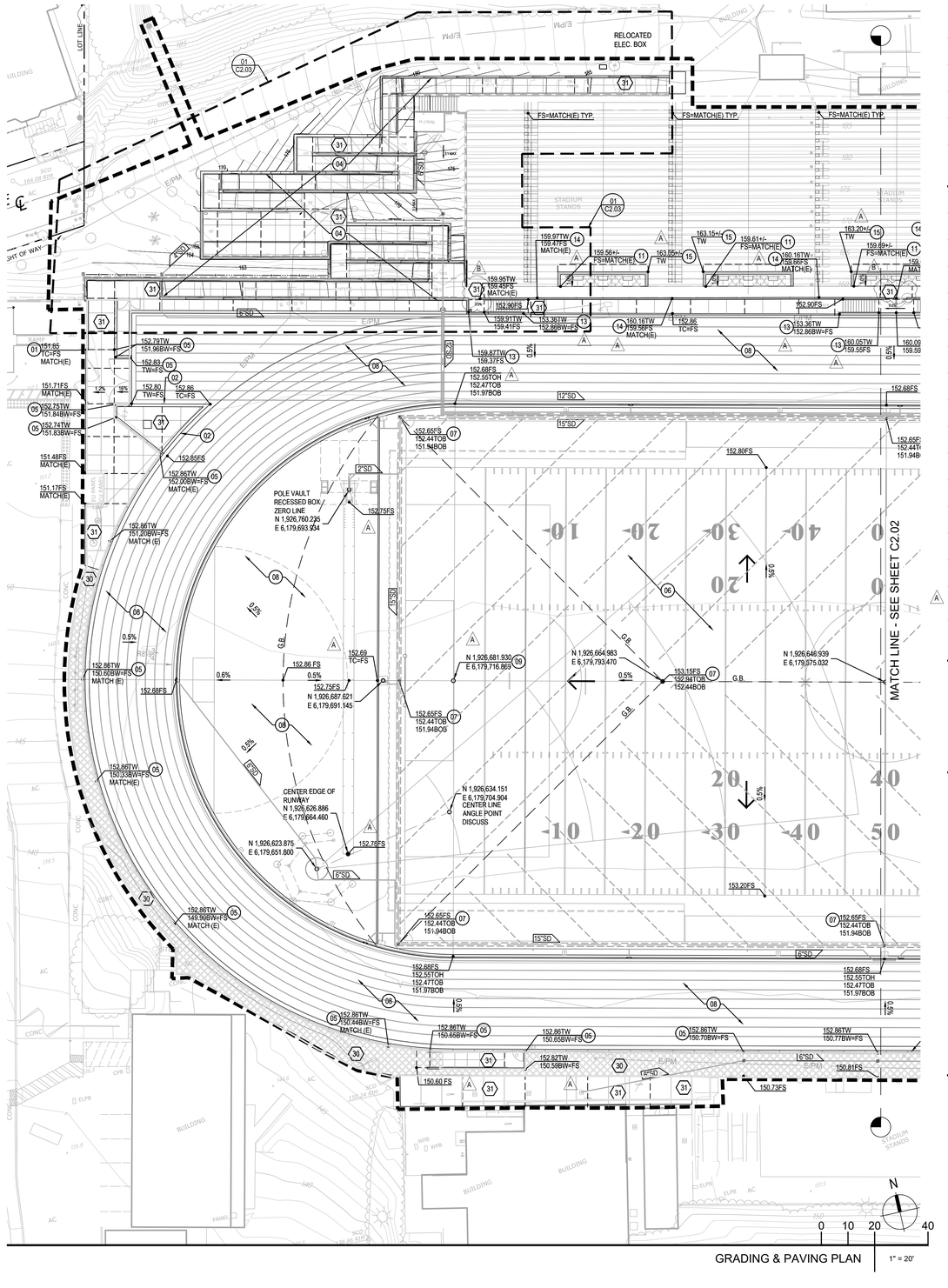
DEMOLITION PLAN

C1.02



LEGEND

SYMBOL	DESCRIPTION
30	GRIND 2" MIN AND OVERLAY EXISTING PAVEMENT. LIMITS SHOWN ARE APPROXIMATE. OVERLAY SLOPES SHOULD BE IN ACCORD WITH ACCESSBILITY REQUIREMENTS.
31	PEDESTRIAN CONCRETE PAVEMENT 5" PCC OVER 6" AB PER GEOTECHNICAL ENGINEER'S RECOMMENDATION PAGE 30&31. SEE ALSO DETAIL 12 SHEET C7.01
32	DRIVE AISLE AC PAVEMENT 3" AC OVER 4" AB PER GEOTECHNICAL ENGINEER'S RECOMMENDATION. (TRAFFIC INDEX = 4.0)
	APPROXIMATE LIMIT OF WORK
GB	GRADE BREAK
	SAWCUT (E) PAVEMENT AS NEEDED. SEE DEMOLITION PLAN
	FLOWLINE
	OVERLAND RELEASE

GRADING CONSTRUCTION NOTES

KEY NOTE	DESCRIPTION
01	CONSTRUCT VERTICAL CURB PER DETAIL 03 SHEET C7.01.
02	CONSTRUCT FLUSH CURB PER DETAIL 07 SHEET C7.01.
03	JOIN EXISTING RETAINING WALL AND MATCH EXISTING GRADE.
04	CONSTRUCT RETAINING WALL PER STRUCTURAL PLANS.
05	CONSTRUCT RETAINING WALL WITH FENCE POSTS PER LANDSCAPE MATERIALS PLAN SHEET L1.01 AND L1.02.
06	SYNTHETIC TURF SYSTEM AT FOOTBALL FIELD PER LANDSCAPE MATERIALS PLAN SHEET L1.01 AND L1.02
07	GRADE BOTTOM OF BASE (BOB) TO ENSURE DRAINAGE TOWARDS SUBDRAIN. SEE STORM DRAIN PLANS.
08	RUBBERIZED TRACK SURFACING PER LANDSCAPE MATERIALS PLAN SHEET L1.01 AND L1.02
09	CONCRETE RADIUS MONUMENT PER DETAIL 18 SHEET L5.05.
10	REMOVE AND REINSTALL FENCE IN PLACE TO INSTALL STORM DRAIN PIPE.
11	MATCH (E) GRADE. PROVIDE 1% MINIMUM GRADE FOR DRAINAGE OUT OF THE WHEELCHAIR SEATING AREA.
12	CONSTRUCT CONCRETE RETAINING WALL WITH FENCING PER LANDSCAPE DETAIL 03 SHEET L5.02
13	CONSTRUCT WALL PER LANDSCAPE SHEET L3.01.
14	CONSTRUCT GUARDRAIL ATTACHMENT TO EXISTING CONCRETE RETAINING WALL PER LANDSCAPE DETAIL 15 SHEET L5.02
15	CONSTRUCT CONCRETE RETAINING WALL WITH GUARD RAIL PER LANDSCAPE DETAIL 12 SHEET L5.02. VERIFY IN FIELD EXISTING THIRD BLEACHER STEP ELEVATION. TOP OF WALL 6" MIN ABOVE THIRD BLEACHER STEP.

PAVING NOTES:

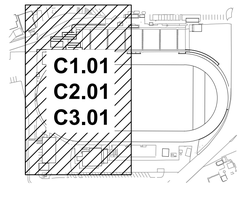
1. SEE LANDSCAPE PLANS FOR PAVERS, LOCATION AND TYPE OF CONCRETE WALKS AND HARDSCAPE INCLUDING DETAILS FOR CONCRETE FINISHES, CONTROL JOINTS AND EXPANSION JOINTS.
2. VERIFY ALL VEHICULAR AND NON-VEHICULAR LIMITS WITH LANDSCAPE PLANS.
3. RUNNING TRACK PAVING SHALL BE INSTALLED SO THAT THE TRACK RUBBERIZED SURFACING SHALL BE FLUSH AND SMOOTH PER SPECIFICATIONS. RUBBERIZED SURFACING CMAS BY OWNER.

HORIZONTAL CONTROL NOTES:

THIS HORIZONTAL CONTROL PLAN ESTABLISHES THE FOLLOWING TO BE USED AS BASE CONTROL FOR CONSTRUCTION STAKING.

1. PRIOR TO STAKING ANY FIELDGOAL OR FOULPOLE, SURVEYOR SHALL VERIFY THAT THE COORDINATES SHOWN ON THIS PLAN MATCHES THE SPORTFIELD DIMENSIONS AND PRODUCT SPECIFICATIONS..
2. IF ANY DISCREPANCIES ARE FOUND DURING CONSTRUCTION STAKING NOTIFY CIVIL ENGINEER IMMEDIATELY.
4. SEE LANDSCAPE PLANS FOR DETAILED HARDSCAPE DIMENSIONS.
5. SEE LANDSCAPE PLANS FOR LOCATION AND TYPE OF CONCRETE WALKS AND HARDSCAPE INCLUDING DETAILS FOR CONCRETE FINISHES, CONTROL JOINTS AND EXPANSION JOINTS.

KEYMAP



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VENTURA HIGH SCHOOL TRACK AND FIELD REPLACEMENT AND BLEACHER UPGRADES

2 NORTH CATALINA STREET
VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

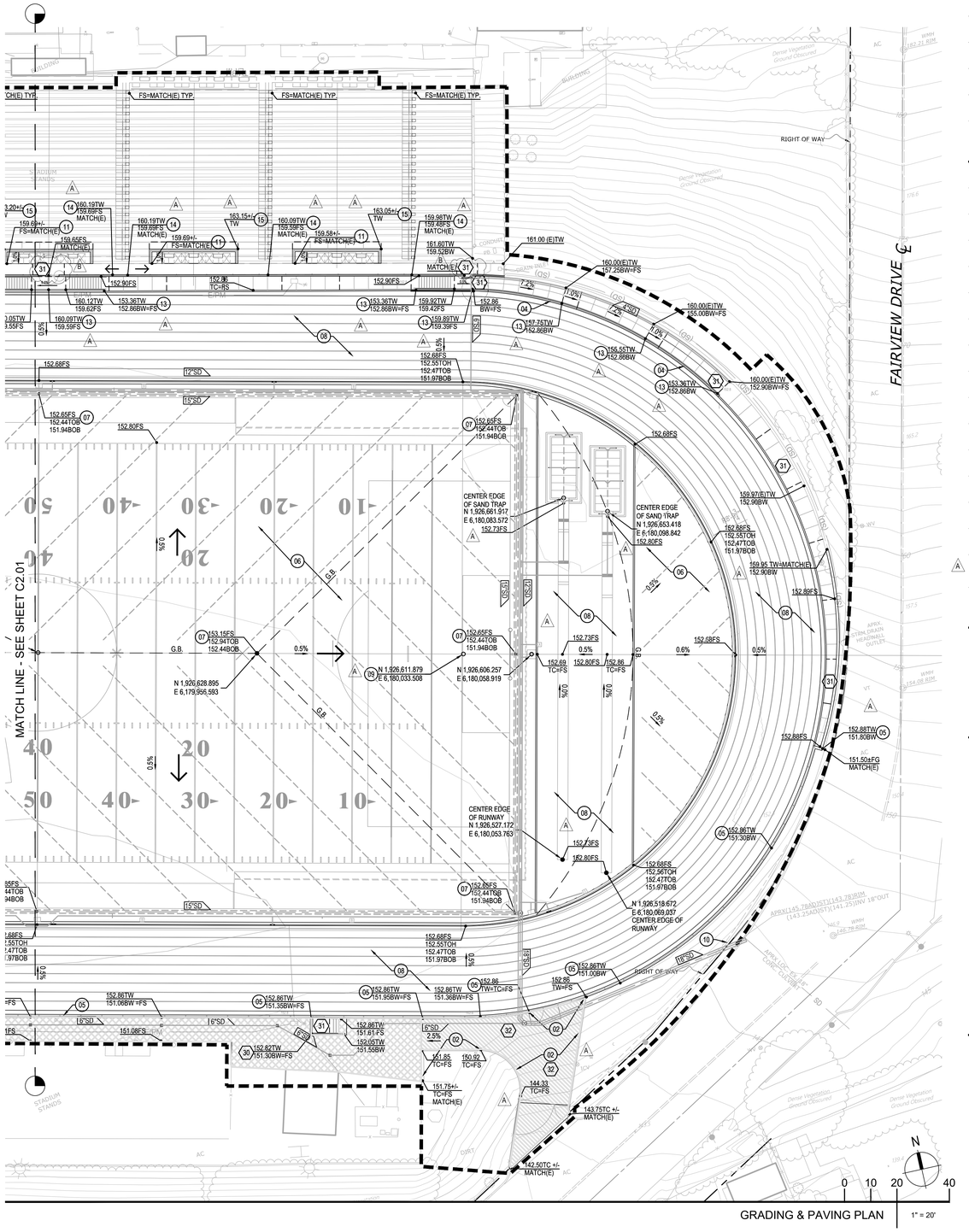
Revision	Date
A. ADDENDUM A	08/14/2026
B. ADDENDUM B	09/23/2026

Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/11/2025
50% CONSTRUCTION DOCS	06/27/2025
100% CONSTRUCTION DOCS	09/01/2025
DSA BACKCHECK	11/03/2025
DSA BACKCHECK	07/01/2026

Job Number	32321
Checked By	AW,MM
Scale	1" = 20'

GRADING, PAVING & HORIZONTAL CONTROL PLAN

C2.01



LEGEND

SYMBOL	DESCRIPTION
30	GRIND 2" MIN AND OVERLAY EXISTING PAVEMENT. LIMITS SHOWN ARE APPROXIMATE. OVERLAY SLOPES SHOULD BE IN ACCORD WITH ACCESSBILITY REQUIREMENTS.
31	PEDESTRIAN CONCRETE PAVEMENT 5" PCC OVER 6" AB PER GEOTECHNICAL ENGINEER'S RECOMMENDATION PAGE 30&31. SEE ALSO DETAIL 12 SHEET C7.01
32	DRIVE AISLE AC PAVEMENT 3" AC OVER 4" AB PER GEOTECHNICAL ENGINEER'S RECOMMENDATION. (TRAFFIC INDEX = 4.0)
	APPROXIMATE LIMIT OF WORK
GB	GRADE BREAK
	SAWCUT (E) PAVEMENT AS NEEDED. SEE DEMOLITION PLAN
	FLOWLINE
	OVERLAND RELEASE

GRADING CONSTRUCTION NOTES

KEY NOTE	DESCRIPTION
01	CONSTRUCT VERTICAL CURB PER DETAIL 03 SHEET C7.01.
02	CONSTRUCT FLUSH CURB PER DETAIL 07 SHEET C7.01.
03	JOIN EXISTING RETAINING WALL AND MATCH EXISTING GRADE.
04	CONSTRUCT RETAINING WALL PER STRUCTURAL PLANS.
05	CONSTRUCT RETAINING WALL WITH FENCE POSTS PER LANDSCAPE MATERIALS PLAN SHEET L1.01 AND L1.02.
06	SYNTHETIC TURF SYSTEM AT FOOTBALL FIELD PER LANDSCAPE MATERIALS PLAN SHEET L1.01 AND L1.02
07	GRADE BOTTOM OF BASE (BOB) TO ENSURE DRAINAGE TOWARDS SUBDRAIN. SEE STORM DRAIN PLANS.
08	RUBBERIZED TRACK SURFACING PER LANDSCAPE MATERIALS PLAN SHEET L1.01 AND L1.02
09	CONCRETE RADIUS MONUMENT PER DETAIL 18 SHEET L5.05.
10	REMOVE AND REINSTALL FENCE IN PLACE TO INSTALL STORM DRAIN PIPE.
11	MATCH (E) GRADE. PROVIDE 1% MINIMUM GRADE FOR DRAINAGE OUT OF THE WHEELCHAIR SEATING AREA.
12	CONSTRUCT CONCRETE RETAINING WALL WITH FENCING PER LANDSCAPE DETAIL 03 SHEET L5.02
13	CONSTRUCT WALL PER LANDSCAPE SHEET L3.01.
14	CONSTRUCT GUARDRAIL ATTACHMENT TO EXISTING CONCRETE RETAINING WALL PER LANDSCAPE DETAIL 15 SHEET L5.02
A 15	CONSTRUCT CONCRETE RETAINING WALL WITH GUARD RAIL PER LANDSCAPE DETAIL 12 SHEET L5.02. VERIFY IN FIELD EXISTING THIRD BLEACHER STEP ELEVATION. TOP OF WALL 6" MIN ABOVE THIRD BLEACHER STEP.

PAVING NOTES:

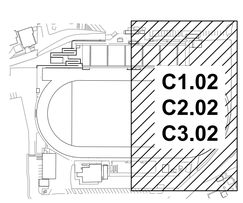
1. SEE LANDSCAPE PLANS FOR PAVERS, LOCATION AND TYPE OF CONCRETE WALKS AND HARDSCAPE INCLUDING DETAILS FOR CONCRETE FINISHES, CONTROL JOINTS AND EXPANSION JOINTS.
2. VERIFY ALL VEHICULAR AND NON-VEHICULAR LIMITS WITH LANDSCAPE PLANS.
3. RUNNING TRACK PAVING SHALL BE INSTALLED SO THAT THE TRACK RUBBERIZED SURFACING SHALL BE FLUSH AND SMOOTH PER SPECIFICATIONS. RUBBERIZED SURFACING CMAS BY OWNER.

HORIZONTAL CONTROL NOTES:

THIS HORIZONTAL CONTROL PLAN ESTABLISHES THE FOLLOWING TO BE USED AS BASE CONTROL FOR CONSTRUCTION STAKING.

1. PRIOR TO STAKING ANY FIELDGOAL OR FOULPOLE, SURVEYOR SHALL VERIFY THAT THE COORDINATES SHOWN ON THIS PLAN MATCHES THE SPORTFIELD DIMENSIONS AND PRODUCT SPECIFICATIONS..
2. IF ANY DISCREPANCIES ARE FOUND DURING CONSTRUCTION STAKING NOTIFY CIVIL ENGINEER IMMEDIATELY.
4. SEE LANDSCAPE PLANS FOR DETAILED HARDSCAPE DIMENSIONS.
5. SEE LANDSCAPE PLANS FOR LOCATION AND TYPE OF CONCRETE WALKS AND HARDSCAPE INCLUDING DETAILS FOR CONCRETE FINISHES, CONTROL JOINTS AND EXPANSION JOINTS.

KEYMAP



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GRADING, PAVING & HORIZONTAL CONTROL PLAN

C2.02

ABBREVIATIONS

&	AND	GA.	GAUGE
∠	ANGLE	GALV.	GALVANIZED
@	AT	GND.	GROUND
℄	CENTERLINE	GR.	GRADE
Ø	DIAMETER OR ROUND		
#	POUND OR NUMBER	HDR	HEADER
		HT.	HEIGHT
ADJ.	ADJACENT		
AGGR.	AGGREGATE	LT.	LIGHT
AL.	ALUMINUM		
APPROX.	APPROXIMATE	MAX.	MAXIMUM
ARCH.	ARCHITECTURAL	MET.	METAL
AC.	ASPHALT	MFR.	MANUFACTURER
ACC.	ACCESSIBLE	MIN.	MINIMUM
		MTD.	MOUNTED
B.C.R.	BEGINNING OF CURVE RADIUS	MTL.	MATERIAL
B.O.C.	BACK OF CURB		
B.O.W.	BOTTOM OF WALL	N.I.C.	NOT IN CONTRACT
B.O.S.	BOTTOM OF SLOPE	N.T.S.	NOT TO SCALE
BLDG.	BUILDING		
BLK.	BLOCK	O.C.	ON CENTER
		O.D.	OUTSIDE DIAMETER
C.E.	CIVIL ENGINEER	(DIM.)	
C.I.P.	CAST IN PLACE		
CLKG.	CAULKING	PA	PLANTING AREA
CMU.	CONCRETE MASONRY UNIT	PED.	PEDESTRIAN
CONC.	CONCRETE	PRCST.	PRECAST
CONSTR.	CONSTRUCTION	P.I.P.	POURED IN PLACE
CONT.	CONTINUOUS	P.O.T.	POINT OF TANGENCY
CTR.	CENTER	P.T.S.	POST TENSION SLAB
D.A.	DISABLED ACCESS	QTY	QUANTITY
DET.	DETAIL		
DIA.	DIAMETER	R.	RISER
DIM.	DIMENSION	RAD.	RADIUS
DN.	DOWN	REINF.	REINFORCED
DWGS.	DRAWINGS	REQ.	REQUIRED
E.J.	EXPANSION JOINT	SCHED.	SCHEDULE
EL.	ELEVATION	SHT.	SHEET
ELEC.	ELECTRICAL	SPEC.	SPECIFICATION
EQ.	EQUAL	S.S.	STAINLESS STEEL
EXP.	EXPANSION	STD.	STANDARD
EXT.	EXTERIOR	STRL.	STRUCTURAL
F.G.	FINISH GRADE	T.	TREAD
F.S.	FINISH SURFACE	T.C.	TOP OF CURB
F.O.B.	FACE OF BUILDING	T.O.S.	TOP OF SLOPE
F.O.C.	FACE OF CURB	T.O.W.	TOP OF WALL
F.O.W.	FACE OF WALL	TYP.	TYPICAL
		TBD.	TO BE DETERMINED
		VEH.	VEHICULAR
		VERT.	VERTICAL
		W/	WITH
		W/O	WITHOUT

PLANTING NOTES

1. REFER TO CIVIL ENGINEER'S DRAWINGS FOR UTILITY LOCATIONS, TREE SUBDRAINAGE STUBOUTS, (IF REQUIRED), AND FINAL GRADING. IF ACTUAL SITE CONDITIONS VARY FROM WHAT IS SHOWN ON THE LANDSCAPE ARCHITECT'S DRAWINGS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AUTHORIZED REPRESENTATIVE AND LANDSCAPE ARCHITECT FOR DIRECTION AS TO HOW TO PROCEED.
2. VERIFY LOCATIONS OF ALL PERTINENT EXISTING AND PROPOSED SITE IMPROVEMENTS. IF ANY PART OF THIS PLAN CANNOT BE FOLLOWED DUE TO SITE CONDITIONS, CONTACT THE LANDSCAPE ARCHITECT FOR INSTRUCTION PRIOR TO COMMENCING WORK.
3. EXACT LOCATIONS OF PLANT MATERIALS SHALL BE REVIEWED BY THE LANDSCAPE ARCHITECT IN THE FIELD PRIOR TO INSTALLATION. LANDSCAPE ARCHITECT RESERVES THE RIGHT TO ADJUST PLANTS TO EXACT LOCATION IN FIELD.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ALL PLANT COUNTS AND SQUARE FOOTAGES. QUANTITIES SHOWN ON PLANS TAKE PRECEDENCE OVER WRITTEN QUANTITIES IN "PLANTING LEGEND."
5. PROVIDE MATCHING FORMS AND SIZES FOR ALL PLANT MATERIALS WITHIN EACH SPECIES AND SIZE DESIGNATED ON THE DRAWINGS.
6. PRUNE NEWLY PLANTED TREES ONLY AS DIRECTED BY LANDSCAPE ARCHITECT.
7. ALIGNED AND EQUALLY SPACED, IN ALL DIRECTIONS, ALL SHRUBS TO BE AS DESIGNATED PER THESE NOTES AND DRAWINGS.
8. ALL TREES IN ROWS TO BE ALIGNED. (UNLESS NOTED OTHERWISE ON PLANS)
9. TREES SHALL BEAR SAME RELATION TO FINISH GRADE AS AT PLACE OF GROWTH.
10. FINISH GRADES OF ALL TURF AREAS SHALL BE (1") BELOW ADJACENT CURB OR PAVEMENT. FINISH GRADES OF ALL SHRUB AREAS SHALL BE (2-1/2") BELOW ADJACENT CURB, PAVEMENT OR HEADER.
11. CONTRACTOR SHALL SUBMIT FOR APPROVAL COLOR PHOTOS OF ALL TREES, SHRUBS, AND GROUNDCOVER. PHOTOS SHOULD INCLUDE A PERSON FOR SCALE PURPOSES, PHOTOS SHALL BE OF THE ACTUAL PLANT MATERIAL TO BE USED ON THE PROJECT. ALL PLANT MATERIAL SHALL BE OF A QUALITY AS DETERMINED BY THE LANDSCAPE ARCHITECT. MATERIAL FOUND UNSUITABLE FOR THE DESIGN OR SPECIFICATION INTENT WILL BE REJECTED.
12. PROVIDE A (3") LAYER OF MULCH AT PROPOSED TREE, SHRUB, AND GROUNDCOVER PLANTING AREAS, EXCEPT AREAS WITH JUTE MESHING.
13. CONTRACTOR SHALL CONDUCT AGRICULTURAL SUITABILITY AND FERTILITY SOILS TESTING PER SOIL PREPARATION SPECIFICATION. ANALYSIS SHALL INCLUDE RECOMMENDATIONS FOR SOIL PREPARATION AND BACKFILL MIX AS WELL AS RECOMMENDATIONS FOR POST MAINTENANCE FERTILIZATION. SUBMIT SOILS ANALYSES AND SAMPLES OF AMENDMENTS TO LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO SOIL PREPARATION.
14. QUANTITIES LISTED ON PLANT LEGEND ARE PER SHEET. CONTRACTOR MUST VERIFY QUANTITIES GIVEN ON THE PLANS WITH ACTUAL QUANTITIES SHOWN.
15. PROVIDE ROOT BARRIERS IN ADDITION TO THOSE INDICATED ON THE PLANS FOR ALL TREES WITHIN 5' OF ANY HARDSCAPE.
16. NOT INSTALL WATERING BASINS AROUND TREES WHEN PLANTED IN TURF. PROVIDE A CIRCULAR TURF-FREE ZONE TO OUTSIDE EDGE OF ROOTBALL. PLACE ONLY 2-INCHES OF WOOD MULCH IN THIS AREA AND NO CLOSER THAN 4-INCHES FROM TRUNK.
17. PLANT ALL TREES A MIN. OF 5' FROM ANY UTILITIES. THE LANDSCAPE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO COMMENCING WORK.
18. TREES ARE TO BE A MINIMUM OF 5' AWAY FROM ANY HARDSCAPE SUCH AS CURBS, WALKS, ETC.
19. LANDSCAPE MAINTENANCE PERIOD IS 90 DAYS.
20. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

TURF AND TRACK PROCUREMENT

1. THE DISTRICT HAS PROCURED THE SYNTHETIC TURF SURFACING THROUGH A CMAS PROCESS. THE INSTALLATION OF THE TURF SURFACING WILL BE BY THE DISTRICT THROUGH THE CMAS PROCESS. ONLY THE TURF SURFACING (SYNTHETIC CARPET, INFILL MATERIAL AND SHOCKPAD) IS BY THE DISTRICT. PROCUREMENT AND INSTALLATION OF ALL OTHER COMPONENTS OF THE FIELD AND ADJACENT AREAS INCLUDING BUT NOT LIMITED TO THE GRADING, FILTER FABRIC, BASE MATERIAL, DRAINAGE, IMPERMEABLE LINER, CURBING, COMPOSITE NAILER BOARD, GRAVEL, MONUMENTS, FOOTINGS, SLEEVES, ETC. ARE ALL BY THE GENERAL CONTRACTOR AS PART OF THESE CONTRACT DOCUMENTS. THE GENERAL CONTRACTOR SHALL ACCOMODATE, COORDINATE AND ALLOW FOR ACCESS AND INSTALLATION OF THE TURF SURFACING BY THE DISTRICT CMAS SURFACING INSTALLER AS NEEDED. SEE SPECIFICATIONS (PROJECT "FRONT ENDS" AND INSTRUCTIONS TO BIDDERS FOR ADDITIONAL INFORMATION.)
2. THE DISTRICT HAS PROCURED THE SYNTHETIC TRACK SURFACING THROUGH A CMAS PROCESS. THE INSTALLATION OF THE TRACK SURFACING WILL BE BY THE DISTRICT THROUGH THE CMAS PROCESS. ONLY THE TRACK SURFACING (URETHANE AND RUBBER) IS THE BY THE DISTRICT. PROCUREMENT AND INSTALLATION OF ALL OTHER COMPONENTS OF THE TRACK AND ADJACENT AREAS INCLUDING BUT NOT LIMITED TO THE ASPHALT PAVING, GRADING, BASE MATERIAL, DRAINAGE, EMBEDDED ITEMS (SUCH AS THE SAND CATCHERS, HIGH JUMPED EMBED, TAKE OFF BOARDS, ETC), TRENCH DRAIN, ASPHALTIC CONCRETE UNDERLAYMENT (AC), CURBING, WALLS, GRAVEL, FOOTINGS, SLEEVES, ETC. ARE ALL BY THE GENERAL CONTRACTOR AS PART OF THESE CONTRACT DOCUMENTS. THE GENERAL CONTRACTOR SHALL ACCOMODATE, COORDINATE AND ALLOW FOR ACCESS AND INSTALLATION OF THE TRACK SURFACING BY THE DISTRICT CMAS SURFACING INSTALLER AS NEEDED. SEE SPECIFICATIONS (PROJECT "FRONT ENDS" AND INSTRUCTIONS TO BIDDERS FOR ADDITIONAL INFORMATION.)

LAYOUT AND MATERIALS NOTES

1. THE CONTRACTOR SHALL LAYOUT AND FIELD VERIFY ALL DIMENSIONS OF DRIVEWAY, PLANTERS, WALKS, SLOPES AND RELATED WORK PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S AUTHORIZED REPRESENTATIVE.
2. VERIFY LOCATIONS OF ALL PERTINENT EXISTING AND PROPOSED SITE IMPROVEMENTS. IF ANY PART OF THIS PLAN CANNOT BE FOLLOWED DUE TO SITE CONDITIONS, CONTACT THE LANDSCAPE ARCHITECT FOR INSTRUCTION PRIOR TO COMMENCING WORK.
3. WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALE.
4. THIS DRAWING INCLUDES THE LOCATION OF AREA DRAINS FOR REFERENCE. REFER TO RELATED CIVIL ENGINEER'S DRAWINGS FOR CONSTRUCTION DETAILS AND UTILITY CONNECTIONS.
5. REFER TO ELECTRICAL ENGINEER'S DRAWINGS FOR LIGHT FIXTURE SCHEDULE AND CIRCUITRY AS NECESSARY.
6. REFER TO SOIL ENGINEER'S GEOTECHNICAL REPORT FOR SUB-BASE MATERIALS AND COMPACTION.
7. WHERE DIMENSIONS ARE CALLED AS "EQUAL", ALL REFERENCED ITEMS SHALL BE SPACED EQUALLY, MEASURED TO THEIR CENTERLINES.
8. ALL MEASUREMENTS ARE TO FACE OF WALL, CURB OR OTHER FIXED SITE IMPROVEMENT, UNLESS OTHERWISE NOTED. DIMENSIONS TO CENTERLINES AS INDICATED.
9. INSTALL ALL INTERSECTING ELEMENTS AT 90 DEGREES TO EACH OTHER UNLESS OTHERWISE NOTED.
10. ALL DRAINS/ BASINS SHOULD HAVE BLACK ATRIUM TYPE GRATES WITHIN SHRUBS/GROUNDCOVER AREAS AND BLACK FLAT TYPE GRATES IN TURF AREAS.

LANDSCAPE GRADING AND DRAINAGE NOTES

1. REFER TO CIVIL ENGINEER'S GRADING PLANS FOR SITE GRADING, DRAINAGE, AND UTILITY LOCATIONS. IF ACTUAL SITE CONDITIONS VARY FROM WHAT IS SHOWN ON THE LANDSCAPE ARCHITECT'S DRAWINGS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AUTHORIZED REPRESENTATIVE AND LANDSCAPE ARCHITECT FOR DIRECTION AS TO HOW TO PROCEED.
2. REFER TO CIVIL ENGINEER'S DRAWINGS FOR SUBDRAINAGE POINT OF IN CONNECTION TO STORM DRAIN.
3. THE CONTRACTOR SHALL REQUEST OBSERVATION AS REQUIRED 48 HOURS ADVANCE OF PERFORMING WORK.
4. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (USA 800/227-2600) OR DIG ALERT (800-422-4133) 48 HOURS PRIOR TO ANY EXCAVATION.
5. ALL GRADING OPERATIONS SHALL CONFORM TO LOCAL GUIDELINES.
6. FIELD VERIFY EXISTING UNDERGROUND UTILITIES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL LOCATION AND ELEVATION IN THE FIELD PRIOR TO BEGINNING CONSTRUCTION. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES ENCOUNTERED DURING CONSTRUCTION.
7. NO CHANGE IN CONTRACT PRICE WILL BE ALLOWED FOR ACTUAL OR CLAIMED DISCREPANCY BETWEEN EXISTING GRADE AND THOSE SHOWN ON PLANS AFTER CONTRACTOR HAS ACCEPTED EXISTING GRADES AND MOVED ONTO THE SITE.
8. ALL PROPOSED GRADES ARE TO MEET AND BLEND IN WITH EXISTING GRADING AT PROJECT LIMIT AND EXISTING SIDEWALK. PRECISE ELEVATIONS INDICATED ON PLANS TO BE VERIFIED IN FIELD TO AS-BUILT CONDITION.
9. THE DEBRIS CREATED BY LANDSCAPE GRADING OPERATIONS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE LEGALLY DISPOSED OF OFF-SITE.
10. FINAL LANDSCAPE GRADING SHALL BE REVIEWED BY THE LANDSCAPE ARCHITECT IN THE FIELD PRIOR TO INSTALLATION OF PLANTING.

GENERAL NOTES

1. BASE INFORMATION INCLUDING THE LOCATION OF PROPERTY LINES, EASEMENTS, BUILDINGS, ROADS AND CURBS HAVE BEEN TAKEN FROM THE CIVIL ENGINEER'S DRAWINGS. REFER TO CIVIL ENGINEER'S DRAWINGS FOR ADDITIONAL INFORMATION.
2. REFER TO THE CIVIL ENGINEER'S DRAWINGS FOR PROPOSED UTILITY INFORMATION INCLUDING STORM DRAIN, SEWER, WATER, ELECTRICAL, GAS, TELEPHONE AND CABLE TV.
3. REFER TO CITY AND/OR COUNTY STANDARD PLANS AND SPECIFICATIONS WHERE APPLICABLE.
4. VERIFY SITE INFORMATION, INCLUDING PROPERTY LINES, EXISTING ABOVE GROUND AND BELOW GROUND UTILITIES AND STRUCTURES, AND OTHER INFORMATION AFFECTING THE SCOPE OF WORK INCLUDED ON THESE DRAWINGS. IF ACTUAL SITE CONDITIONS VARY FROM WHAT IS SHOWN ON THE LANDSCAPE ARCHITECT'S DRAWINGS, THE CONTRACTOR SHALL CONTACT THE OWNER'S AUTHORIZED REPRESENTATIVE AND THE LANDSCAPE ARCHITECT FOR DIRECTION ON HOW TO PROCEED.
5. EXCAVATION IN THE VICINITY OF UTILITIES AND EXISTING MATERIALS SHALL BE UNDERTAKEN WITH CARE. THE CONTRACTOR BEARS FULL RESPONSIBILITY FOR THIS WORK. ANY DAMAGE CAUSED BY ANY PERSON, VEHICLE, EQUIPMENT, OR TOOL RELATED TO THE EXECUTION OF THE CONTRACT SHALL BE REPAIRED IMMEDIATELY AT NO EXPENSE TO THE OWNER.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY COORDINATION REQUIRED TO ACCOMPLISH ALL CONSTRUCTION OPERATIONS. ALL PIPING, CONDUIT, SLEEVES, ETC., SHALL BE SET IN PLACE PRIOR TO INSTALLATION OF CONSTRUCTION ITEMS.
7. CONTRACTOR SHALL BE RESPONSIBLE TO CONSULT WITH SITE SUPERINTENDENT, APPROPRIATE AGENCIES AND PLANS, FOR THE LOCATIONS OF ALL UNDER-GROUND UTILITIES, PIPES AND STRUCTURES. CONTRACTOR SHALL TAKE SOLE RESPONSIBILITY FOR ANY COST INCURRED DUE TO DAMAGE OF SAID UTILITIES.
8. CONTRACTOR SHALL NOT WILLFULLY PROCEED WITH CONSTRUCTION AS DESIGNED WHEN IT IS OBVIOUS THAT UNKNOWN OBSTRUCTIONS, AREA DISCREPANCIES AND/OR GRADE DIFFERENCES EXIST THAT MAY NOT HAVE BEEN KNOWN DURING DESIGN. SUCH CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER'S AUTHORIZED REPRESENTATIVE. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL NECESSARY REVISIONS DUE TO FAILURE TO GIVE SUCH NOTIFICATIONS.
9. CONTRACTOR IS RESPONSIBLE FOR REPLACEMENT OF ANY EXISTING MATERIALS THAT ARE DAMAGED DURING CONSTRUCTION.
10. PRIOR TO INSTALLATION OF ANY CONSTRUCTION ITEM, FORMS WITH STEEL IN PLACE AND COMPACTED SUBGRADE COMPLETE, SHALL BE OBSERVED AND REVIEWED BY THE LANDSCAPE ARCHITECT.
11. ALL WALLS AND WALKS SHOULD HAVE SMOOTH, CONTINUOUS CURVES AS INDICATED ON PLANS.
12. ALL PROPERTY LINES, LOT LINES, AND TOP OF SLOPE LINES SHALL BE VERIFIED PRIOR TO COMMENCING WORK.
13. ALL ELECTRICAL JUNCTION BOXES FOR LIGHTS SHALL BE IN PLANTING AREAS AND LOCATION REVIEWED BY THE LANDSCAPE ARCHITECT. STAKE LOCATION PRIOR TO INSTALLATION.
14. SEE CIVIL ENGINEER'S DRAWINGS FOR CURBS AND A/C PAVING.
15. REFER TO CIVIL ENGINEER'S DRAWINGS FOR ELEVATIONS AND LOCATION OF DRAINAGE STRUCTURES PRIOR TO INSTALLATION OF WALKS, FOOTINGS AND OTHER STRUCTURES.
16. REFER TO GEOTECHNICAL REPORT FOR ADDITIONAL INFORMATION. IF NOTES ON THE PLANS DIFFER FROM THE GEOTECHNICAL REPORT, PROVIDE THE MOST STRINGENT REQUIREMENT.
17. RAISE ALL VAULTS/UTILITIES BOXES TO GRADE WITHIN LIMITS OF WORK. FIELD VERIFY PRIOR TO BID.

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L2.02 LAYOUT PLAN

L3.01 MATERIALS AND LAYOUT ENLARGEMENT PLAN

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LANDSCAPE SCOPE OF WORK

1. RECONSTRUCTION OF SYNTHETIC TRACK AND FIELD
2. NEW TRACK AND FIELD PERIMETER CHAIN LINK FENCING
3. HARDSCAPE
4. RESURFACING OF EXISTING CONCRETE BLEACHERS
5. WIDENING OF ACCESS AISLE AND ADDITION OF ADA SEATING IN EXISTING CONCRETE BLEACHERS
6. NEW ACCESSIBLE CONCRETE RAMPS, STAIRS, AND ASSOCIATED RETAINING WALLS

SPORTS EQUIPMENT LEGEND

SYM.	DESC.	MANUF.	MODEL #	COLOR	FINISH/PTRN.	DET.	QTY.
	RUBBERIZED TRACK SURFACING	BEYNON	BSS 300	GRAY WITH GOLD EXCHANGE ZONES	CMAS BY OWNER	04/ L5.05	PER PLAN
	SYNTHETIC TURF SURFACING	FIELDTURF	VERTEX CORE 2.25 INCH PILE HT. / CORK INFILL W/ SHOCK BASE PRO	GREEN	CMAS BY OWNER	01/ L5.05	PER PLAN
	POLE VAULT BOX	SPORTSFIELD SPECIALTIES	PVBCAW	WHITE	ALUMINUM	13/ L5.06	1
	POLE VAULT BOX COVER	SPORTSFIELD SPECIALTIES	PVBCPCA	GRAY TRACK	ALUMINUM	13/ L5.06	1
	POLE VAULT STANDARDS CIP	SPORTSFIELD SPECIALTIES	PVSFS	NATURAL GRAY	MEDIUM BROOM	10/ L5.06	1
	POLE VAULT LANDING SYSTEM: PROVIDE STANDARD PADS, COLAR PAD, DRAINAGE MAT, & PAD COVER	SPORTSFIELD SPECIALTIES	PV2021HDZ PVBPANG PVPBSC	GOLD	GRAPHICS TBD BY DISTRICT	PER MANUF.	1
	LONG JUMP/ TRIPLE JUMP TAKE OFF BOARD	SPORTSFIELD SPECIALTIES	LTJTOB12	GRAY SYNTHETIC TRACK	POLYBOARD	07/ L5.06	2
	LONG JUMP / TRIPLE JUMP SAND CATCHERS	SPORTSFIELD SPECIALTIES	SPSCHS JUMPFORM	GRAY SYNTHETIC TRACK	ALUMINUM	05/ L5.06	2
	LONG JUMP/ TRIPLE JUMP PIT COVERS	SPORTSFIELD SPECIALTIES	SPHSCVR	GRAY SYNTHETIC TRACK	ALUMINUM	05/ L5.06	2
	FOOTBALL GOAL POST W/ WIND FLAGS & SAFETY CLAMP SYSTEM	SPORTSFIELD SPECIALTIES	POST: GP830HSR PAD: GPPRDG ACCESS KIT: GPAFITR30HD GRAPHIC: TBD	POST: YELLOW PAD: GRAY	ALUMINUM	17/ L5.07 DSA PC A# 04-122813	2
	SOCCER GOAL	SPORTSFIELD SPECIALTIES	SG824R SG2SCC SGWKL (B)	WHITE	ALUMINUM	PER MANUF.	2
	DISCUS THROW PAD	SPORTSFIELD SPECIALTIES	RING: TFD FORM: TRDAA	NATURAL GRAY	MED BROOM FINISH	03/ L5.08	1
	DISCUS THROW CAGE	SPORTSFIELD SPECIALTIES	DCHSTEA	GRAY TRACK	STAINLESS STEEL	01/ L5.08	1
A	QCV BOX @ TRACK SURFACING	SPORTSFIELD SPECIALTIES	TCTSQCV	GRAY TRACK	STAINLESS STEEL	19/ L5.05	3
B	QCV BOX @ SYNTHETIC TURF SURFACING	SPORTSFIELD SPECIALTIES	TCITQCV	SYNTHETIC TURF LID	STAINLESS STEEL	07/ L5.05	8
C	COM BOX @ SYNTHETIC TURF SURFACING	SPORTSFIELD SPECIALTIES	CBTS1830	SYNTHETIC TURF LID	STAINLESS STEEL	06,08/ L5.05	6
D	UTILITY BOX @ TRACK SURFACING	SPORTSFIELD SPECIALTIES	CBIT1815	GRAY TRACK	STAINLESS STEEL	20/ L5.05	2
	HIGH JUMP	SPORTSFIELD SPECIALTIES	HJS0208 HJX HJSBP HJ1810DZ HJ1810AWC HJDG	GOLD AND GRAY	VINYL	PER MANUF.	1 EA.
	TRACK WALK OFF MATS	SPORTSFIELD SPECIALTIES	TCM1540	BLACK	VINYL	PER MANUF.	2
	TRANSPORT CART	SPORTSFIELD SPECIALTIES	MC612	ALUMINUM	STAINLESS STEEL	PER MANUF.	2
	COMPANION SEAT	SALSBURY INDUSTRIES	48" WIDE ALUMINUM ADA LOCKER BENCH WITH BACK SUPPORT MODEL # 77772-ADAB	STANDARD	ALUMINUM	PER MANUF.	26
	RADIUSED TRACK SLOT DRAIN	ACO	ACO 3000 RADIUSED	GRAY TRACK	POLYMER CONCRETE	15,16/ L5.05	AS SHOWN

MATERIALS KEYNOTES

NOTE	DESCRIPTION	DET/ SHT	COLOR / FINISH
01	CONCRETE PAVING	01/ L5.01	NATURAL GRAY/ MEDIUM BROOM
02	CONCRETE MOW BAND	09/ L5.01	NATURAL GRAY/ SMOOTH TROWEL
03	CONCRETE BAND @ TRACK SURFACING	14/ L5.05	NATURAL GRAY/ SMOOTH TROWEL
04	CONCRETE BAND @ FENCING	10/ L5.02	NATURAL GRAY/ SMOOTH TROWEL
05	CONCRETE RETAINING WALL W/ FENCING	03/ L5.02	NATURAL GRAY/ AS-CAST SIDES, SMOOTH TOP
06	CONCRETE RETAINING WALL	01+02/ L5.02	NATURAL GRAY/ AS-CAST SIDES, SMOOTH TOP
07	CONCRETE RAMP	09/ L5.03	NATURAL GRAY/ MEDIUM BROOM
08	CONCRETE STAIR	01/ L5.03	NATURAL GRAY/ MEDIUM BROOM
09	GUARDRAIL	14/ L5.04	GALVANIZED
10	GATE IN GUARDRAIL (B)	19/ L5.01	GALVANIZED
11	HANDRAIL @ RAMP	09/ L5.03	GALVANIZED
12	HANDRAIL @ STAIR	03/ L5.03	GALVANIZED
13	HANDRAIL @ (E)BLEACHER STAIRS	18/ L5.03	GALVANIZED
14	CHAINLNK FENCE	01/ L5.04	BLACK/ VINYL COATED
15	CHAINLINK SINGLE SWING GATE	03/ L5.04	BLACK/ VINYL COATED
16	CHAINLINK VEHICULAR GATE	02/ L5.04	BLACK/ VINYL COATED
17	CHAINLINK DOUBLE SWING GATE	12/ L5.04	BLACK/ VINYL COATED
18	RETAINING WALL W/ GUARDRAIL @ EXISTING BLEACHERS	12/ L5.02	NATURAL GRAY/ AS-CAST SIDES, SMOOTH TOP
19	PERFORATED PANEL WITH LETTER	15/ L5.07	FRAME: BLACK LETTER: YELLOW
20	FREESTANDING CONCRETE SEATWALL	19/ L5.02	NATURAL GRAY/ AS-CAST SIDES, SMOOTH TOP
21	CONCRETE STEMWALL	21/ L5.02	NATURAL GRAY/ SMOOTH TROWEL
22	EXISTING BLEACHER STAIR EXTENSION	20/ L5.02	NATURAL GRAY/ MEDIUM BROOM
23	RELOCATE EXISTING MONUMENT (B)	08/ L5.01	
24	RELOCATE EXISTING PLAQUE	14/ L5.02	
25	SOLID METAL EXTERIOR RATED DOOR	11/ L5.06	DOOR REPLACEMENT @ EXISTING UTILITY ENCLOSURE
26	SITE LIGHTING		SEE SITE SYMBOL LEGEND FOR LIGHTING DETAIL
27 (A)	GATE IN GUARDRAIL W/ PANIC HARDWARE - 180 SWING (B)	17/ L5.01	GALVANIZED
28	CHAINLINK DOUBLE SWING VEHICULAR GATE	04/ L5.06	BLACK/ VINYL COATED
29 (B)	(2) SINGLE SWING GATES AT GUARDRAIL	09/ L5.04	GALVANIZED

ATHLETIC KEYNOTES

NOTE	DESCRIPTION	DET/ SHT	COLOR / FINISH
A01	RUBBERIZED TRACK SURFACING	04/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A02	SYNTHETIC TURF SURFACING	01/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A03	POLE VAULT LAYOUT	09/ L5.06	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A04	LONG JUMP / TRIPLE JUMP LAYOUT	01/ L5.06	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A05	FOOTBALL GOAL POST DSA PC A# 04-122813	17/ L5.07	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A06	SOCCER FIELD STRIPING + GOAL	04/ L5.07	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A07	CONCRETE CURB @ D-ZONE	03/ L5.05	
A08	DISCUS LAYOUT (SEE SFS SHEETS)	01/ L5.08	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A09	UTIL BOX @ TRACK SURFACING	20/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A10	QCV BOX @ TRACK SURFACING	19/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A11	QCV BOX @ SYNTHETIC TURF SURFACING	07/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A12	COM BOX @ SYNTHETIC TURF SURFACING	06,08/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A13	TRACK SLOT DRAIN	15/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A14 (A)	TRACK SLOT DRAIN CATCH BASIN	16/ L5.05	
A15	TRACK AND FIELD STRIPING AND LOGOS	01/ L5.07	

REFERENCE KEYNOTES

NOTE	DESCRIPTION	DET/ SHT	COMMENTS
A	EXISTING PAVING		PROTECT IN PLACE
B	EXISTING CURB		PROTECT IN PLACE
C	EXISTING WALL		PROTECT IN PLACE
D	EXISTING FENCE + GATE		PROTECT IN PLACE
E	EXISTING UTILITY		PROTECT IN PLACE
F	EXISTING CONCRETE BLEACHER	(A)	PROTECT IN PLACE
G	EXISTING UTILITY ENCLOSURE		PROTECT IN PLACE
H	EXISTING LIGHTING		PROTECT IN PLACE
J	A.C. PAVING		PER CIVIL
K	CONCRETE CURB		PER CIVIL
L	ACCESSIBLE SEATING AREA		PER CBC 11B-802

SITE SYMBOLS LEGEND

SYM.	DESCRIPTION	SYM.	DESCRIPTION	DET.
	FIRE HYDRANT - PER CIVIL		SAWCUT JOINT	02/ L5.01
	CATCH BASIN - PER CIVIL		EXPANSION JOINT	02/ L5.01
CO	CLEAN OUT - PER CIVIL		LIMIT OF WORK	
MH	MAN HOLE - PER CIVIL		LIGHT POLE	01, 02/ E7.02 11, 15/ L5.02
	DIRECTION OF RAMP; DOWN SLOPE		ALIGN	
+	EXISTING TREE PROTECT IN PLACE	(E)PA	EXISTING PLANTING AREA	
PA	PLANTING AREA		INGRADE UPLIGHT	

NOTE: UTILITIES SHOWN ARE FOR REFERENCE ONLY. SEE CIVIL AND ELEC DWGS FOR DETAILS AND EXACT LOCATIONS. FINAL LOCATIONS TO BE REVIEWED BY LANDSCAPE ARCHITECT.

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ARCHITECTURE ENGINEERING INTERIOR DESIGN LANDSCAPE ARCHITECTURE PLANNING

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LICENSED LANDSCAPE ARCHITECT
MICHAEL MICHALEK
6429
SIGNATURE
7/31/2028
RENEWAL DATE
9/23/2026
DATE
STATE OF CALIFORNIA

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VENTURA HIGH SCHOOL
TRACK AND FIELD REPLACEMENT
AND BLEACHER UPGRADES

2 NORTH CATALINA STREET
VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

Revision	Date
(A) ADDENDUM A	08/14/2026
(B) ADDENDUM B	09/23/2026

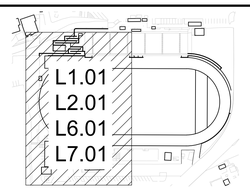
Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/11/2025
50% CONSTRUCTION DOCS	07/24/2025
100% CONSTRUCTION DOCS	09/01/2025
DSA BACKCHECK	11/03/2025
DSA BACKCHECK	03/10/2026
DSA BACKCHECK	07/01/2026

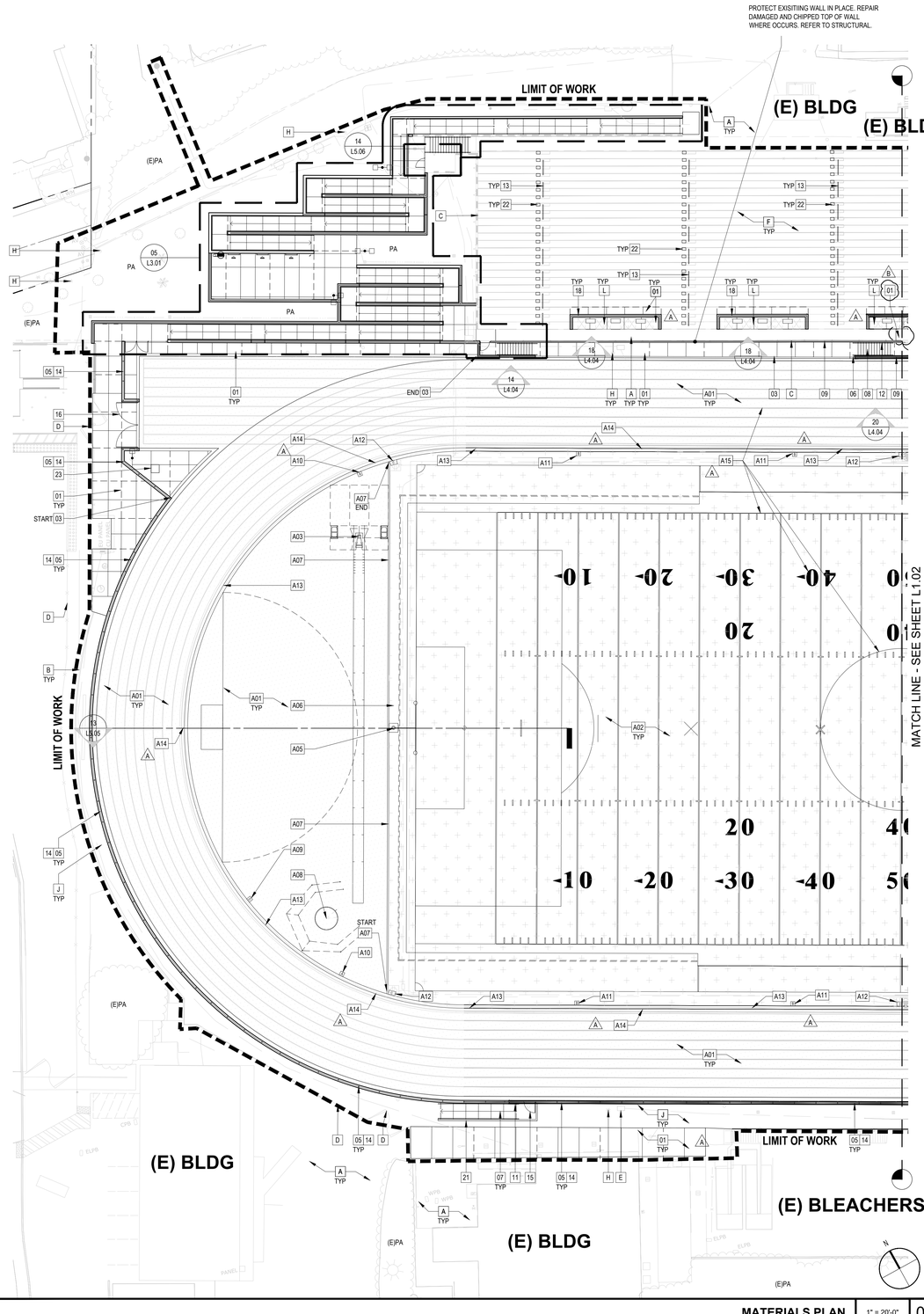
Job Number	32321
Checked By	AW,MM
Scale	AS NOTED

LANDSCAPE NOTES
AND SCHEDULES

L0.01

KEYMAP





MATERIALS KEYNOTES

NOTE	DESCRIPTION	DET/ SHT	COLOR / FINISH
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23	RELOCATE EXISTING MONUMENT	B 06/ L5.01	
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ATHLETIC KEYNOTES

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MATERIALS PLAN | 1" = 20'-0" | 05

LPA

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LICENSED LANDSCAPE ARCHITECT MICHAEL MICHALEK 5617 STATE OF CALIFORNIA
09/23/2026

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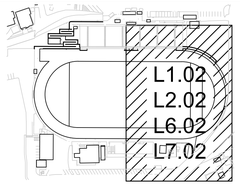
DSA BACKCHECK	03/10/2026
DSA BACKCHECK	07/01/2026

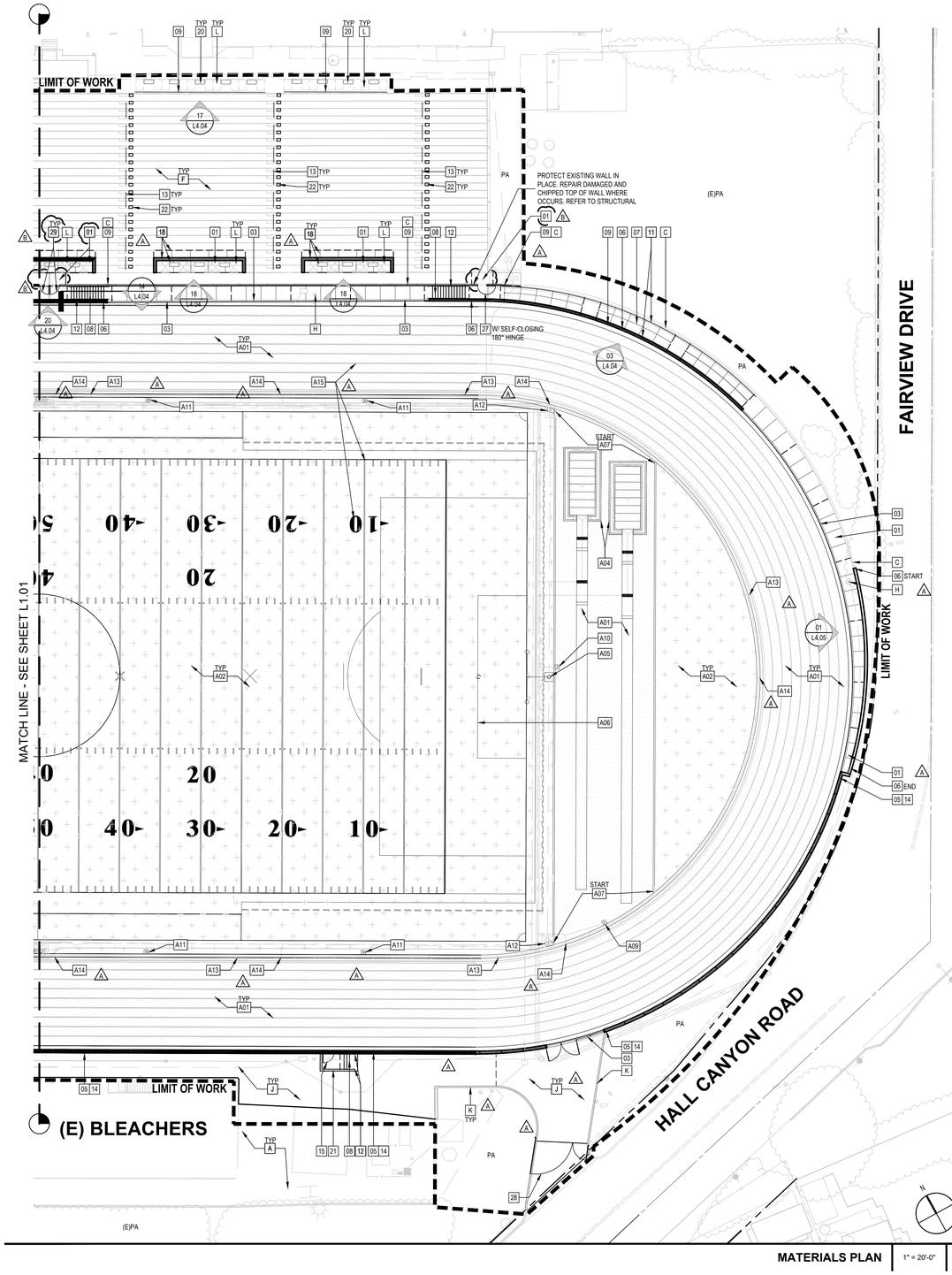
Job Number	32321
Checked By	AW,MM
Scale	1" = 20'-0"

MATERIALS PLAN

L1.01

KEYMAP





MATERIALS PLAN | 1" = 20'-0" | 05

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23	RELOCATE EXISTING MONUMENT	A/B 06 L5.01	
24	RELOCATE EXISTING PLAQUE	14/ L5.02	
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ATHLETIC KEYNOTES

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A03	POLE VAULT LAYOUT	09/ L5.06	REFER TO SPORTS EQUIPMENT LEGEND L0.01
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A05	FOOTBALL GOAL POST DSA PC A# 04-122813	17/ L5.07	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A06	SOCCER FIELD STRIPING + GOAL	04/ L5.07	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A07	CONCRETE CURB @ D-ZONE	03/ L5.05	
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D	EXISTING FENCE + GATE		PROTECT IN PLACE
E	EXISTING UTILITY		PROTECT IN PLACE
F	EXISTING CONCRETE BLEACHER		A PROTECT IN PLACE
G	EXISTING UTILITY ENCLOSURE		PROTECT IN PLACE
H	EXISTING LIGHTING		PROTECT IN PLACE
J	A.C. PAVING		PER CIVIL
K	CONCRETE CURB		PER CIVIL
L	ACCESSIBLE SEATING AREA		PER CBC 11B-802

SITE SYMBOLS LEGEND

SYM.	DESCRIPTION	SYM.	DESCRIPTION	DET.
	FIRE HYDRANT - PER CIVIL		SAWCUT JOINT	02/ L5.01
	CATCH BASIN - PER CIVIL		EXPANSION JOINT	02/ L5.01
CO	CLEAN OUT - PER CIVIL		LIMIT OF WORK	
MH	MAN HOLE - PER CIVIL		LIGHT POLE	01, 02/ 11, 15/ E7.02 L5.02
	DIRECTION OF RAMP; DOWN SLOPE		ALIGN	
	EXISTING TREE PROTECT IN PLACE	(E)PA	EXISTING PLANTING AREA	
PA	PLANTING AREA		INGRADE UPLIGHT	

NOTE: UTILITIES SHOWN ARE FOR REFERENCE ONLY. SEE CIVIL AND ELEC DWGS FOR DETAILS AND EXACT LOCATIONS. FINAL LOCATIONS TO BE REVIEWED BY LANDSCAPE ARCHITECT.

LPA

ARCHITECTURE ENGINEERING INTERIOR DESIGN
LANDSCAPE ARCHITECTURE PLANNING

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LICENSED LANDSCAPE ARCHITECT — MICHAEL NICHALEK — 6574 — STATE OF CALIFORNIA
07/31/2026 — 8/13/2026

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VENTURA HIGH SCHOOL
TRACK AND FIELD REPLACEMENT AND BLEACHER UPGRADES

2 NORTH CATALINA STREET
VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

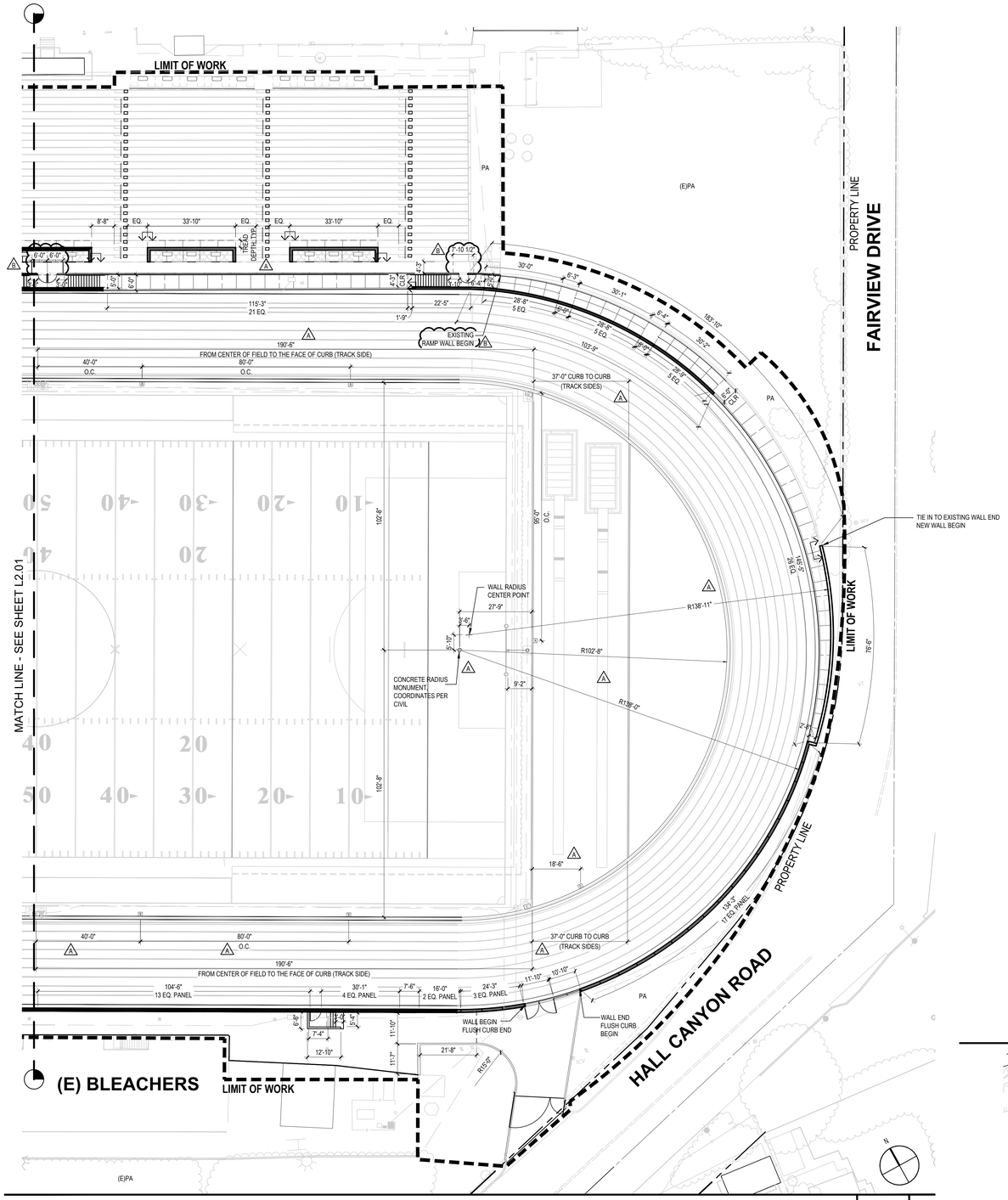
Revision	Date
A ADDENDUM A	08/14/2026
B ADDENDUM B	09//2026

Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/11/2025
50% CONSTRUCTION DOCS	07/24/2025
100% CONSTRUCTION DOCS	09/01/2025
DSA BACKCHECK	11/03/2025
DSA BACKCHECK	03/10/2026
DSA BACKCHECK	07/01/2026

Job Number	32321
Checked By	AW,MM
Scale	1" = 20'-0"

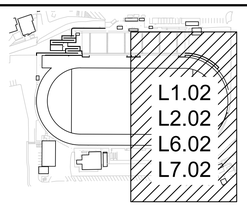
MATERIALS PLAN

L1.02



LAYOUT PLAN | 1" = 20'-0" | 05

KEYMAP



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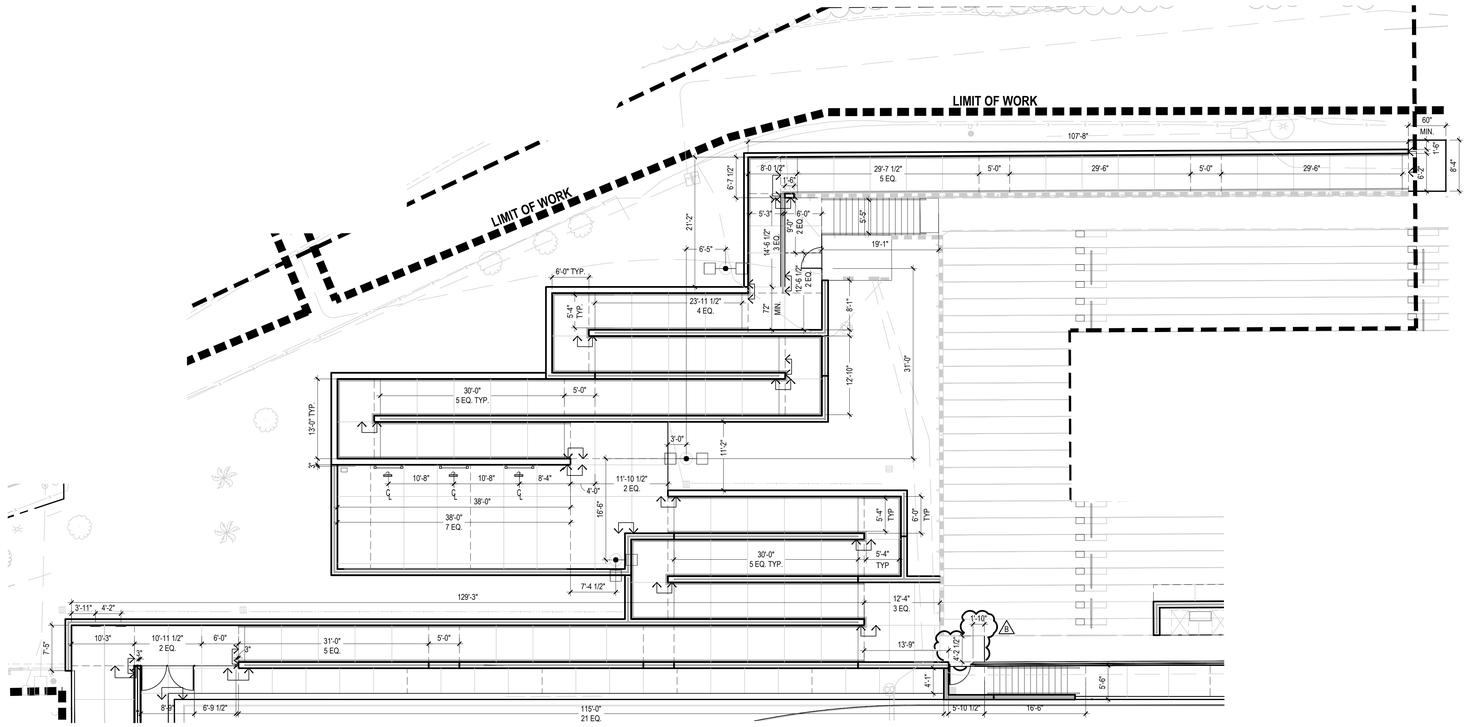
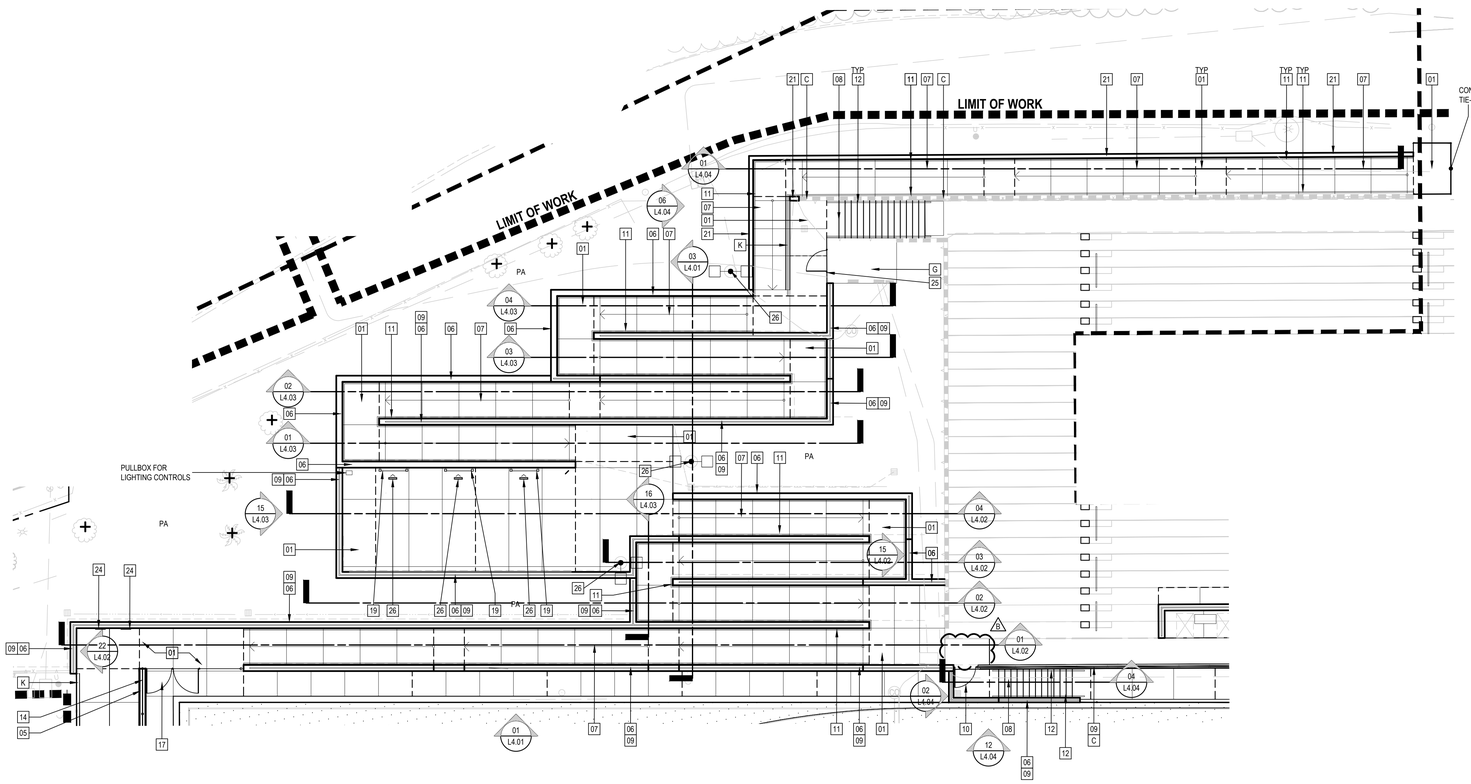
Job Number	32321
Checked By	AW,MM
Scale	1" = 20'-0"

LAYOUT PLAN

L2.02



LAYOUT ENLARGEMENT AT CONCRETE RAMPS | 1" = 10'-0" | 07



MATERIALS ENLARGEMENT AT CONCRETE RAMPS | 1" = 10'-0" | 05

MATERIALS KEYNOTES

NOTE	DESCRIPTION	DET/ SHT	COLOR / FINISH
01	CONCRETE PAVING	01/ L5.01	NATURAL GRAY/ MEDIUM BROOM
02	CONCRETE MOW BAND	09/ L5.01	NATURAL GRAY/ SMOOTH TROWEL
03	CONCRETE BAND @ TRACK SURFACING	14/ L5.05	NATURAL GRAY/ SMOOTH TROWEL
04	CONCRETE BAND @ FENCING	10/ L5.02	NATURAL GRAY/ SMOOTH TROWEL
05	CONCRETE RETAINING WALL W/ FENCING	03/ L5.02	NATURAL GRAY/ AS-CAST SIDES, SMOOTH TOP
06	CONCRETE RETAINING WALL	01+02/ L5.02	NATURAL GRAY/ AS-CAST SIDES, SMOOTH TOP
07	CONCRETE RAMP	09/ L5.03	NATURAL GRAY/ MEDIUM BROOM
08	CONCRETE STAIR	01/ L5.03	NATURAL GRAY/ MEDIUM BROOM
09	GUARDRAIL	14/ L5.04	GALVANIZED
10	GATE IN GUARDRAIL	A 19 L5.01	GALVANIZED
11	HANDRAIL @ RAMP	09/ L5.03	GALVANIZED
12	HANDRAIL @ STAIR	03/ L5.03	GALVANIZED
13	HANDRAIL @ (E)BLEACHER STAIRS	18/ L5.03	GALVANIZED
14	CHAINLINK FENCE	01/ L5.04	BLACK/ VINYL COATED
15	CHAINLINK SINGLE SWING GATE	03/ L5.04	BLACK/ VINYL COATED
16	CHAINLINK VEHICULAR GATE	02/ L5.04	BLACK/ VINYL COATED
17	CHAINLINK DOUBLE SWING GATE	12/ L5.04	BLACK/ VINYL COATED
18	RETAINING WALL W/ GUARDRAIL @ EXISTING BLEACHERS	12/ L5.02	NATURAL GRAY/ AS-CAST SIDES, SMOOTH TOP
19	PERFORATED PANEL WITH LETTER	15/ L5.07	FRAME: BLACK LETTER: YELLOW
20	FREESTANDING CONCRETE SEATWALL	19/ L5.02	NATURAL GRAY/ AS-CAST SIDES, SMOOTH TOP
21	CONCRETE STEMWALL	21/ L5.02	NATURAL GRAY/ SMOOTH TROWEL
22	EXISTING BLEACHER STAIR EXTENSION	20/ L5.02	NATURAL GRAY/ MEDIUM BROOM
23	RELOCATE EXISTING MONUMENT	A 08 L5.01	
24	RELOCATE EXISTING PLAQUE	14/ L5.02	
25	SOLID METAL EXTERIOR RATED DOOR	11/ L5.06	DOOR REPLACEMENT @ EXISTING UTILITY ENCLOSURE
26	SITE LIGHTING		SEE SITE SYMBOL LEGEND FOR LIGHTING DETAIL
27	GATE IN GUARDRAIL W/ PANIC HARDWARE - 180 SWING	A 17 L5.01	GALVANIZED
28	CHAINLINK DOUBLE SWING VEHICULAR GATE	04/ L5.06	BLACK/ VINYL COATED
29	(2) SINGLE SWING GATES AT GUARDRAIL	09/ L5.04	GALVANIZED

ATHLETIC KEYNOTES

NOTE	DESCRIPTION	DET/ SHT	COLOR / FINISH
A01	RUBBERIZED TRACK SURFACING	04/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A02	SYNTHETIC TURF SURFACING	01/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A03	POLE VAULT LAYOUT	09/ L5.06	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A04	LONG JUMP / TRIPLE JUMP LAYOUT	01/ L5.06	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A05	FOOTBALL GOAL POST DSA PC. A# 04-122813	17/ L5.07	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A06	SOCCER FIELD STRIPING + GOAL	04/ L5.07	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A07	CONCRETE CURB @ D-ZONE	03/ L5.05	
A08	DISCUS LAYOUT (SEE SFS SHEETS)	01/ L5.08	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A09	UTIL BOX @ TRACK SURFACING	20/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A10	QCV BOX @ TRACK SURFACING	19/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A11	QCV BOX @ SYNTHETIC TURF SURFACING	07/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A12	COM BOX @ SYNTHETIC TURF SURFACING	06,08/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A13	TRACK SLOT DRAIN	15/ L5.05	REFER TO SPORTS EQUIPMENT LEGEND L0.01
A14	TRACK SLOT DRAIN CATCH BASIN	16/ L5.05	
A15	TRACK AND FIELD STRIPING AND LOGOS	01/ L5.07	

REFERENCE KEYNOTES

NOTE	DESCRIPTION	DET/ SHT	COMMENTS
A	EXISTING PAVING		PROTECT IN PLACE
B	EXISTING CURB		PROTECT IN PLACE
C	EXISTING WALL		PROTECT IN PLACE
D	EXISTING FENCE + GATE		PROTECT IN PLACE
E	EXISTING UTILITY		PROTECT IN PLACE
F	EXISTING CONCRETE BLEACHER	A	PROTECT IN PLACE
G	EXISTING UTILITY ENCLOSURE		PROTECT IN PLACE
H	EXISTING LIGHTING		PROTECT IN PLACE
J	A.C. PAVING		PER CIVIL
K	CONCRETE CURB		PER CIVIL
L	ACCESSIBLE SEATING AREA		PER CBC 11B-802

SITE SYMBOLS LEGEND

SYM.	DESCRIPTION	SYM.	DESCRIPTION	DET.
	FIRE HYDRANT - PER CIVIL		SAWCUT JOINT	02/ L5.01
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CO	CLEAN OUT - PER CIVIL		LIMIT OF WORK	
MH	MAN HOLE - PER CIVIL		LIGHT POLE	01, 02/ 11, 15/ E7.02 L5.02
	DIRECTION OF RAMP; DOWN SLOPE		ALIGN	
+	EXISTING TREE PROTECT IN PLACE	(E)PA	EXISTING PLANTING AREA	
PA	PLANTING AREA		INGRADE UPLIGHT	

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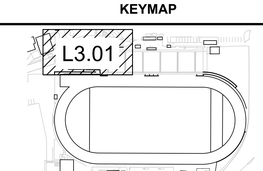
KEYMAP



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08/14/2026
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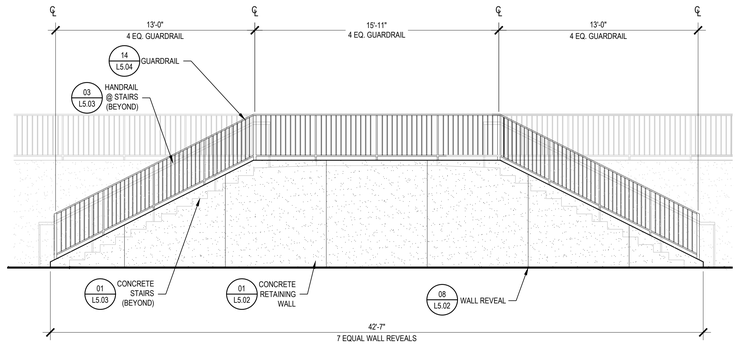
DSA BACKCHECK	07/01/2026
DSA BACKCHECK	

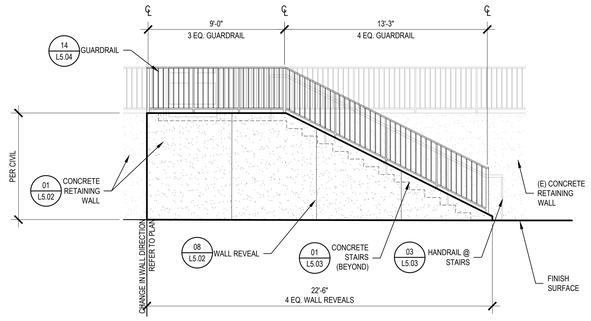
Job Number	32321
Checked By	AW,MM
Scale	1" = 10'-0"

MATERIALS ENLARGEMENT PLAN

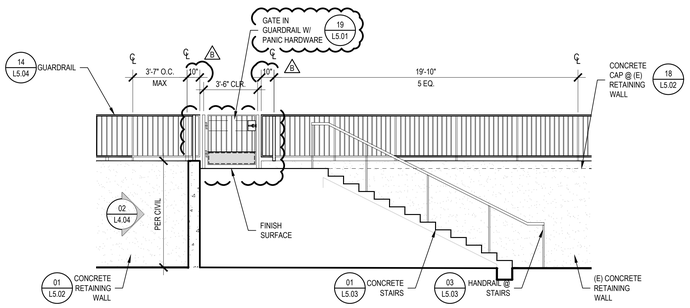
L3.01



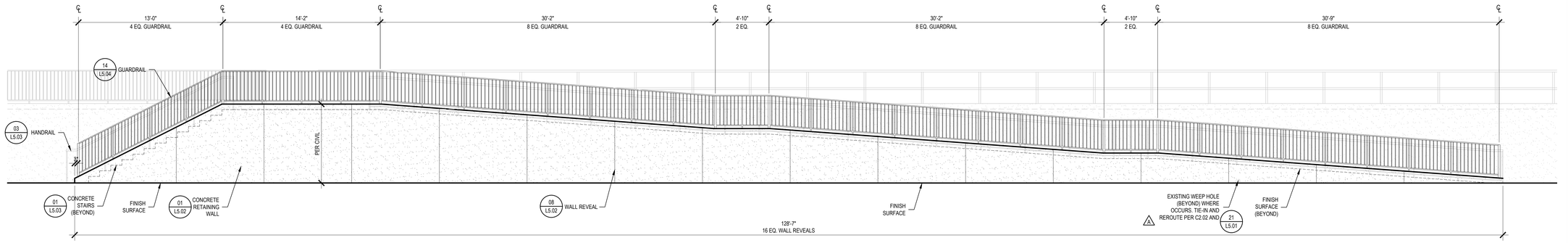
STADIUM STAIRCASE ELEVATION | 1/4" = 1'-0" | L1.1.01 | 20



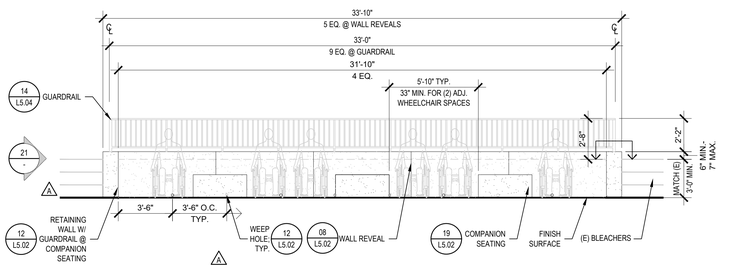
STADIUM STAIRCASE ELEVATION | 1/4" = 1'-0" | L3.01 | 12



STADIUM STAIRCASE SECTION | 1/4" = 1'-0" | L3.01 | 04

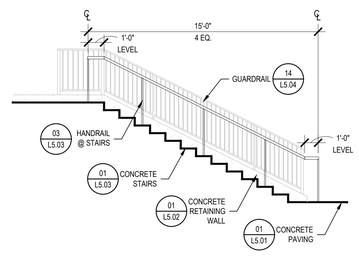


DEVELOPED ELEVATION OF CURVED CONCRETE RAMP @ EAST TRACK FIELD | 1/4" = 1'-0" | L1.02 | 03

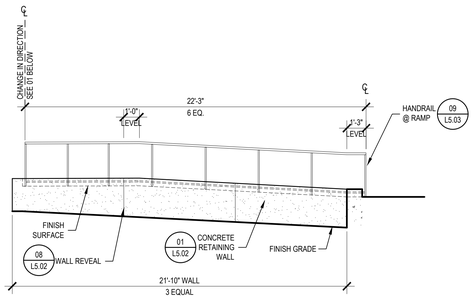


NOTES:
A. WEEP HOLE SIZE AND FREQUENCY PER GEOTECH FIELD VERIFICATION. QUANTITY ARE FOR BID PURPOSES ONLY.

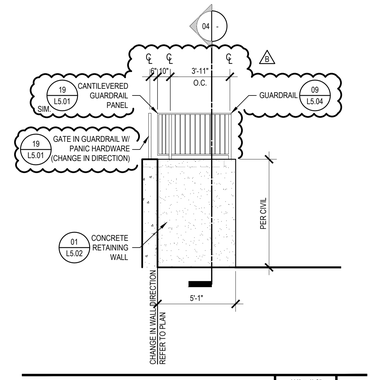
CONCRETE LANDING ELEVATION | 1/4" = 1'-0" | L1.01 + L1.02 | 18



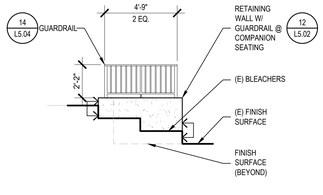
CONCRETE LANDING AT STADIUM STAIRCASE ELEVATION | 1/4" = 1'-0" | L1.02 | 14



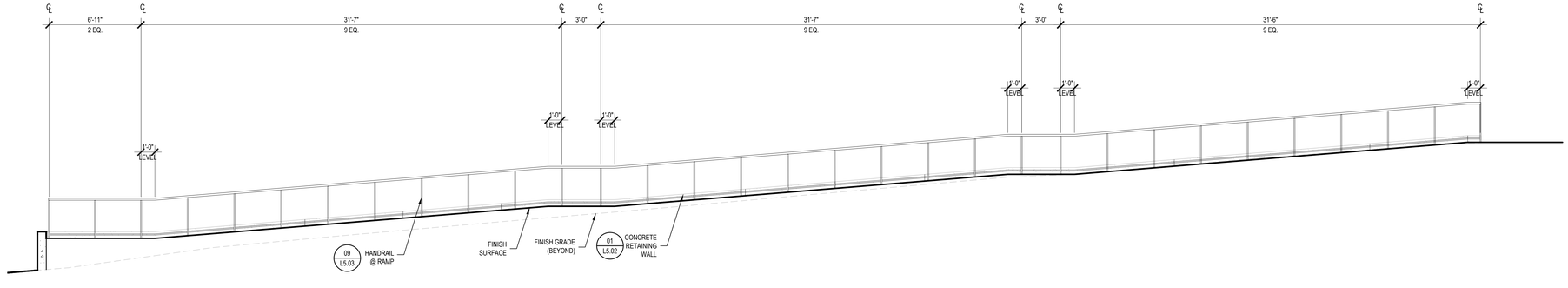
ELEVATION OF CONCRETE LANDING AT TOP OF SLOPE | 1/4" = 1'-0" | L3.01 | 06



STADIUM STAIRCASE WALL ELEVATION | 1/4" = 1'-0" | L3.01 | 02



CONCRETE LANDING ELEVATION | 1/4" = 1'-0" | - | 21 ⚠



SECTION THROUGH CONCRETE RAMP AT TOP OF BLEACHERS | 1/4" = 1'-0" | L3.01 | 01

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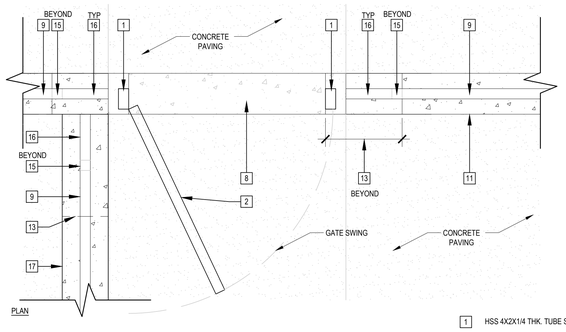
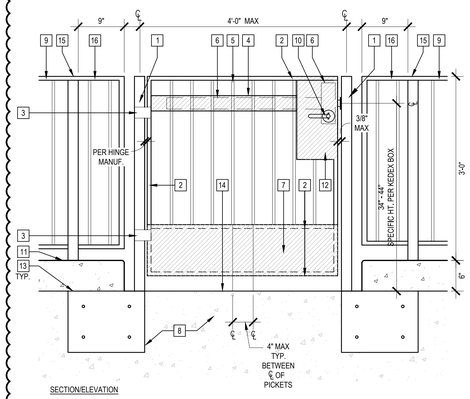
Scale	

SECTIONS AND ELEVATIONS

L4.04

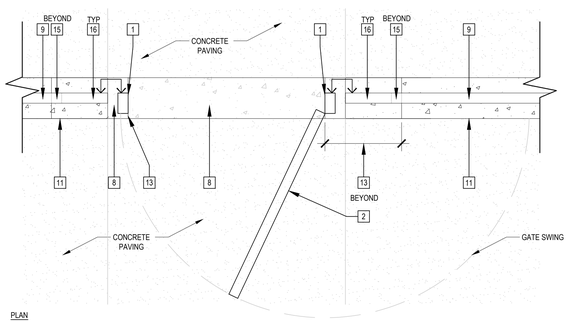


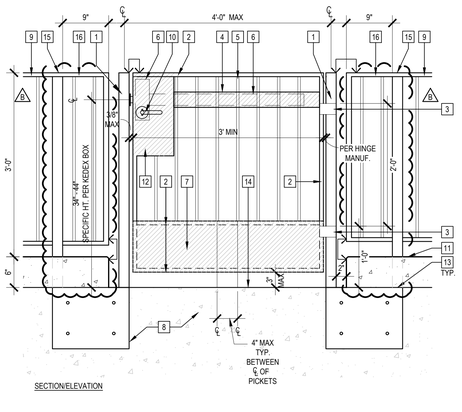


1. HSS 4X2X1/4 THK. TUBE STEEL POST.
2. HSS 2X1X1/8 THK. TUBE STEEL GATE FRAME
3. 1/4" FILLET WELD ALL AROUND, TYPICAL WELDED HEAVY DUTY HINGES. FINISH, COATING, AND COLOR TO MATCH GATE.
4. 3" WIDE 11 GUAGE HDG STEEL PLATE WELDED FLUSH WITH FRAME & WELDABLE BOX FOR PANIC HARDWARE MOUNT
5. 3/4" SQ. 1/8" THK. TUBE STEEL PICKET
6. PANIC HARDWARE (PERFORATED METAL PANEL NOT REQUIRED AT THIS LOCATION) — 20 / L5.04 SIM.
7. KICKPLATE PER — 19 / L5.04
8. EXISTING WALL; GRIND EXPOSED CHIPPED SURFACE SMOOTH & FLUSH BETWEEN CURBS
9. ADJACENT GUARDRAIL PER — 14 / L5.04
10. LEVER HARDWARE PER — 20 / L5.04
11. CONCRETE CURB ON TOP OF EXISTING WALL, SEE — 18 / L5.02
12. KEDEX BOX WELDED FLUSH WITH EDGE OF GATE AND UNDER GATE TOP FRAME.
13. STEEL U BUCKET AND THRU BOLTS PER — 04 / S6.03
14. FINISH SURFACE
15. HSS 2X2X1/4 GUARDRAIL END POST
16. HSS 2X1X1/8 CANTILEVERED GUARDRAIL PANEL FRAME; TYP. @ ALL GATES
17. CONCRETE RETAINING WALL — 02 / L5.02 SIM.

NOTES:
A. ALL COMPONENTS ARE TO BE HOT DIPPED GALVANIZED STEEL,
B. GRIND ALL WELDS SMOOTH.
C. 1/8" EDGES TYPICAL ALL CORNERS.
D. COLD GALVANIZE ALL FIELD WELDS.
E. SEE SPEC SECTION 055213 FOR MATERIAL, GRADE, AND FINISH OF METAL ELEMENTS (TYPICAL).
F. SEE DETAILS 15 AND 19 SHEET L5.03 FOR WELDING CONNECTIONS.

GATE IN GUARDRAIL W/ PANIC HARDWARE | 1" = 1'-0" | 19 | 6

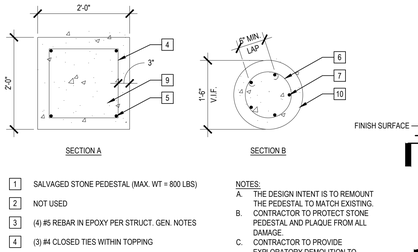




1. HSS 4X2X1/4 THK. TUBE STEEL POST.
2. HSS 2X1X1/8 THK. TUBE STEEL GATE FRAME
3. SELF-CLOSING 180 HINGE; D&D SURECLOSE FLUSH MOUNT MODEL 75108214M. 1/4" FILLET WELD ALL AROUND
4. 3" WIDE 11 GUAGE HDG STEEL PLATE WELDED FLUSH WITH FRAME & WELDABLE BOX FOR PANIC HARDWARE MOUNT
5. 3/4" SQ. 1/8" THK. TUBE STEEL PICKET
6. PANIC HARDWARE (PERFORATED METAL PANEL NOT REQUIRED AT THIS LOCATION) — 20 / L5.04 SIM.
7. KICKPLATE PER — 19 / L5.04
8. EXISTING WALL; GRIND EXPOSED CHIPPED SURFACE SMOOTH & FLUSH BETWEEN CURBS
9. ADJACENT GUARDRAIL PER — 14 / L5.04
10. LEVER HARDWARE PER — 20 / L5.04
11. CONCRETE CURB ON TOP OF EXISTING WALL, SEE — 18 / L5.02
12. KEDEX BOX WELDED FLUSH WITH EDGE OF GATE AND UNDER GATE TOP FRAME.
13. STEEL U BUCKET AND THRU BOLTS PER — 04 / S6.03 (A)
14. FINISH SURFACE
15. HSS 2X2X1/4 GUARDRAIL END POST
16. HSS 2X1X1/8 CANTILEVERED GUARDRAIL PANEL FRAME; TYP. @ ALL GATES (A)

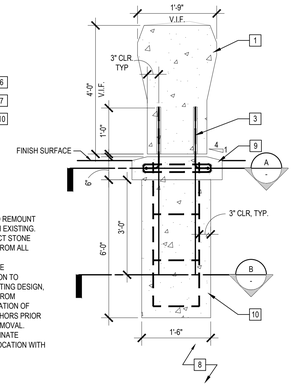
NOTES:
A. ALL COMPONENTS ARE TO BE HOT DIPPED GALVANIZED STEEL,
B. GRIND ALL WELDS SMOOTH.
C. 1/8" EDGES TYPICAL ALL CORNERS.
D. COLD GALVANIZE ALL FIELD WELDS.
E. SEE SPEC SECTION 055213 FOR MATERIAL, GRADE, AND FINISH OF METAL ELEMENTS (TYPICAL)
F. SEE DETAILS 15 AND 19 SHEET L5.03 FOR WELDING CONNECTIONS.

GATE IN GUARDRAIL W/ PANIC HARDWARE - 180 SWING | 1" = 1'-0" | 17 | 6

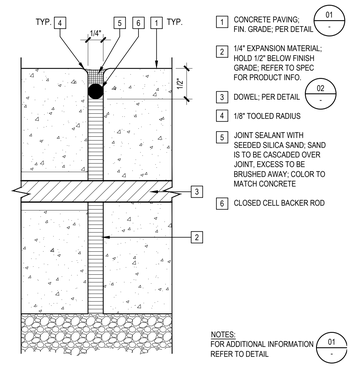


1. SALVAGED STONE PEDESTAL (MAX. WT = 800 LBS)
2. NOT USED
3. (4) #5 REBAR IN EPOXY PER STRUCT. GEN. NOTES
4. (3) #4 CLOSED TIES WITHIN TOPPING
5. (4) #3 REBAR TIES
6. #4 CLOSED TIES @ 12" O.C. & (3) TIES AT TOP @ 4" O.C.
7. (5) #4 REBAR CONT.
8. SUBRADE OVEREXCAVATION AND COMPACTION PER GEOTECHNICAL REPORT
9. CONCRETE TOPPING PAD. LIGHT BROOM FINISH
10. CONCRETE CAISSON FOOTING

NOTES:
A. THE DESIGN INTENT IS TO REMOUNT THE PEDESTAL TO MATCH EXISTING.
B. CONTRACTOR TO PROTECT STONE PEDESTAL AND PLAQUE FROM ALL DAMAGE.
C. CONTRACTOR TO PROVIDE EXPLORATORY DEMOLITION TO IDENTIFY EXISTING MOUNTING DESIGN, AND OBTAIN DIRECTION FROM ARCHITECT ON PRESERVATION OF EXISTING MOUNTING ANCHORS PRIOR TO DAMAGE AND FULL REMOVAL.
D. CONTRACTOR TO COORDINATE TEMPORARY STORAGE LOCATION WITH THE DISTRICT.

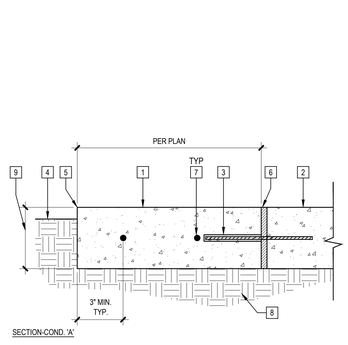


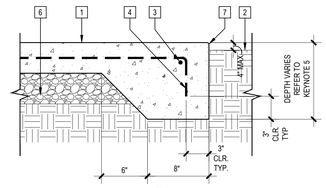
STONE MONUMENT BASE & FOOTING | 3/4" = 1'-0" | 08 | 6



1. CONCRETE PAVING; FIN. GRADE; PER DETAIL — 01
2. 1/4" EXPANSION MATERIAL; HOLD 1/2" BELOW FINISH GRADE; REFER TO SPEC FOR PRODUCT INFO.
3. DOWEL; PER DETAIL — 02
4. 1/8" TOOLED RADIUS
5. JOINT SEALANT WITH SEEDED SILICA SAND; SAND IS TO BE CASCADED OVER JOINT, EXCESS TO BE BRUSHED AWAY; COLOR TO MATCH CONCRETE
6. CLOSED CELL BACKER ROD

EXPANSION JOINT ENLARGEMENT | N.T.S. | 04

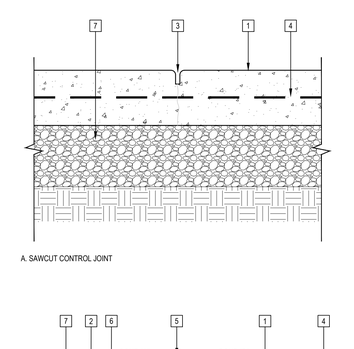


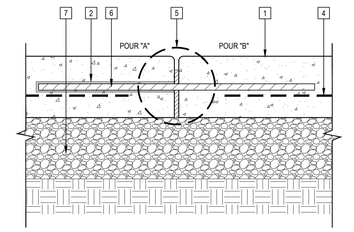


1. CONCRETE PAVING; REFER TO DTL — 01
2. ADJACENT SURFACE/ FINISH GRADE; REFER TO PER MATERIALS PLAN
3. #4 REINFORCING; CONTINUOUS; PER SPEC SECTION 32313.
4. EXTEND REINFORCEMENT FROM PAVING INTO THICKENED EDGE & WRAP ENDS
5. THICKENED EDGE: 9" DEPTH FOR PEDESTRIAN PAVING; 12" DEPTH FOR VEHICULAR PAVING
6. BASE MATERIAL & COMPACTED SUBGRADE; REFER TO GEOTECH REPORT
7. EASE ALL EDGES; 1/4"R, TYP.

NOTE:
FOR EDGE CONDITION ADJACENT TO VERTICAL SURFACE REFER TO DTL — 06

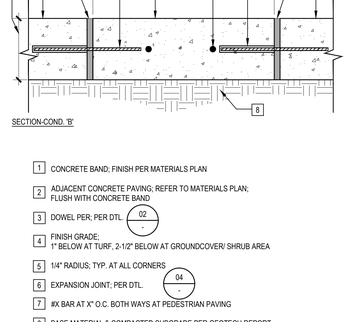
CONC. PAVING THICKENED EDGE | 1 1/2" = 1'-0" | 07





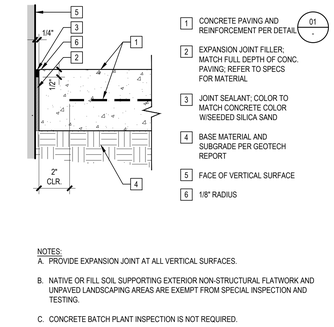
1. CONCRETE PAVING; REFER TO DETAIL — 01
2. SPEED DOWEL PER SPEC SECTION 32313, BY SIKA CORPORATION CONCRETE ACCESSORIES; PRODUCT # PSD12/ #4TX.
3. SAWCUT CONTROL JOINT; 1/8-INCH WIDE; CUT TO 1/4 DEPTH OF SLAB; PROVIDE TIGHT 1/8-INCH RADIUS ON EDGE OF PAVING BEFORE SAWCUTTING.
4. CONCRETE PAVING REINFORCEMENT; REFER TO DETAIL — 01
5. JOINT ENLARGEMENT; REFER TO DETAIL — 04
6. PEDESTRIAN: 3/8" SMOOTH STEEL DOWEL; 18" @ 18" O.C. VEHICULAR: 3/8" SMOOTH STEEL DOWEL; 18" @ 18" O.C.
7. AGGREGATE BASE AND SUBGRADE; REFER TO GEOTECH REPORT

NOTES:
A. NATIVE OR FILL SOIL SUPPORTING EXTERIOR NON-STRUCTURAL FLATWORK AND UNPAVED LANDSCAPING AREAS ARE EXEMPT FROM SPECIAL INSPECTION AND TESTING.
B. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED.



1. CONCRETE BAND; FINISH PER MATERIALS PLAN
2. ADJACENT CONCRETE PAVING; REFER TO MATERIALS PLAN; FLUSH WITH CONCRETE BAND
3. DOWEL PER; PER DTL. — 02
4. FINISH GRADE; 1" BELOW AT TURF, 2-1/2" BELOW AT GROUNDCOVER/ SHRUB AREA
5. 1/4" RADIUS; TYP. AT ALL CORNERS
6. EXPANSION JOINT; PER DTL. — 04
7. #X BAR AT X" O.C. BOTH WAYS AT PEDESTRIAN PAVING
8. BASE MATERIAL & COMPACTED SUBGRADE PER GEOTECH REPORT
9. CONCRETE THICKNESS; PER CIVIL DTL. — 12 / C7.01

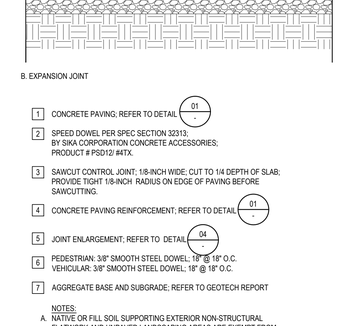
CONCRETE BAND | 3"=1'-0" | 10



1. CONCRETE PAVING AND REINFORCEMENT PER DETAIL — 01
2. EXPANSION JOINT FILLER; MATCH FULL DEPTH OF CONC. PAVING; REFER TO SPECS FOR MATERIAL
3. JOINT SEALANT; COLOR TO MATCH CONCRETE COLOR W/SEEDED SILICA SAND
4. BASE MATERIAL AND SUBGRADE PER GEOTECH REPORT
5. FACE OF VERTICAL SURFACE
6. 1/8" RADIUS

NOTES:
A. PROVIDE EXPANSION JOINT AT ALL VERTICAL SURFACES.
B. NATIVE OR FILL SOIL SUPPORTING EXTERIOR NON-STRUCTURAL FLATWORK AND UNPAVED LANDSCAPING AREAS ARE EXEMPT FROM SPECIAL INSPECTION AND TESTING.
C. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED.

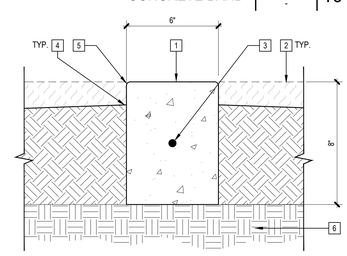
EXPANSION JOINT AT VERTICAL SURFACE | 3"=1'-0" | 06



1. CONCRETE PAVING; REFER TO MATERIALS PLAN KEYNOTE LEGEND FOR FINISH & COLOR.
2. FOR PAVING THICKNESS & REINFORCEMENT SEE CIVIL — 01 / C2.01
3. AGGREGATE BASE SEE GEOTECH REPORT
4. SUBGRADE COMPACTION & OVER EXCAVATION SEE GEOTECH REPORT

NOTES:
A. SAWCUT & EXPANSION JOINTS; REFER TO DETAIL. — 02
B. PROVIDE DOWELS WHERE NEW CONCRETE TIES INTO EXISTING PER DETAIL. — 05
C. PROVIDE THICKENED EDGE AT COLUMNS, SITE AND BLDG. WALLS, AND WHERE PAVING IS ADJACENT TO PLANTING AREAS. — 07
D. DO NOT ALLOW CONCRETE OVER-POUR INTO ADJACENT PLANTING AREA.
E. NATIVE OR FILL SOIL SUPPORTING EXTERIOR NON-STRUCTURAL FLATWORK AND UNPAVED LANDSCAPING AREAS ARE EXEMPT FROM SPECIAL INSPECTION AND TESTING.
F. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED.

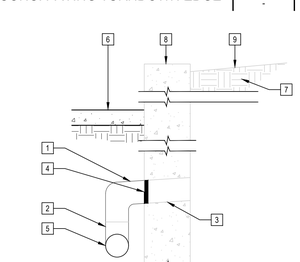
CONCRETE PAVING JOINTS | 3" = 1'-0" | 02



1. CONCRETE FLUSH CURB; REFER TO MATERIALS PLAN FOR FINISH.
2. PLANTING AREA; FINISH GRADE TOP OF BARK MULCH OR TURF.
3. #4 CONTINUOUS HORIZONTAL REINFORCING; PER SPEC SECTION 32313.
4. AMENDED TOP SOIL; FIN. GRADE ADJACENT TO CONC. BAND 1" BELOW CONC. BAND AT TURF. 2.5" BELOW CONC. BAND AT SHRUB AND GROUNDCOVER AREA.
5. 1/4" TOOLED RADIUS; TYP. AT BOTH SIDES OF BAND.
6. COMPACTED SUBGRADE; REFER TO GEOTECH REPORT

NOTES:
A. PROVIDE SCORE JOINT EVERY 10'-0" OR TO ALIGN WITH PAVING JOINTS & EXPANSION JOINT EVERY 30' & AT EVERY CHANGE IN DIRECTION — 02

CONCRETE MOW BAND | 3" = 1'-0" | 09



1. CONCRETE PAVING; REFER TO DTL — 01
2. ADJACENT CONCRETE PAVING; REFER TO MATERIALS PLAN; FLUSH WITH CONCRETE BAND
3. #4 REINFORCING; CONTINUOUS
4. EXTEND REINFORCEMENT FROM PAVING INTO THICKENED EDGE & WRAP ENDS
5. CONCRETE THICKENED EDGE — 07
6. BASE MATERIAL & COMPACTED SUBGRADE; REFER TO DTL — 01
7. EASE ALL EDGES; 1/8"R, TYP.

CONC. PAVING TURNDOWN EDGE | 1-1/2" = 1'-0" | 14

1. SCH 40 PVC Ø TO MATCH EXISTING
2. "T" CONNECTION TO COLLECTOR PVC
3. EXISTING WEEP HOLE
4. PVC MALE INSERT AND SOLVENT WELD
5. NEW COLLECTOR 3" PVC CONNECT TO SD PER CIVIL SHEET C3.02
6. FINISH SURFACE/ NEW CONCRETE PAVING
7. EXISTING SUBGRADE
8. EXISTING CONCRETE RETAINING WALL
9. EXISTING FINISH GRADE
10. BASE MATERIAL AND COMPACTED SUBGRADE PER — 01

NOTES:
A. PROVIDE CONNECTION TO ALL EXISTING WEEP HOLES OBSTRUCTED BY PROPOSED WORK.
B. WEEP HOLE LOCATIONS TO BE FIELD VERIFIED.

WEEP HOLE TIE-IN | 3/4" = 1'-0" | 13 | 6

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VENTURA HIGH SCHOOL TRACK AND FIELD REPLACEMENT AND BLEACHER UPGRADES

2 NORTH CATALINA STREET
VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

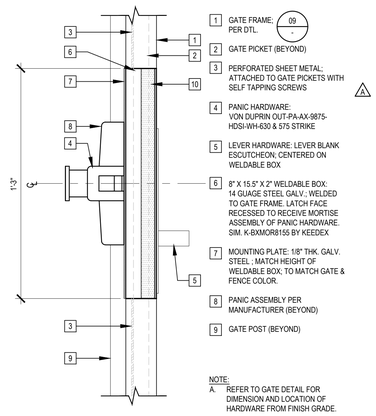
Revision	Date
ADDENDUM A	08/14/2026
ADDENDUM B	09/23/2026

Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/11/2025
50% CONSTRUCTION DOCS	07/01/2025
100% CONSTRUCTION DOCS	09/01/2025
DSA BACKCHECK	11/03/2025
DSA BACKCHECK	03/10/2026
DSA BACKCHECK	07/01/2026

Job Number	32321
Checked By	AW,MM
Scale	AS NOTED

CONSTRUCTION DETAILS

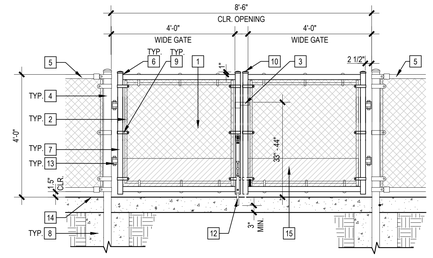
L5.01



1 GATE FRAME; PER DTL. (09 / -)
2 GATE PICKET (BEYOND)
3 PERFORATED SHEET METAL; ATTACHED TO GATE PICKETS WITH SELF TAPPING SCREWS
4 PANIC HARDWARE: VON DUPRIN OUT-PA-AX-9875-HDSI-WH-630 & 575 STRIKE
5 LEVER HARDWARE: LEVER BLANK ESCUTCHEON; CENTERED ON WELDABLE BOX
6 8" X 15.5" X 2" WELDABLE BOX; 14 GUAGE STEEL GALV.; WELDED TO GATE FRAME. LATCH FACE RECESSED TO RECEIVE MORTISE ASSEMBLY OF PANIC HARDWARE. SIM. K-BXMOR8155 BY KEEDEX
7 MOUNTING PLATE; 1/8" THK. GALV. STEEL ; MATCH HEIGHT OF WELDABLE BOX; TO MATCH GATE & FENCE COLOR.
8 PANIC ASSEMBLY PER MANUFACTURER (BEYOND)
9 GATE POST (BEYOND)

NOTE:
A. REFER TO GATE DETAIL FOR DIMENSION AND LOCATION OF HARDWARE FROM FINISH GRADE.

PANIC & LEVER HARDWARE ENLARGEMENT — 3" = 1'-0" — 20

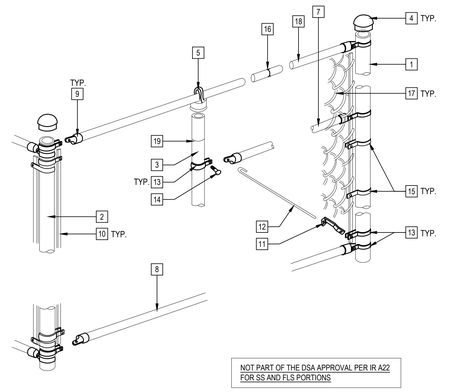


NOT PART OF THE DSA APPROVAL PER IR A22 FOR SS AND FLS PORTIONS

1 CHAIN LINK FENCE FABRIC; 2-3/4" - 9 GA.; ATTACH TO GATE TOP AND BOTTOM FRAME WITH RAIL TIE WIRE; COLOR PER MATERIALS PLAN KEYNOTE LEGEND
2 TENSION BAR; THREAD TENSION BAR TO CHAIN LINK & ATTACH TO GATE FRAME WITH TENSION BANDS; TYP.
3 FULCRUM STYLE DOUBLE GATE LATCH (15 / -)
4 POST: 4" O.D. SCH. 40; EACH SIDE OF GATE
5 CHAIN LINK FENCE; REFER TO DTL (01 / -)
6 ALL JOINTS WELDED CONTINUOUS TO MAKE A SOLID FRAME.
7 GATE FRAME: 1-7/8" O.D. SCH. 40
8 CONCRETE POST FOOTING; REFER TO DTL (09 / L5.02)
9 TENSION BAND
10 GATE FRAME POST CAP TO MATCH FENCE POST CAP (04 / -)
11 MID FRAME: 1-7/8" O.D. SCH. 40
12 CANE BOLT (21 / -)
13 WELD-ON HINGE: C13000
14 FINISH GRADE
15 KICKPLATE (11 / -)

NOTES:
A. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.
B. PROVIDE TWO PART URETHANE COATING SYSTEM FOR ALL GATE COMPONENT TO MATCH FENCE COLOR.
C. ALL WELDS TO BE GROUND SMOOTH AND CONTINUOUS, FREE OF BURS.

CHAIN LINK DOUBLE SWING GATE WITH LOCKABLE CANE BOLT — 1/2" = 1'-0" — 12

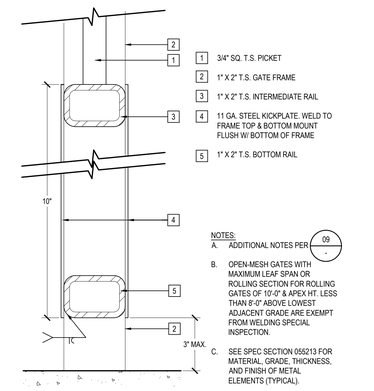


1 END POST
2 CORNER POST
3 LINE POST
4 POST CAP. SIZE TO MATCH POST
5 LOOP CAP
6 TOP RAIL
7 MID RAIL
8 BOTTOM RAIL
9 RAIL END
10 TENSION BAR
11 TURNBUCKLE
12 TRUSS ROD
13 BRACE BAND
14 BOLT & NUT
15 TENSION BAND
16 RAIL SLEEVE
17 CHAIN LINK FENCE FABRIC
18 RAIL TIE
19 LINE POST TIE

NOTES:
A. SUBMIT SHOP DRAWINGS TO LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
B. CONTRACTOR TO VERIFY ALL ATTACHMENTS/DIMENSIONS & INSTALL PER MFR. RECOMMENDATIONS.
C. ANY COMPONENT REQUIRED FOR A COMPLETE FENCE SYSTEM, BUT NOT SHOWN, SHOULD BE CONSIDERED A PART OF THESE DRAWING & INCLUDED IN THE FINAL INSTALLED SYSTEM.
D. USE SQUARE COMPONENTS WHERE OCCURS PER MATERIALS PLANS AND ELEVATIONS.

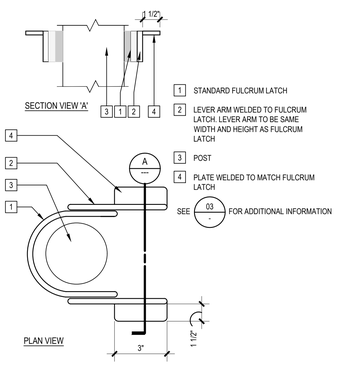
NOT PART OF THE DSA APPROVAL PER IR A22 FOR SS AND FLS PORTIONS

CHAIN LINK FENCE CONNECTIONS — 1" = 1'-0" — 04



NOTES:
A. ADDITIONAL NOTES PER (09 / -)
B. OPEN-MESH GATES WITH MAXIMUM LEAF SPAN OR ROLLING SECTION FOR ROLLING GATES OF 10'-0" & APEX HT. LESS THAN 8'-0" ABOVE LOWEST ADJACENT GRADE ARE EXEMPT FROM WELDING SPECIAL INSPECTION.
C. SEE SPEC SECTION 055213 FOR MATERIAL, GRADE, THICKNESS, AND FINISH OF METAL ELEMENTS (TYPICAL).

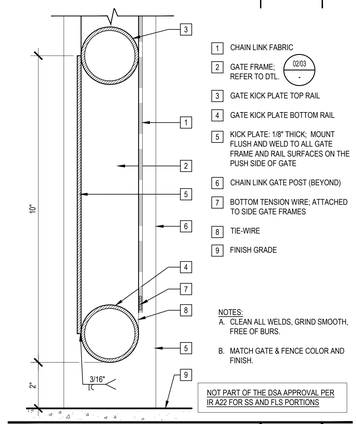
TUBE STEEL GATE KICKPLATE — 6" = 1'-0" — 19



1 STANDARD FULCRUM LATCH
2 LEVER ARM WELDED TO FULCRUM LATCH. LEVER ARM TO BE SAME WIDTH AND HEIGHT AS FULCRUM LATCH
3 POST
4 PLATE WELDED TO MATCH FULCRUM LATCH

SEE (03 / -) FOR ADDITIONAL INFORMATION

MODIFIED FULCRUM LATCH — N.T.S. — 15

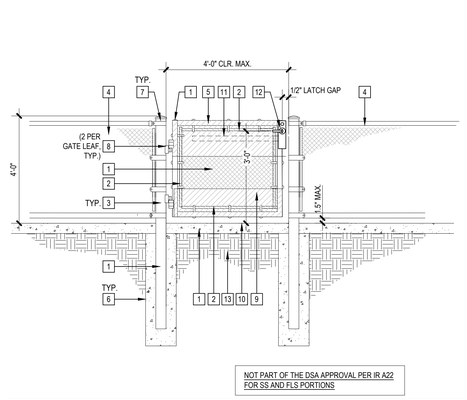


1 CHAIN LINK FABRIC
2 GATE FRAME: REFER TO DTL. (03/03 / -)
3 GATE KICK PLATE TOP RAIL
4 GATE KICK PLATE BOTTOM RAIL
5 KICK PLATE; 1/8" THICK; MOUNT FLUSH AND WELD TO ALL GATE FRAME AND RAIL SURFACES ON THE PUSH SIDE OF GATE
6 CHAIN LINK GATE POST (BEYOND)
7 BOTTOM TENSION WIRE; ATTACHED TO SIDE GATE FRAMES
8 TIE-WIRE
9 FINISH GRADE

NOTES:
A. CLEAN ALL WELDS, GRIND SMOOTH, FREE OF BURS.
B. MATCH GATE & FENCE COLOR AND FINISH.

NOT PART OF THE DSA APPROVAL PER IR A22 FOR SS AND FLS PORTIONS

CHAIN LINK GATE KICK PLATE — 6" = 1'-0" — 11



1 CHAIN LINK FENCE FABRIC; 2-3/4" - 9 GA.; ATTACH TO GATE TOP AND BOTTOM FRAME WITH RAIL TIE WIRE; COLOR PER MATERIALS PLAN KEYNOTE LEGEND
2 TENSION BAR; THREAD TENSION BAR TO CHAIN LINK & ATTACH TO GATE FRAME WITH TENSION BANDS; TYP.
3 POST: 4" O.D. SCH. 40; EACH SIDE OF GATE
4 ADJACENT CHAIN LINK FENCE; REFER TO DTL (01 / -)
5 GATE FRAME: 1-7/8" O.D. SCH. 40
6 CONCRETE POST FOOTING; REFER TO DTL (09 / L5.02)
7 GATE FRAME POST CAP TO MATCH FENCE POST CAP (04 / -)
8 LOCINOX MAMMOTH-HD-9005 AUTO-CLOSE GATE HINGE
9 KICKPLATE (11 / -)
10 FINISH GRADE
11 PANIC HARDWARE AND MOUNTING PLATE (10 / -)
12 LEVER HARDWARE AND MOUNTING PLATE (10 / -)
13 COMPACTED SUBGRADE PER GEOTECH REPORT

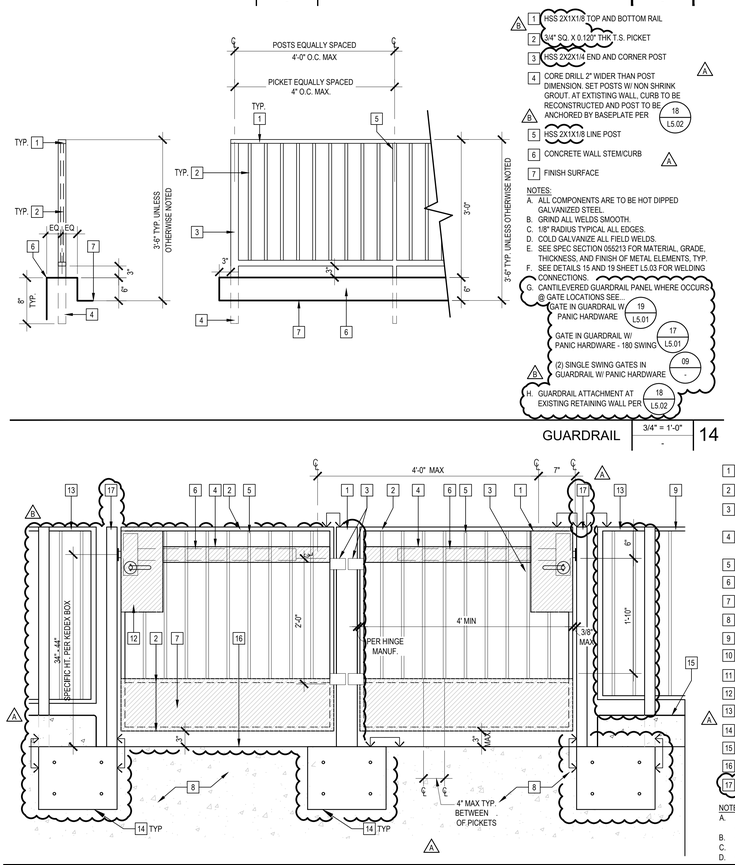
NOTES:
A. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.
B. PROVIDE TWO PART URETHANE COATING SYSTEM FOR ALL GATE COMPONENT TO MATCH FENCE COLOR.
C. ALL WELDS TO BE GROUND SMOOTH AND CONTINUOUS, FREE OF BURS.

NOT PART OF THE DSA APPROVAL PER IR A22 FOR SS AND FLS PORTIONS

CHAIN LINK SINGLE SWING GATE — 1/2" = 1'-0" — 03

NOTE:
1. ALL HARDWARE FINISH & COLOR TO MATCH GATE.
2. PROVIDE FIRE DEPT. APPVD. LOCK FOR EACH CANE BOLT. LOCKS TO BE KEYED THE SAME. PROVIDE DUPLICATE KEYS FOR OWNER.
3. PROVIDE SLEEVE FOR BOTH OPEN AND CLOSED POSITION (TYP. ALL GATES)
4. CONCRETE BATCH PLANT INSPECTION IS NOT REQUIRED.

CANE BOLT — 3" = 1'-0" — 21



1 HSS 2X1X1/8 TOP AND BOTTOM RAIL
2 3/4" SQ. X 0.120" THK T.S. PICKET
3 HSS 2X2X1/4 END AND CORNER POST
4 CORE DRILL 2" WIDER THAN POST DIMENSION. SET POSTS W/ NON SHRINK GROUT. AT EXTISTING WALL, CURB TO BE RECONSTRUCTED AND POST TO BE ANCHORED BY BASEPLATE PER (18 / L5.02)
5 HSS 2X1X1/8 LINE POST
6 CONCRETE WALL STEM/CURB
7 FINISH SURFACE

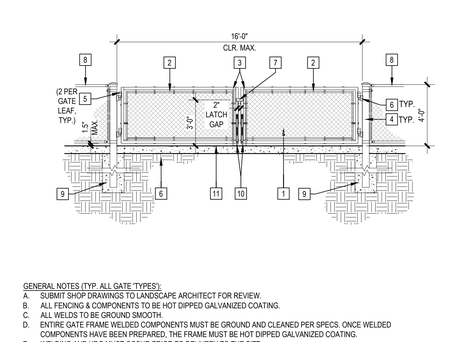
NOTES:
A. ALL COMPONENTS ARE TO BE HOT DIPPED GALVANIZED STEEL
B. GRIND ALL WELDS SMOOTH.
C. 1/8" RADIUS TYPICAL ALL EDGES.
D. COLD GALVANIZE ALL FIELD WELDS.
E. SEE SPEC SECTION 055213 FOR MATERIAL, GRADE, THICKNESS, AND FINISH OF METAL ELEMENTS, TYP.
F. SEE DETAILS 15 AND 19 SHEET L5.03 FOR WELDING CONNECTIONS.
G. CANTILEVERED GUARDRAIL PANEL WHERE OCCURS @ GATE LOCATIONS SEE...
GATE IN GUARDRAIL W/ PANIC HARDWARE (19 / L5.01)
GATE IN GUARDRAIL W/ PANIC HARDWARE - 180 SWING (17 / L5.01)
(2) SINGLE SWING GATES IN GUARDRAIL W/ PANIC HARDWARE (09 / -)
H. GUARDRAIL ATTACHMENT AT EXISTING RETAINING WALL PER (18 / L5.02)

GUARDRAIL — 3/4" = 1'-0" — 14

1 HSS 4X4X1/4 TUBE STEEL POST.
2 HSS 2X1X1/8 THK. TUBE STEEL GATE FRAME
3 1/4" FILLET WELD ALL AROUND, TYPICAL WELDED HEAVY DUTY HINGES. FINISH, COATING, AND COLOR TO MATCH GATE.
4 3" WIDE 11 GUAGE HDG STEEL PLATE WELDED FLUSH WITH FRAME & WELDABLE BOX FOR PANIC HARDWARE MOUNT
5 3/4" SQ. X 0.120" THK T.S. PICKET
6 PANIC HARDWARE (PERF. PANEL NOT REQUIRED THIS LOCATION) (20 / - SIM.
7 KICKPLATE PER (19 / -)
8 EXISTING WALL; GRIND EXPOSED CHIPPED SURFACE SMOOTH & FLUSH BETWEEN CURBS
9 ADJACENT GUARDRAIL PER (14 / -)
10 LEVER HARDWARE PER (20 / -)
11 CONCRETE CURB ON TOP OF EXISTING WALL, SEE (18 / L5.02)
12 KEDEX BOX WELDED FLUSH WITH EDGE OF GATE AND UNDER GATE TOP FRAME.
13 HSS 2X1X1/8 CANTILEVERED GUARDRAIL PANEL FRAME; TYP. @ ALL GATES
14 STEEL U BUCKET PER (04 / S6.03)
15 NEW WALL (SEE PLAN)
16 FINISH SURFACE
17 HSS 4X2X1/4 THK. TUBE STEEL POST

NOTES:
A. ALL COMPONENTS ARE TO BE HOT DIPPED GALVANIZED STEEL
B. GRIND ALL WELDS SMOOTH.
C. 1/8" EDGES TYPICAL ALL CORNERS.
D. COLD GALVANIZE ALL FIELD WELDS.
E. SEE SPEC SECTION 055213 FOR MATERIAL, GRADE, AND FINISH OF METAL ELEMENTS (TYPICAL).
F. SEE DETAILS 15 AND 19 SHEET L5.03 FOR WELDING CONNECTIONS.

CHAIN LINK GATE PANIC & LEVER HARDWARE — 3" = 1'-0" — 10



1 CHAIN LINK FENCE FABRIC: 2" - 9 GA. COLOR PER MATERIALS PLAN KEYNOTE LEGEND
2 TOP AND BOTTOM KNUCKLED SELVAGE CHAIN LINK FABRIC
3 RAIL TIE WIRE; ATTACH TO TOP AND BOTTOM RAIL SINGLE WRAP 9 GAUGE AT 24" O.C.; CHAIN LINK FABRIC TO BE ATTACHED BELOW TOP RAIL
4 CORNER OR END POST: 3" O.D.; SCH. 40
5 LINE POST: 2-3/8" O.D.; SCH. 40
6 TOP AND BOTTOM RAIL: 1-5/8" O.D.; SCH. 40
7 LINE POST LOOP CAP (04 / -)
8 TENSION BAR; THREAD TENSION BAR TO CHAIN LINK FABRIC & ATTACH TO END POST WITH TENSION BAND
9 BRACE BAND; TOP AND BOTTOM RAIL
10 TENSION BAND
11 POST CAP; REFER TO DTL (04 / -)
12 POST FOOTINGS; REFER TO DTL. (09 / L5.02)
13 FINISH SURFACE

NOTES:
A. FOR CHAIN LINK FENCE COMPONENTS REFER TO (04 / -) DTL.
B. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.
C. ALL FENCE COMPONENT FINISH TO MATCH CHAIN LINK FENCE FABRIC

NOT PART OF THE DSA APPROVAL PER IR A22 FOR SS AND FLS PORTIONS

CHAIN LINK VEHICULAR SWING GATE — 1/4" = 1'-0" — 02

NOTES:
A. SUBMIT SHOP DRAWINGS TO LANDSCAPE ARCHITECT FOR REVIEW.
B. ALL FENCING & COMPONENTS TO BE HOT DIPPED GALVANIZED COATING.
C. ALL WELDS TO BE GROUND SMOOTH
D. ENTIRE GATE FRAME WELDED COMPONENTS MUST BE GROUND AND CLEANED PER SPECS. ONCE WELDED COMPONENTS HAVE BEEN PREPARED, THE FRAME MUST BE HOT DIPPED GALVANIZED COATING.
E. WELDING AND HDG MUST OCCUR PRIOR TO DELIVERY TO THE SITE.
F. ACCESSIBLE PEDESTRIAN GATES SHALL OPERATE WITH 5 LB. MAX PRESSURE PER 11B-404.2.9, TYP.

1 1-3/4"- 9 GAUGE CHAINLINK FABRIC PER MATERIALS PLAN
2 TENSION FLAT BAR. THREAD TENSION BAR TO CHAIN LINK AND ATTACH TO GATE FRAME WITH TENSION CLIPS PER MANUFACTURERS RECOMMENDATIONS
3 1.90" O.D. SCH 40 GATE FRAME
4 GATE POST. SEE CHAIN LINK POST SCHEDULE
5 180° HEAVY DUTY GATE ARM HINGES
6 COMPACTED SUBGRADE PER (01 / L5.01)
7 MODIFIED FULCRUM LATCH (15 / - , 01 / -)
8 ADJACENT CHAIN LINK FENCING
9 CONCRETE FOOTING PER (09 / L5.02)
10 DOUBLE CANE BOLT (21 / -)
11 FINISH SURFACE OR CONCRETE BAND/PAVING WHERE OCCURS, REFER TO MATERIALS PLANS

GENERAL NOTES (TYP. ALL GATE TYPES):
A. SUBMIT SHOP DRAWINGS TO LANDSCAPE ARCHITECT FOR REVIEW.
B. ALL FENCING & COMPONENTS TO BE HOT DIPPED GALVANIZED COATING.
C. ALL WELDS TO BE GROUND SMOOTH
D. ENTIRE GATE FRAME WELDED COMPONENTS MUST BE GROUND AND CLEANED PER SPECS. ONCE WELDED COMPONENTS HAVE BEEN PREPARED, THE FRAME MUST BE HOT DIPPED GALVANIZED COATING.
E. WELDING AND HDG MUST OCCUR PRIOR TO DELIVERY TO THE SITE.
F. ACCESSIBLE PEDESTRIAN GATES SHALL OPERATE WITH 5 LB. MAX PRESSURE PER 11B-404.2.9, TYP.

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CHAIN LINK FENCE — 1/2" = 1'-0" — 01

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REGISTERED LANDSCAPE ARCHITECT MICHAEL NICHALEK 5617 STATE OF CALIFORNIA
Signature 7/31/2026
Registration Expiration 9/23/2026

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VENTURA HIGH SCHOOL TRACK AND FIELD REPLACEMENT AND BLEACHER UPGRADES

2 NORTH CATALINA STREET
VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

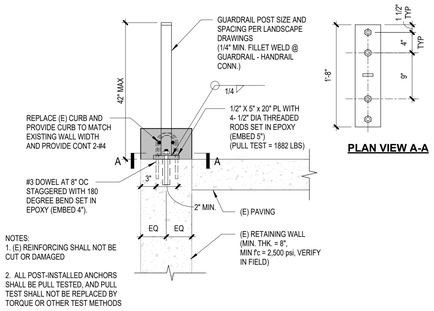
Revision	Date
ADDENDUM A	08/14/2026
ADDENDUM B	09/23/2026

Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/11/2025
100% CONSTRUCTION DOCS	07/07/2025
100% CONSTRUCTION DOCS	09/01/2025
DSA BACKCHECK	11/03/2025
DSA BACKCHECK	03/10/2026
DSA BACKCHECK	07/01/2026

Job Number	32321
Checked By	AW,MM
Scale	AS NOTED

CONSTRUCTION DETAILS

L5.04

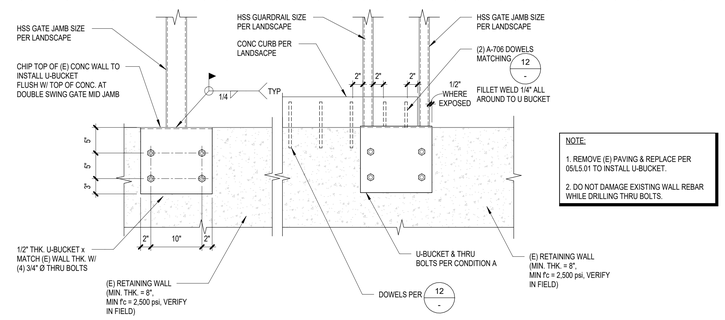


NOTES:
1. (E) REINFORCING SHALL NOT BE CUT OR DAMAGED

2. ALL POST-INSTALLED ANCHORS SHALL BE PULL TESTED, AND PULL TEST SHALL NOT BE REPLACED BY TORQUE OR OTHER TEST METHODS

PLAN VIEW A-A

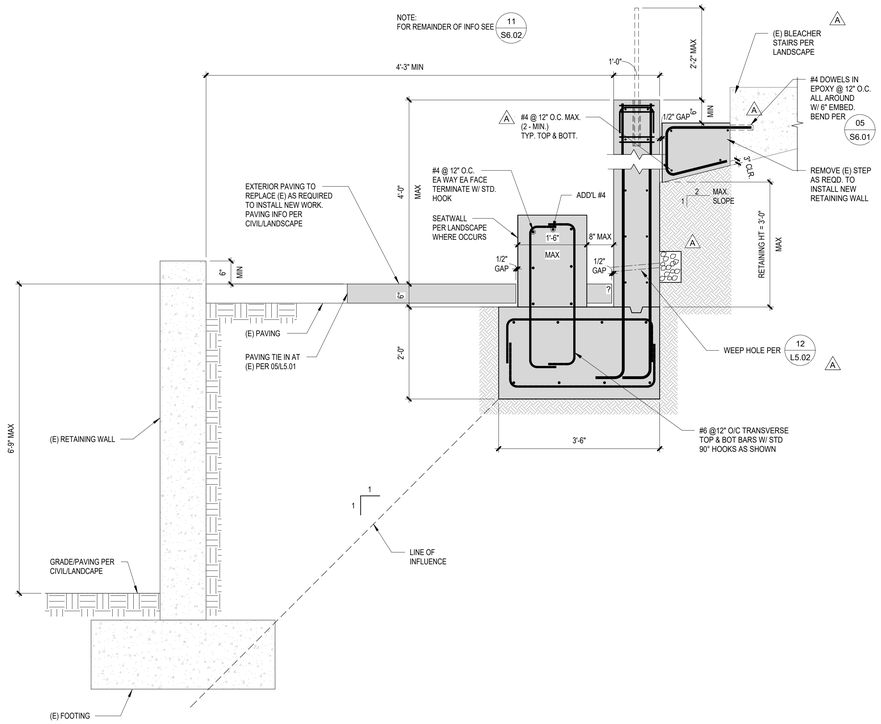
HANDRAIL ON (E) RETAINING WALL CONNECTION | 1" = 1'-0" | 12



A. CONDITION AT MID - JAMB DOUBLE SWING GATE

B. TYPICAL U BUCKET DETAIL: CONDITION AT END-JAMBS

GATE POST ON (E) RETAINING WALL CONNECTION | 1" = 1'-0" | 04



CONCRETE RETAINING WALL AT COMPANION SEATING | N.T.S. | 01

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09/22/2026

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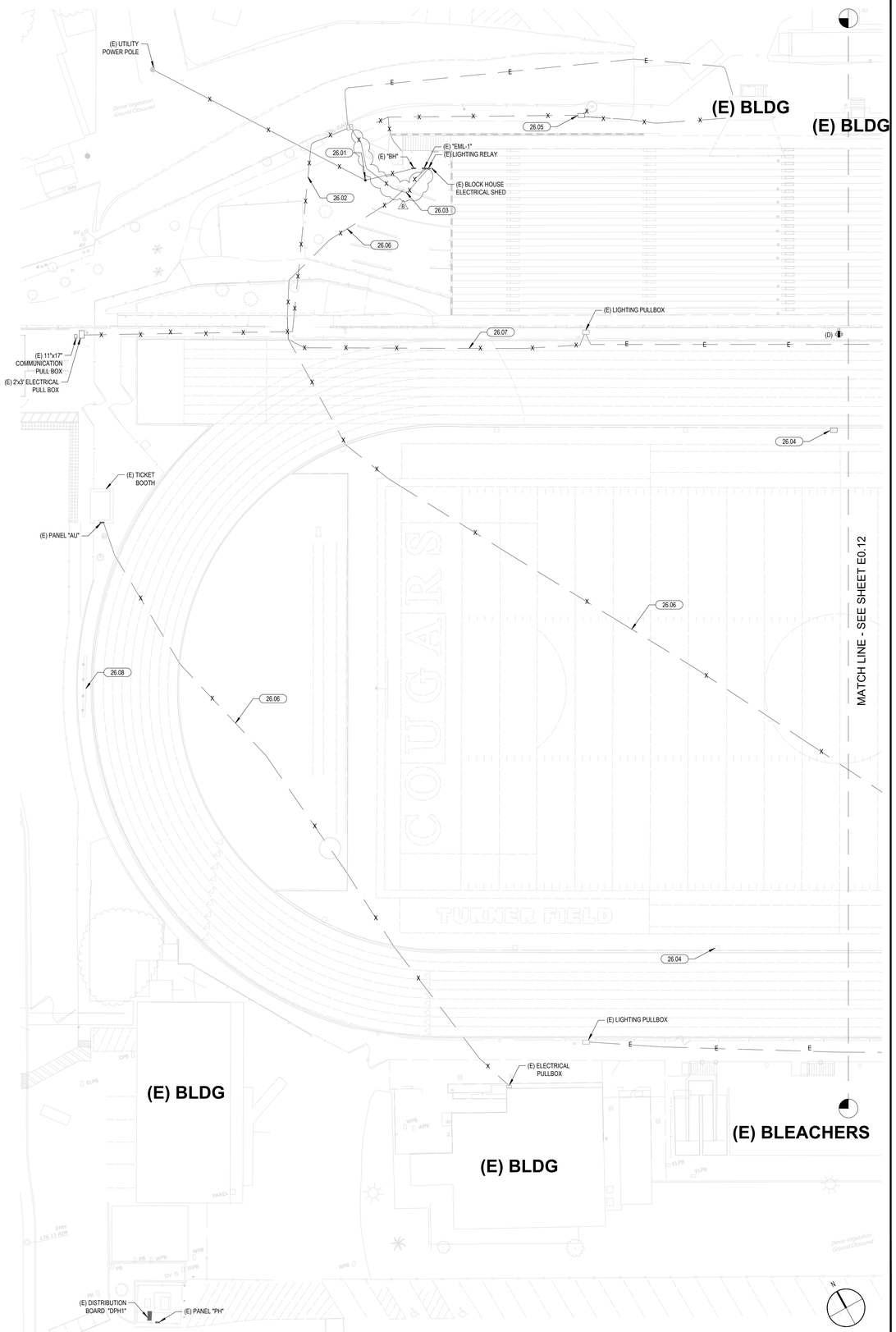
Revision		Date
A	ADDENDUM A	08/14/2026
B	ADDENDUM B	09/23/2026

Submittal	Date
100% DESIGN DEVELOPMENT	04/11/2025
50% CONSTRUCTION DOCS	07/24/2025
100% CONSTRUCTION DOCS	09/05/2025
DSA BACKCHECK	02/05/2026
DSA BACKCHECK	07/01/2026

Job Number	32321
Checked By	NP
Scale	

TYPICAL SITE DETAILS

S6.03



ELECTRICAL SITE DEMOLITION PLAN | 1" = 20'-0" | 05

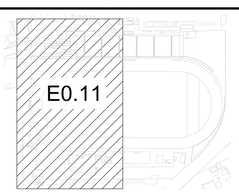
KEYNOTES

26.01	EXISTING UTILITY POLE TO BE DEMOLISHED PER SCE, EXISTING ELECTRICAL OVERHEAD WIRES TO BE REROUTED TO UNDERGROUND. SEE FINISHED PLAN FOR NEW ROUTING AND FOLLOW SCE GUIDELINE FOR INSTALLATION.
26.02	EXISTING ELECTRICAL AND COMMUNICATION UNDERGROUND CONDUITS AND WIRES TO BE DEMOLISHED BACK TO SOURCE.
26.03	EXISTING CONDUIT TO BE DEMOLISHED BACK TO PULL BOX. PULL EXISTING CONDUCTORS BACK TO PULL BOX AND PRESERVE FOR REUSE IN NEW WORK.
26.04	EXISTING ELECTRICAL INGRADE BOX TO BE DEMOLISHED
26.05	REMOVE EXISTING LIGHTING PULL BOX INCLUDING ASSOCIATED CONDUITS AND CONDUCTORS.
26.06	EXISTING ELECTRICAL UNDERGROUND CONDUIT AND WIRES TO BE DEMOLISHED.
26.07	EXISTING LIGHTING UNDERGROUND CONDUITS TO BE REMOVED BACK TO PULL BOX. EXISTING CONDUCTORS SHALL BE PRESERVED FOR REUSE IN NEW WORK. REFER TO NEW WORK PLANS FOR RECONNECTION
26.08	EXISTING SCOREBOARD TO REMAIN IN-PLACE, PROTECT ALL EXISTING CONDUIT AND WIRES IF POSSIBLE. PROVIDE NEW POWER AND COMMUNICATION FEEDERS FROM SOURCE AS NECESSARY FOR FULLY OPERATIONAL SCOREBOARD SYSTEM.

NOTES

A. CONTRACTOR TO IDENTIFY THE LOCATION OF EXISTING 50A RECEPTACLE IN FIELD BOX, NOTIFY THE ARCHITECTURE FOR NEW LOCATION AND PROVIDE PROPER POWER CONNECTION

KEYMAP



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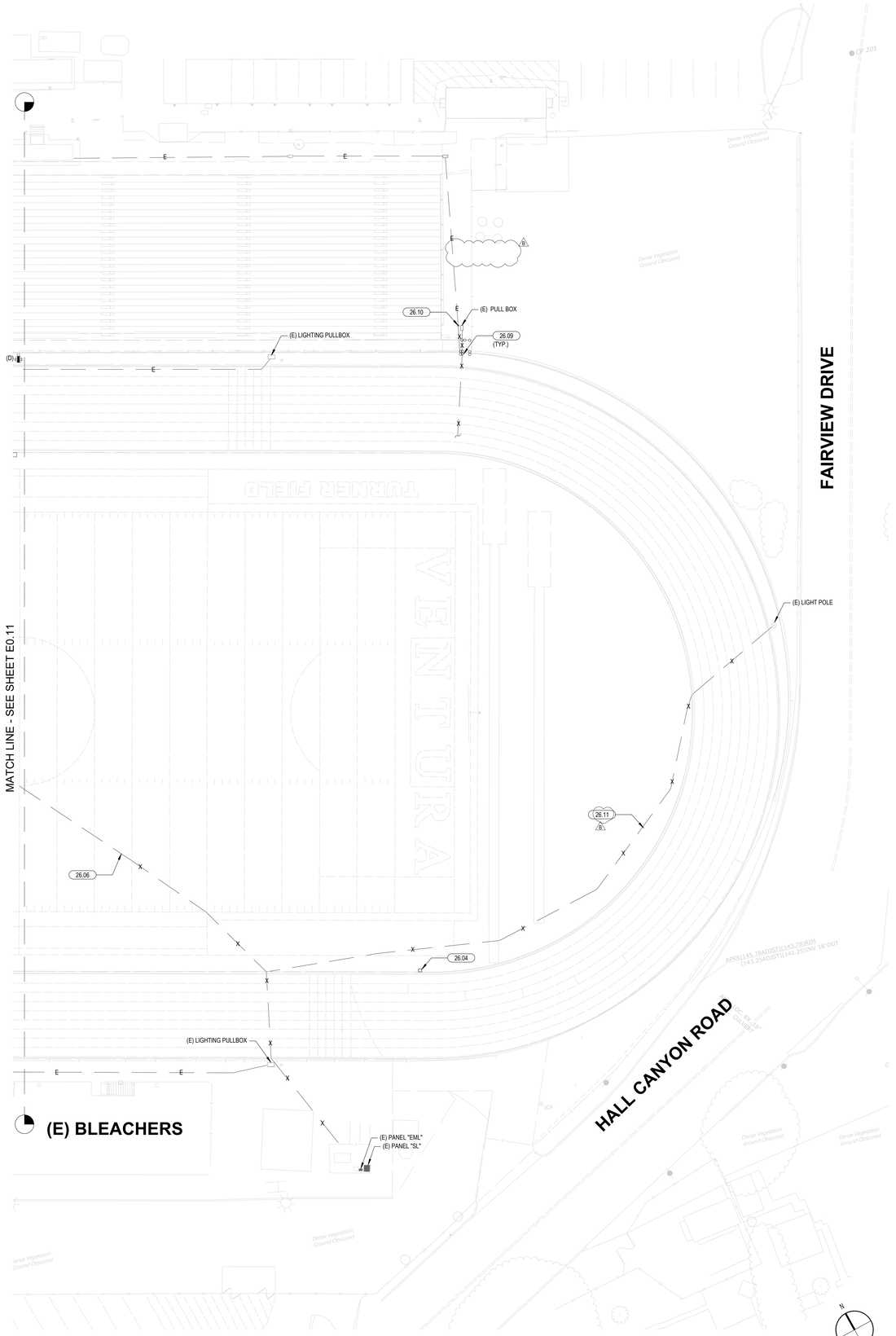
Revision		Date
B	ADDENDUM B	09/23/2026

Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/11/2025
50% CONSTRUCTION DOCS	07/24/2025
100% CONSCTRUCTION DOCS	09/01/2025
DSA BACKCHECK	02/05/2026
DSA BACKCHECK V3	03/10/2026
DSA SUBMITTAL	07/01/2026

Job Number	32321
Checked By	AB
Scale	1" = 20'-0"

ELECTRICAL
DEMOLITION SITE
PLAN

E0.11



ELECTRICAL DEMOTION SITE PLAN | 1" = 20'-0" | 05

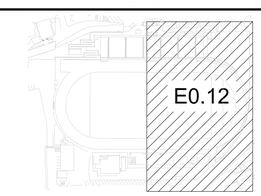
KEYNOTES

26.02	NOT USED.
26.04	EXISTING ELECTRICAL INGRADE BOX TO BE DEMOLISHED
26.06	EXISTING ELECTRICAL UNDERGROUND CONDUIT AND WIRES TO BE DEMOLISHED.
26.07	NOT USED
26.09	REMOVE EXISTING CONDULETS. REMOVE EXISTING ELECTRICAL AND COMMUNICATION CONDUITS IN THE FIELD. PULL EXISTING CONDUCTORS BACK TO THE NEAREST PULL BOX AND PRESERVE FOR REUSE IN NEW WORK.
26.10	SAW-CUT EXISTING CONDUITS AT THIS LOCATION TO INSTALL NEW PULL BOX. PROTECT EXISTING CONDUCTORS FOR RECONNECTION.
26.11	DEMOLISH EXISTING UNDERGROUND LIGHTING FEEDER. REFER TO NEW WORK PLANS FOR NEW PATHWAY AND RECONNECTION TO EXISTING LIGHTING POLE. REFEED USING CONDUCTORS OF THE SAME SIZE AS THE EXISTING FEEDER.

NOTES

A. MAKE ALL NECESSARY ALTERATIONS TO COORDINATE AND CONNECT THE EXISTING WITH THE NEW ELECTRICAL WORK TO THE END THAT WHEN THE WORK IS COMPLETE, THE ENTIRE ELECTRICAL INSTALLATION, EXISTING AND NEW, SHALL BE IN COMPLETE OPERATING CONDITION. THE DRAWINGS INDICATE THE WORK WHICH IS TO BE IN PLACE AT THE COMPLETION OF THE INSTALLATION

KEYMAP



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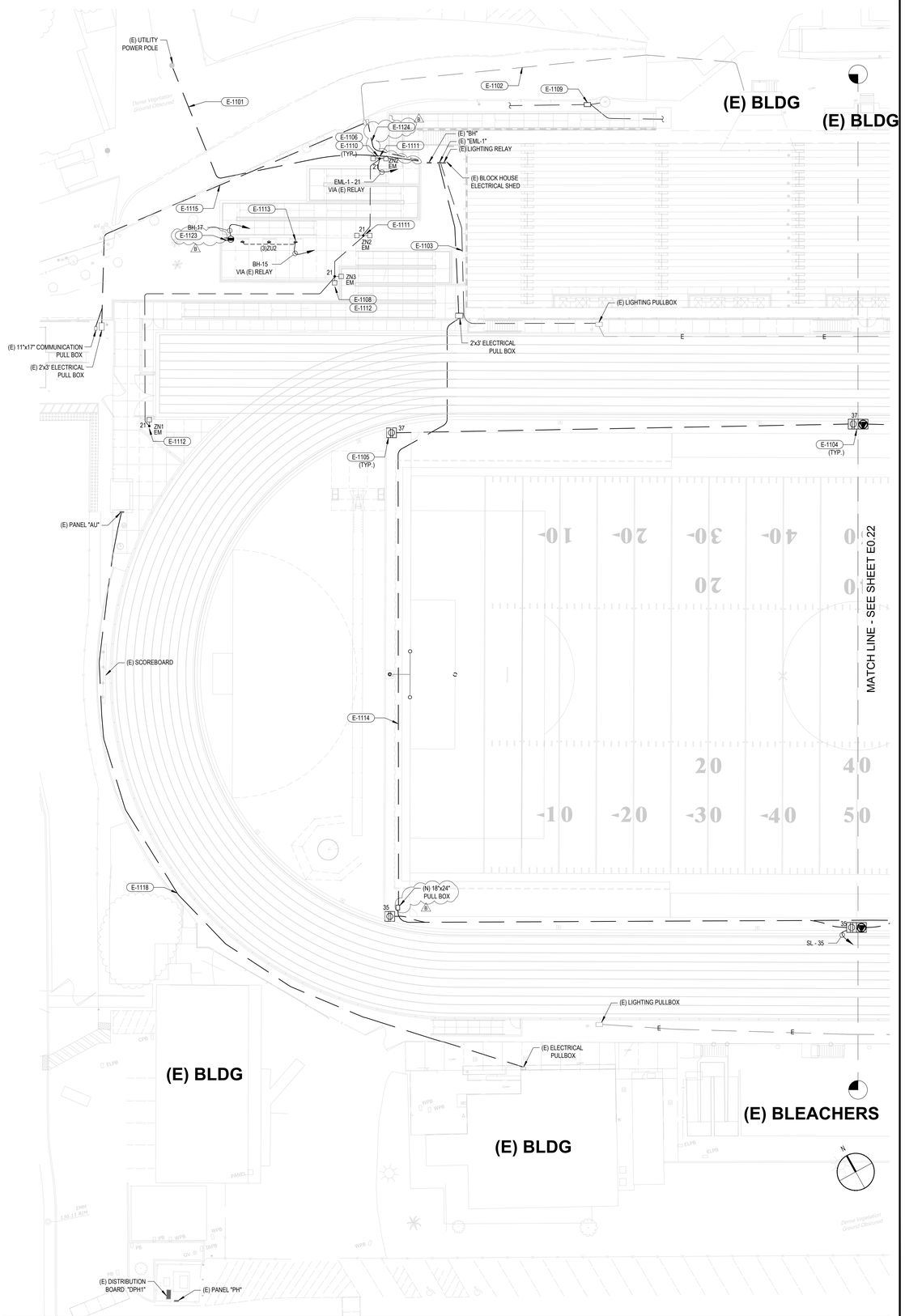
Revision	Date
⚠ ADDENDUM B	09/23/2026

Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/17/2025
95% CONSTRUCTION DOCS	07/04/2025
100% CONSTRUCTION DOCS	09/01/2025
DSA BACKCHECK	02/05/2026
DSA BACKCHECK V3	03/10/2026
DSA SUBMITTAL	07/01/2026

Job Number	32321
Checked By	AB
Scale	1" = 20'-0"

ELECTRICAL
DEMOLITION SITE
PLAN

E0.12



ELECTRICAL SITE PLAN | 1" = 20'-0" | 05

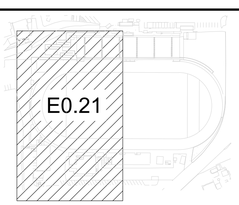
KEYNOTES

E-1101	PROPOSE NEW UNDERGROUND ELECTRICAL SERVICE ENTRANCE TO DISTRIBUTION PANEL BOARD "BH"
E-1102	EXISTING ELECTRICAL UNDERGROUND CONDUITS AND WIRES TO REMAIN IN PLACE
E-1103	PROVIDE NEW UNDERGROUND LIGHTING PATHWAY. REUSE EXISTING CONDUCTORS FOR RECONNECTION.
E-1104	INSTALL IN-GRADE COMBOX WITH GFCI WEATHERPROOF DUPLEX RECEPTACLE AND DATA WITH UL COMPLIANT OUTDOOR RATED LOCKABLE ENCLOSURE AND FACE PLATE
E-1105	INSTALL IN-GRADE COMBOX WITH NEW GFCI WEATHERPROOF DUPLEX RECEPTACLE WITH OUTDOOR RATED LOCKABLE ENCLOSURE AND FACE PLATE. REFER TO LANDSCAPE DRAWING FOR EXACT LOCATIONS
E-1106	REFER TO LANDSCAPE PLANS FOR EXACT MOUNTING LOCATIONS OF NEW POLE LIGHTS (TYP)
E-1107	NOT USED.
E-1108	TYPE 'ZN3' TO HAVE TYPE 2 OPTIC LUMINAIRE AT PLAN-SOUTH ORIENTATION, AND TYPE 4 FORWARD THROW OPTIC LUMINAIRE AT PLAN-EAST ORIENTATION; REFER TO LIGHTING FIXTURE SCHEDULE ON E7.02
E-1109	INSTALL NEW 2'x3' LIGHTING PULLBOX. PROVIDE NEW UNDERGROUND PATHWAY AND RECONNECT TO EXISTING LIGHTING POLE.
E-1110	NEW LIGHT POLE TYPES 'ZN1', 'ZN2', 'ZN3' TO BE CONNECTED TO EXISTING TIMECLOCK CONTROLS WITH MANUAL OVERRIDE (TYP).
E-1111	FOR NEW LIGHT POLE TYPE 'ZN2', REFER TO DETAIL 02/E7.02 FOR FOOTING DETAIL
E-1112	FOR NEW LIGHT POLE TYPES 'ZN1' AND 'ZN3', REFER TO DETAIL 01/E7.02 FOR FOOTING DETAIL
E-1113	FIXTURE TYPE 'ZU2' INGRADE UPLIGHTS WITH ASYMMETRIC DISTRIBUTION TO BE ORIENTED SO THAT ASYMMETRIC OPTIC IS DIRECTED TOWARDS WALL AND SIGNAGE; CENTER FIXTURE IN FRONT OF LETTER SIGN, 12" BETWEEN FRONT OF SIGN AND CLOSEST EDGE OF FIXTURE (TYP).
E-1114	RECONNECT FEEDER FOR EXISTING PANEL EML-1. RUN NEW WIRES IN NEW UNDERGROUND CONDUIT PATHWAY. REFER TO SINGLE LINE DIAGRAM FOR MORE INFORMATION ON FEEDER SIZING
E-1115	NEW ELECTRICAL AND DATA UNDERGROUND CONDUIT PATHWAY.
E-1116	NOT USED
E-1117	NOT USED.
E-1118	RECONNECT FEEDER FOR EXISTING PANEL "AU". RUN EXISTING WIRES IN NEW UNDERGROUND CONDUIT PATHWAY. REFER TO SINGLE LINE DIAGRAM FOR MORE INFORMATION
E-1119	NOT USED.
E-1123	WEATHERPROOF LOCKABLE IN-USE (COLE LIGHTING TL31D-WCS).
E-1124	NEW ELECTRICAL CONDUIT PATHWAY. REUSE EXITING CONDUCTOR FOR RECONNECTION.

NOTES

A. MAKE ALL NECESSARY ALTERATIONS TO COORDINATE AND CONNECT THE EXISTING WITH THE NEW ELECTRICAL WORK TO THE END THAT WHEN THE WORK IS COMPLETE, THE ENTIRE ELECTRICAL INSTALLATION, EXISTING AND NEW, SHALL BE IN COMPLETE OPERATING CONDITION. THE DRAWINGS INDICATE THE WORK WHICH IS TO BE IN PLACE AT THE COMPLETION OF THE INSTALLATION

KEYMAP



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VENTURA HIGH SCHOOL
TRACK AND FIELD REPLACEMENT AND BLEACHER UPGRADES

2 NORTH CATALINA STREET
VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

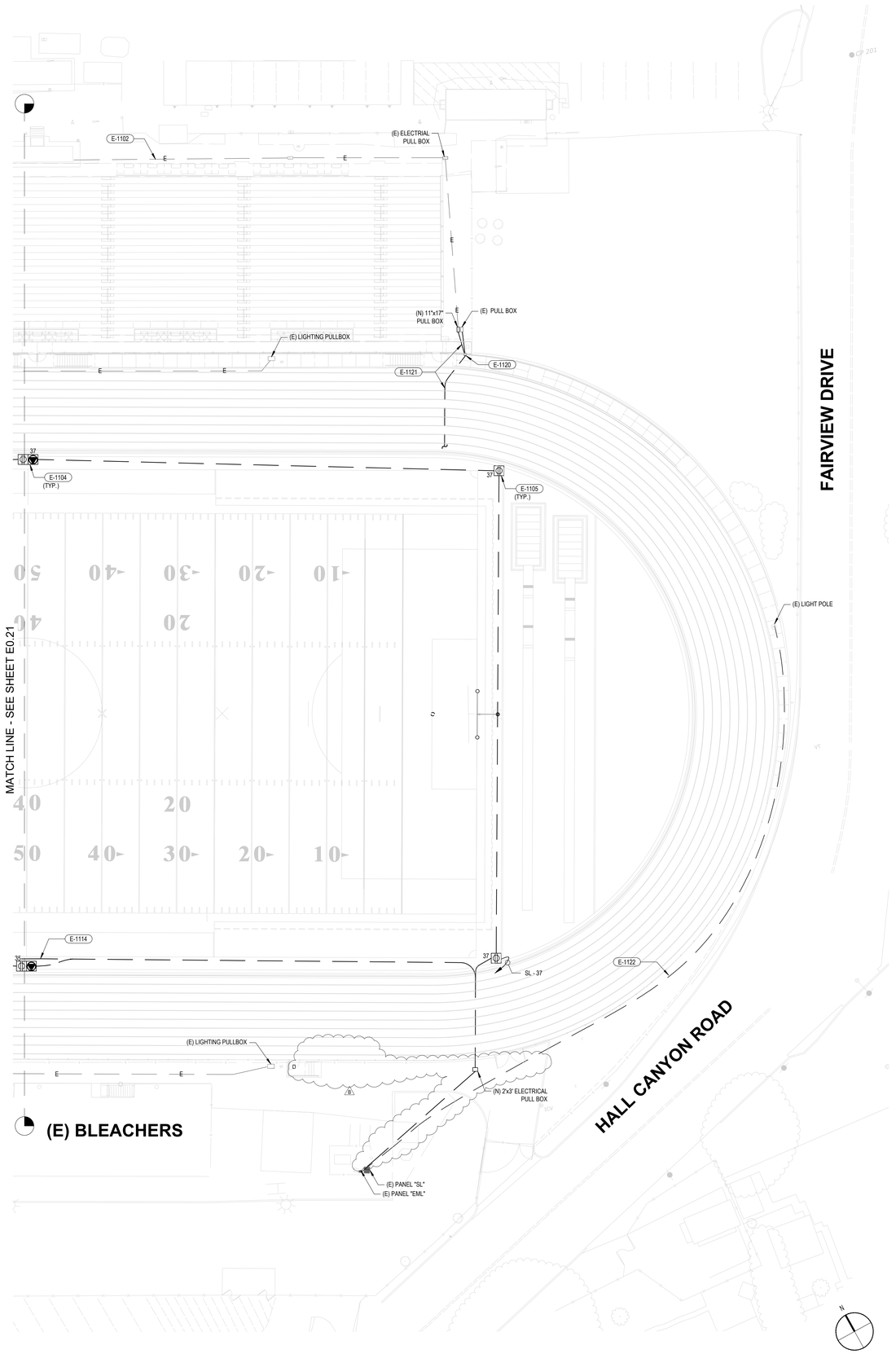
Revision	Date
1 ADDENDUM B	09/23/2026

Submittal	Date
100% SCHEMATIC DESIGN	12/10/2024
100% DESIGN DEVELOPMENT	04/11/2025
100% CONSTRUCTION DOCS	07/04/2025
100% CONSTRUCTION DOCS	09/01/2025
DSA BACKCHECK	02/05/2026
DSA BACKCHECK V3	03/10/2026
DSA SUBMITTAL	07/01/2026

Job Number	32321
Checked By	AB
Scale	1" = 20'-0"

ELECTRICAL SITE PLAN

E0.21



ELECTRICAL SITE PLAN | 1" = 20'-0" | 05

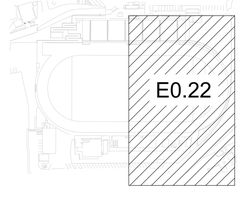
KEYNOTES

E-1102	EXISTING ELECTRICAL UNDERGROUND CONDUITS AND WIRES TO REMAIN IN PLACE
E-1104	INSTALL IN-GRADE COMBOX WITH GFCI WEATHERPROOF DUPLEX RECEPTACLE AND DATA WITH UL COMPLIANT OUTDOOR RATED LOCKABLE ENCLOSURE AND FACE PLATE
E-1105	INSTALL IN-GRADE COMBOX WITH NEW GFCI WEATHERPROOF DUPLEX RECEPTACLE WITH OUTDOOR RATED LOCKABLE ENCLOSURE AND FACE PLATE. REFER TO LANDSCAPE DRAWING FOR EXACT LOCATIONS
E-1114	RECONNECT FEEDER FOR EXISTING PANEL "EML-1". RUN NEW WIRES IN NEW UNDERGROUND CONDUIT PATHWAY. REFER TO SINGLE LINE DIAGRAM FOR MORE INFORMATION ON FEEDER SIZING
E-1120	INSTALL NEW CONDULETS FOR CONDUITS POKING THROUGH WALL AND TRANSITIONING TO UNDERGROUND ROUTING.
E-1121	NEW ELECTRCAL AND COMMUNICATION UNDERGROUND CONDUIT ROUTING AND RE-USE EXISTING CONDUCTORS FOR RECONNECTION AS REQUIRED.
E-1122	PROVIDE NEW UNDERGROUND LIGHTING FEEDER PATHWAY.

NOTES

A. MAKE ALL NECESSARY ALTERATIONS TO COORDINATE AND CONNECT THE EXISTING WITH THE NEW ELECTRICAL WORK TO THE END THAT WHEN THE WORK IS COMPLETE, THE ENTIRE ELECTRICAL INSTALLATION, EXISTING AND NEW, SHALL BE IN COMPLETE OPERATING CONDITION. THE DRAWINGS INDICATE THE WORK WHICH IS TO BE IN PLACE AT THE COMPLETION OF THE INSTALLATION

KEYMAP



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TRACK AND FIELD REPLACEMENT
AND BLEACHER UPGRADES

2 NORTH CATALINA STREET
VENTURA, CA 93001

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VENTURA UNIFIED SCHOOL DISTRICT

Revision	Date
B ADDENDUM B	09/23/2026

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100% SCHEMATIC DESIGN	12/10/2024
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50% CONSTRUCTION DOCS	07/24/2025
100% CONSCTRUCTION DOCS	09/01/2025
DSA BACKCHECK	02/05/2026
DSA BACKCHECK V3	03/10/2026
DSA SUBMITTAL	07/01/2026

Job Number	32321
Checked By	AB
Scale	1" = 20'-0"

ELECTRICAL SITE PLAN

E0.22

STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

Ventura High School Track and Field Replacement and Bleacher Upgrades

Prepared By:

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KATHEREEN SHINKAI, RCE 68369 EXP. 9/30/2027

REGISTERED PROFESSIONAL ENGINEER
KATHEREEN M. SHINKAI
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EXP. 9-30-27
CIVIL
STATE OF CALIFORNIA

STORM WATER POLLUTION PREVENTION PLAN

For

Ventura High School Track And Field Replacement And Bleacher Upgrades

WDID NUMBER: TBD

RISK LEVEL: 1

Legally Responsible Person (LRP):

Ahsan Mirza
Superintendent of Business Services
Ahsan.Miraz@venturausd.org

Project Address:

2 North Catalina Street

Ventura, CA 93001

Site Operating Hours:

Monday through Friday, 7:30a.m. to 6:00p.m.

SWPPP Prepared by:

5301 California Avenue, Suite 100
Irvine, CA 92617
Phone: (949) 261-1001
Fax: (949) 260-1190
QSD: Kathereen Shinkai, RCE 68369

Preparation Date: September 23, 2026

Estimated Project Dates:

Start of Construction	**11/30/2026**	Completion of Construction	**08/27/2027**

Project Location:

Contact Information

Role	Name	Phone Number	License or Certification Number, if Applicable
Qualified SWPPP Developer (QSD)	Kathereen Shinkai, P.E.	949) 261-1001	RCE 68369
Qualified SWPPP Developer (QSD)			
Qualified SWPPP Practitioner (QSP)			
Qualified SWPPP Practitioner (QSP)			
QSP Delegate			
QSP Delegate			
QSP Delegate			
QSP Delegate			

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Qualified SWPPP Developer

Approval and Certification of the Stormwater Pollution Prevention Plan

Project Name: *Ventura High School Track and Field Replacement and Bleacher Upgrades*

Project Number/ID: *32321*

"This Stormwater Pollution Prevention Plan and its appendices were prepared under my direction to meet the requirements of the California Construction Stormwater General Permit (*Order No. 2022-0057-DWQ*). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below and will maintain up to date credentials for the duration of the project."

QSD Signature	*Date*
Kathereen Shinkai	68369
QSD Name	*QSD Certificate Number*
Managing Director of Civil Engineering	949-701-4033
Title and Affiliation	*Telephone Number*
kshinkai@lpadesignstudios.com	
E-mail	

Amendment Log

Project Name: *Ventura High School Track and Field Replacement and Bleacher Upgrades*

Project Number/ID: *32321*

Amendment No.	Date	Brief Description of Amendment (include section and page number)	Prepared and Approved By
			Name: QSD#
			Name: QSD#
			Name: QSD#

The SWPPP will be revised when:

- There is a 2022 CGP violation (2022 CGP Section VI.Q.1);
- There is a reduction or increase in total disturbed acreage (2022 CGP Section III.F.2. and F.4);
- BMPs are not effective and are not resulting in a reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges (2022 CGP Section VI.Q.1 and Attachment E Section III.C.5);
- There is a change in the project duration that changes the project Risk Type (2022 CGP Section III.F.1);
- Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more (2022 CGP Section III.G);
- There is a change in construction or operations that may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4) (2022 CGP Sections IV.O. and VI.Q.1); or
- When deemed necessary by the QSD.

The QSD has determined that the changes listed in Table 1-1 can be field determined by the QSP. All other changes will be made by the QSD as formal amendments to the SWPPP. Note that the 2022 CGP requires that the QSD "revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations (2022 CGP Section V.C.2.).

SWPPP Amendment QSD Certifications are in Appendix C.

Section 1 SWPPP Requirements

1.1 INTRODUCTION

This Stormwater Pollution Prevention Plan (SWPPP) is designed to comply with California's *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (2022 CGP),* State Water Resources Control Board (State Water Board) *Order No. 2022-0057-DWQ (NPDES No. CAS000002)* (Appendix S). This SWPPP has been prepared following the 2022 CGP SWPPP Template for Traditional Projects provided in the California Stormwater Quality Association (CASQA) Stormwater *Best Management Practice (BMP) Handbook: Construction* (CASQA 2023).

This project is considered a traditional construction project.

In accordance with the 2022 CGP, Section IV.O, this SWPPP is designed to address the following:

- Identification of all pollutants, their sources, and control mechanisms, including sources of sediment associated with all construction activities (e.g., sediment, paint, cement, stucco, cleaners, site erosion);
- Pollutant source assessments, including a list of potential pollutant sources and identification of site areas where additional BMPs are necessary to reduce or prevent pollutants in stormwater and authorized non-stormwater discharges, per the minimum requirements when developing the pollutant source assessment;
- Description of site-specific BMPs implemented to reduce or eliminate stormwater pollution;
- Where not otherwise required to be under a Regional Water Quality Control Board (Regional Water Board) permit, all non-stormwater discharges are identified and either eliminated, controlled, or treated;
- Site BMPs are effective and result in the reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges from construction activity to the Best Available Technology/Best Control Technology (BAT/BCT) standard; and;
- Stabilization BMPs are installed to reduce or eliminate pollutants after construction is completed are effective and maintained; and
- Calculations and design details, as well as BMP controls, are complete and correct.

The Ventura High School Track and Field Replacement and Bleacher Upgrades project (Project, or Site) comprises approximately 4.84 acres, of which 4.28 acres will be disturbed. The Project is located at 2 North Catalina Street in Ventura, California. The property is owned by Ventura Unified School District and is being developed by Ahsan Mirza, Superintendent of Business Services VUSD. The project's location is shown on the Site Maps in Appendix A.

1.2 PERMIT REGISTRATION DOCUMENTS

Required Permit Registration Documents (PRDs) shall be submitted to the State Water Board via the Stormwater Multi Application and Report Tracking System (SMARTS) by the LRP or DAR. The project-specific PRDs include (2022 CGP Section III.A):

1. Notice of Intent (NOI);
2. Risk Level Determination (Construction Site Sediment and Receiving Water Risk Determination);
3. Site Drawings and Map;
4. SWPPP;
5. Applicable plans, calculations, and other supporting documentation for compliance with the Phase I or Phase II municipal separate storm sewer system (MS4) post construction requirements or the post-construction standards of the 2022 CGP:
6. Annual Fee per the current 23 California Code of Regulations Chapter 9 fee schedule for National Pollutant Discharge Elimination System (NPDES) stormwater permits; and
7. Signed Certification Statement (LRP Certification is provided electronically with SMARTS PRD submittal).

Site Maps can be found in the Appendix. A copy of the submitted PRDs shall also be kept in Appendix B along with the Waste Discharge Identification (WDID) confirmation.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

The SWPPP will be available at the construction site during working hours list on the title sheet and Section 7.5, while construction is occurring and shall be made available upon request by a federal, state, or municipal inspector. A current copy of the site-specific SWPPP and any site inspection reports required by the 2022 CGP may be kept in electronic format at the site so long as the information requested by a federal, state, or municipal inspector can be made available during an inspection. Legible maps in hard copy must be available at the site (2022 CGP Section IV.O.1.).

The SWPPP must be implemented at the appropriate level to always protect water quality throughout the life of the project. The SWPPP must remain on the site during construction activities, commencing with the initial mobilization and ending with the termination of coverage under the 2022 CGP.

1.4 SWPPP AMENDMENTS

The SWPPP will be revised when:

- If there is a 2022 CGP violation (2022 CGP Section VI.Q.1);
- There is a reduction or increase in total disturbed acreage (2022 CGP Section III.F.2 and F.4.);
- BMPs are not effective and are not resulting in a reduction or elimination of pollutants in stormwater discharges and authorized non-stormwater discharges (2022 CGP Section VI.Q.1 and Attachment D Section III.C.5);
- There is a change in the project duration that changes the project's risk level (2022 CGP Section III.F.1); or
- Dischargers with projects where all construction activities (including passive treatment, active treatment systems, and/or active equipment) will be suspended for 30 days or more (2022 CGP Section III.G.).

Additionally, the SWPPP will be amended when:

- There is a change in construction or operations that may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4) (2022 CGP Sections IV.O. and VI.Q.1); or
- When deemed necessary by the QSD.

The QSD has determined that the changes listed in Table 1-1 can be field determined by the QSP. All other changes will be made by the QSD as formal amendments to the SWPPP. Note that the 2022 CGP requires that the QSD revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations (2022 CGP Section V.C.2.).

The following items shall be included in each amendment:

- Who requested the amendment;
- The location of proposed change;
- The reason for change;
- The original BMP(s) proposed, if any;
- The new BMP(s) proposed; and
- QSD certification.

SWPPP amendments will be logged at the front of the SWPPP and SWPPP Amendment QSD certifications will be in Appendix C. The SWPPP text will be revised, replaced and/or hand annotated as necessary to properly convey the amendment. SWPPP amendments must be made by a QSD. The following changes have been designated by the QSD as "to be field determined" and constitute minor changes that the QSP may implement based on field conditions.

Table 1-1 List of Changes to be Field Determined

Candidate changes for field location or determination by QSP [1]	Check changes that can be field located or field determined by QSP
Increase quantity of an Erosion or Sediment Control Measure	*X*
Relocate/add stockpiles or stored materials	*X*
Relocate or add toilets	*X*
Relocate vehicle storage and/or fueling locations	*X*
Relocate areas for waste storage	*X*
Relocate water storage and/or water transfer location	*X*
Changes to access points (entrance/exits)	

Table 1-1 List of Changes to be Field Determined

Candidate changes for field location or determination by QSP [1]	Check changes that can be field located or field determined by QSP
Change type or location of Erosion or Sediment Control Measure	X
Minor changes to schedule or phases	
Changes in construction materials	
(1) Any field changes not identified for field location or field determination by the QSP must be made as an amendment by the QSD.	

1.5 RETENTION OF RECORDS

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of three years from the date generated or date submitted, whichever is later, for the following items:

- SWPPP;
- Visual monitoring reports;
- Sampling equipment calibration records;
- pH and turbidity sampling field sheets;
- Analytical laboratory reports; and

These records will be available at the Site until construction is complete. Records assisting in the determination of compliance with the 2022 CGP will be made available within a reasonable time to the Regional Water Board, State Water Board, or U.S. Environmental Protection Agency (EPA) upon request. Requests by the Regional Water Board for retention of records for a period longer than three years will be adhered to.

1.6 REPORTING

Completed inspection checklists are not required to be submitted to the Regional Water Board. However, completed inspection checklists will be kept with the SWPPP on-site or electronically. The 2022 CGP requires that permittees prepare, certify, and electronically submit an Annual Report no later than September 1 of each year. Reporting requirements are identified in 2022 CGP Section VI.P. Annual reports will be filed in SMARTS and in accordance with information required by the online forms.

Planned changes in site construction activities that may result in non-compliance with the 2022 CGP are required to be provided in writing to the Regional Water Board and local stormwater agency in advance of the changes.

If a 2022 CGP discharge violation occurs, the QSP will immediately notify the LRP. The LRP will include information on the violation with the Annual Report. Corrective measures will be implemented immediately following identification of the discharge or written notice of non-compliance from the Regional Board. Discharges and corrective actions must be documented and include the following items:

- The date, time, location, nature of operation, and type of unauthorized discharge;

- The cause or nature of the notice or order;
- The BMPs deployed before the discharge event, or prior to receiving notice or order; and
- The date of deployment and type of BMPs deployed after the discharge event, or after receiving the notice or order, including additional measures installed or planned to reduce or prevent re-occurrence.

In the event of an emergency dewatering, the Regional Water Board and applicable MS4 are to be notified within 24 hours of a discharge occurring. An emergency is defined as the need to protect human life and health or prevent severe property damage.

Results of (pH and turbidity, etc.) monitoring will be electronically submitted through SMARTS for all field sampling results within 30 days of the completion of the precipitation event or within 10 days if the field sampling results demonstrate the exceedance of the pH and/or turbidity NALs.

See Section 7.7.4.5 for additional discussion of the reporting requirements including contacts for Regional Water Board and MS4 notifications.

A Passive Treatment Plan will be submitted electronically 14 days before passive treatment chemicals are used on site. See the Passive Treatment Plan for additional discussion of the reporting requirements.

1.7 CHANGES TO PERMIT COVERAGE

The 2022 CGP allows for the reduction or increase of the total acreage covered under the 2022 CGP when: a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.

Modified PRDs will be filed electronically through a Change of Information (COI) within 30 days of a reduction or increase in total disturbed areas if a change in permit-covered acreage is to be sought. The SWPPP will be modified appropriately and will be logged at the front of the SWPPP. SWPPP Amendments QSD Certifications will be located in Appendix C. COIs submitted electronically via SMARTS can be found in Appendix D.

1.8 NOTICE OF TERMINATION

A Notice of Termination (NOT) must be submitted electronically by the LRP or DAR via SMARTS to terminate coverage under the 2022 CGP.

According to the requirements of 2022 CGP Section III.H.4., the following final stabilization method will be used to satisfy final stabilization condition requirements:

- 70 percent final cover method supported by pre- and post-project photographs demonstrating stabilization.

The Regional Water Board will consider a construction site complete when the conditions of the 2022 CGP Section III.H., have been met.

The discharger is required to submit the following in SMARTS:

- NOT SMARTS Form;
- QSP-prepared final NOT inspection which includes the QSP name and valid QSP certificate number;
- Final site map with photo orientation references;
- Photos demonstrating final stabilization and the applicable post-construction BMPs and/or low impact development; and
- A long-term maintenance plan for the post-construction stormwater runoff BMPs and/or low impact development features being implemented.

According to the 2022 CGP, the NOT will be automatically approved within 30 calendar days after the date the NOT was submitted, unless, within the 30 calendar days the Regional Water Board notifies the discharger through SMARTS that the Notice of Termination has been denied, returned, or accepted for review (2022 CGP Section III.H.7).

Note: If an Annual Report has not been filed in the current reporting year, an Annual Report will need to be submitted prior to the NOT.

Section 2 Project Information

2.1 PROJECT AND SITE DESCRIPTION

2.1.1 Site Description

The Ventura High School Track and Field Replacement and Bleachers Upgrade project site has been determined to be a Risk Level 1 project. The site area comprises approximately 4.84 acres and is located at 2 North Catalina Street, in Ventura, California. The project's latitude and longitude are (34°16′42″ N, 119°16′06″ W).

, and from the following landmarks:

- Nearest major highway or roadway intersection: Approximately 1.5 miles west from the intersection of HWY 101 and Main Street.
- Nearest water body: approximately 1.1 miles northeast from Ventura Beach at the Pacific Ocean.

Refer to the Site Maps in Appendix A for the project site location.

2.1.2 Existing Conditions

As of the initial date of this SWPPP, the project site is an existing track and field stadium; with minimal vegetated areas with some existing trees sprinkled around the perimeter; and parking lots. There are no known historic sources of contamination at the site.

2.1.3 Existing Drainage

The project site is built in a steep cliff and is very steep. The parking area north of home bleecher is approximately 33 higher than the track and field. The elevation of the project site ranges from 185 to 150 feet above mean sea level (msl). Surface drainage at the site currently flows to the southeast corner where it discharges to an existing storm drain pipe in the right of way. Stormwater is conveyed through surface runoff, storm drain systems. Existing site topography, drainage patterns, and stormwater conveyance systems are shown on Site Maps in Appendix A.

The project discharges to a storm drain system owned by Ventura County and then outfalls from a box culvert near Sanjon Road into the Pacific Ocean at Ventura Beach. The water quality impairments (303 (d) list and TMDLs identified in the 2022 CGP Table H-1 for the receiving waters are identified in the Table 2-1.

Table 2-1 Applicable 303(d) List Impairments and TMDLs

Receiving Water	Water Quality Impairment	
	303(d) list	TMDL (2022 CGP Table H-1)
Pacific Ocean	None	None

2.1.4 Geology and Groundwater

The site is underlain by relatively youthful, nearly horizontal, alluvial sediments overlie gently south dipping older terrace deposits and steeper south dipping soft bedrock units of San Pedro, aka Saugus Formation. Much of the track area is covered by artificial fill consisting of silty sand (SM) and sandy silt (ML) with varying amounts of gravel to sandy gravel with silt (GM). The thickness varies from 4 feet to about 11 feet across the site. See soils report prepared by Earth Systems Pacific. Groundwater occurs beneath the site at approximately 37 feet below ground surface. The groundwater gradient is unknown.

2.1.5 Project Description

Project grading will occur on approximately 4.28 acres of the project, which comprises approximately 88% percent of the total area. The limits of grading are shown on Site Maps in Appendix A. Grading will include both cut and fill activities, with the total graded material estimated to be 3,510 cubic yards. Graded materials are expected to be imported. Soil will be stockpiled in stockpiles as determined by the contractor and QSD and as marked as shown on Site Maps in Appendix A. Construction activities will not be phased.

2.1.6 Developed Condition

Post-construction surface drainage will be directed to the same discharge point as the existing, through surface sheet flow and storm drain systems. The southeast point of connection to an existing storm drain system in the right of way owned by Ventura County.

Post-construction drainage patterns and conveyance systems are presented on Site Maps in Appendix A.

Table 2-2 Construction Site Estimates

Construction site area	4.82	acres
Total area of disturbance	4.28	acres
Percent impervious before construction		%
Runoff coefficient before construction		
Percent impervious after construction		%
Runoff coefficient after construction		

2.2 PERMITS AND GOVERNING DOCUMENTS

In addition to the 2022 CGP, the following documents have been considered while preparing this SWPPP:

- Regional Water Board requirements
- Contract Documents

- California Ocean Plan

2.3 STORMWATER RUN-ON FROM OFFSITE AREAS

Run-on to the site is generated by upgradient non-point source discharges (dry weather and stormwater runoff). The stormwater runoff drainage area contributing to offsite run-on is estimated to be minimal, with run-off coefficients ranging from 0.30 (east side of the site) to 0.95 (north side of the site).

The 2022 CGP requires that temporary BMPs be implemented to direct offsite run-on away from disturbed areas with runoff controls. The following BMPs will be implemented: Gravel bags, sandbag barrier. These BMPs will be located as shown on the Site Maps in Appendix A. The off-site drainage areas and associated stormwater conveyance facilities or BMPs are shown on Site Maps in Appendix A.

2.4 FINDINGS OF THE CONSTRUCTION SITE SEDIMENT AND RECEIVING WATER RISK DETERMINATION

A construction site risk assessment has been performed for the project, and the resultant risk level is Risk Level 1.

The risk level was determined through the use of the R-value determined from EPA's *Rainfall Erosivity Factor Calculator for Small Construction S*ites at: https://lew.epa.gov/ in accordance with the State Water Board Guidance for multi-year projects at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/smarts/construction/docs/rfactor_guide.pdf, and K and LS provided in SMARTS. The risk level is based on project duration, location, proximity to impaired receiving waters, and soil conditions. A copy of the Risk Level determination submitted on SMARTS with the PRDs is included in Appendix B.

Table 2-3 and Table 2-4 summarize the sediment and receiving water risk factors and document the sources of information used to derive the factors.

Table 2-3 Summary of Sediment Risk

RUSLE Factor	Value	Method for Establishing Value
R	48.33	R factor calculated using https://lew.epa.gov
K	0.24	2022 Construction Stormwater General Permit Soil Erodibility (K) Factor Map Tool, online
LS		2022 Construction Stormwater General Permit Length-Slope (LS) Factor Map Tool, online
Total Predicted Sediment Loss (tons/acre)		
Overall Sediment Risk Low Sediment Risk < 15 tons/ acre Medium Sediment Risk >= 15 and < 75 tons/acre High Sediment Risk >= 75 tons/acre		☒ **Low** ☐ **Medium** ☐ **High**

Runoff from the project site discharges into a storm drainage system owned by Ventura County and eventually into the Pacific Ocean near Ventura Beach.

Table 2-4 Summary of Receiving Water Risk

Receiving Water Name	303(d) Listed for Sediment Related Pollutant (1)	TMDL for Sediment Related Pollutant (1)	Beneficial Uses of COLD, SPAWN, and MIGRATORY (1)
Pacific Ocean	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No
Overall Receiving Water Risk			**☒ Low ☐ High**
(1) If yes is selected for any option the Receiving Water Risk is High			

Risk Level 1 sites are subject to the narrative effluent limitations specified in the 2022 CGP, and may be subject to numeric effluent limits for applicable TMDLs, dewatering activities, active treatment systems and passive treatment systems used on site. The narrative effluent limitations require stormwater discharges associated with construction activity to minimize or prevent pollutants in stormwater and authorized non-stormwater through the use of controls, structures, and best management practices (BMPs). This SWPPP has been prepared to address Risk Level 1 requirements (2022 CGP Attachment D).

2.5 CONSTRUCTION SCHEDULE

The site sediment risk was determined based on construction taking place between November 2026 and August 2027. Modification or extension of the schedule (start and end dates) may affect risk determination and permit requirements. The LRP shall contact the QSD if the schedule changes during construction to address potential impact to the SWPPP. The estimated schedule for planned work can be found in Appendix E.

2.6 POTENTIAL CONSTRUCTION ACTIVITY AND POLLUTANT SOURCES

Appendix F includes a list of construction activities and associated materials that are anticipated to be used onsite as well as the pollutant source assessment form that was completed for the project. These activities and associated materials will or could potentially contribute pollutants, other than sediment, to stormwater runoff.

The anticipated activities and associated pollutants were used in Section 3 to select the BMPs for the project. Locations of anticipated pollutants and associated BMPs are shown on the Site Map in Appendix A.

Additionally, proper measures will be taken to ensure that trench spoils or any other disturbed soil during construction activities that are contaminated are not discharged with stormwater or non-stormwater discharges into storm drains or water bodies (except pursuant to a separate NPDES Permit). If contaminated soils are found on site, and the responsible party cannot be identified or fails to act, soils will be sampled to determine proper handling and protect public safety. The appropriate local, State, and federal agencies along with the appropriate Regional Water Board will be notified when contaminated soils are observed.

For sampling requirements for non-visible pollutants associated with construction activity, please refer to Section 7.7.1. For a full and complete list of onsite pollutants, refer to the Safety Data Sheets (SDS), which are retained onsite at the construction trailer or are available electronically at the site.

2.7 TMDL REQUIREMENTS

This project is not subject to additional TMDL requirements per Attachment H of the 2022 CGP.

2.8 IDENTIFICATION OF NON-STORMWATER DISCHARGES

Non-stormwater discharges into storm drainage systems or waterways, which are not authorized under the 2022 CGP and listed in the SWPPP, or authorized under a separate NPDES permit, are prohibited.

Non-stormwater discharges that are authorized from this project site include the following:

- **De-chlorinated potable water sources and non-potable water sources,** including but not limited to:
    - Fire-fighting activity
    - Fire hydrant system flushing
    - Irrigation of vegetative erosion control measures
    - Uncontaminated water line flushing, pipe flushing and testing
    - Water to control dust
    - Uncontaminated groundwater or spring water from construction dewatering activities in compliance with Attachment J of the 2022 CGP.

These authorized non-stormwater discharges will be managed with the stormwater and non-stormwater BMPs described in Section 3 of this SWPPP and will be minimized under the direction of the QSP. Additionally, the non-stormwater discharges not applicable to this project are still allowable granted they do not contact potential pollutant sources.

Activities at this site that may result in unauthorized non-stormwater discharges include:

- Asphalt / Paving
- Cleaners and Polishes
- Concrete curing, delivery, and application
- Landscaping
- Liquid Waste
- Painting
- Planting and Vegetation
- Utility line testing and flushing
- Vehicle and Equipment operation and maintenance

Steps will be taken, including the implementation of appropriate BMPs, to ensure that unauthorized discharges are eliminated, controlled, disposed, or treated on-site.

Discharges of construction materials and waste, such as fuel or paint, resulting from dumping, spills, or direct contact with rainwater or stormwater runoff, are also prohibited.

2.9 REQUIRED SITE MAP INFORMATION

The construction project's Site Map(s) showing the project location, surface water boundaries, geographic features, construction site perimeter and general topography, locations of storm drain inlets that receive runoff from the project, and other requirements identified in 2022 CGP Sections IV.O.2. k. and l are located in Appendix A. Table 2-9 identifies Maps or Sheet Nos. where required elements are illustrated.

Table 2-9 Required Map Information

Included on Map/Plan Sheet No. [1]	Required Element
Pre-Earthwork Drawings (Existing Conditions)	
ESC-01	Site and project boundaries
N/A	Areas disturbed during geotechnical or other preconstruction investigation work
ESC-02	Existing roads and trails
N/A	Drainage areas
ESC-02	Discharge locations
ESC-02	Existing storm drain system if applicable
N/A	Proposed locations of storage areas for waste
N/A	Proposed locations of construction materials
N/A	Proposed locations of project staging areas
N/A	Proposed locations of stockpiles
N/A	Proposed locations of vehicles, equipment staging and vehicle maintenance
N/A	Proposed locations of loading/unloading materials
ESC-02	Proposed locations of site access (entrance/exits)
N/A	Proposed locations of fueling, water storage, water transfer for dust control
Refer to contract drawings	Proposed locations of demolition
N/A	Proposed locations of other construction support activities
Construction and Earthwork Drawings (Proposed Conditions)	
Refer to contract drawings	Site layout (grading plans) including roads
ESC-03	Site and project boundaries

Table 2-9 Required Map Information

Included on Map/Plan Sheet No. [1]	Required Element
N/A	Drainage areas
ESC-03	Discharge locations
ESC-03	Sampling locations
ESC-01	Areas of soil disturbance (temporary or permanent)
Refer to contract drawings	Proposed active areas of soil disturbance (cut or fill)
ESC-03	Proposed locations of erosion control BMPs
ESC-03	Proposed locations of sediment control BMPs
ESC-03	Proposed locations of run-off BMPs
N/A	Temporary and/or permanent run-on conveyance (if applicable)
ESC-03	Proposed locations of active treatment systems(s) (if applicable)
ESC-03	Proposed locations of storage areas for waste
ESC-03	Proposed locations of construction materials
ESC-03	Proposed locations of project staging areas
TBD	Proposed locations of stockpiles
ESC-03	Proposed locations of vehicles, equipment and vehicle maintenance
ESC-03	Proposed locations of loading/unloading materials
ESC-03	Proposed locations of site access (entrance/exits)
ESC-03	Proposed locations of fueling, water storage, water transfer for dust control
Refer to contract drawings	Proposed locations of demolition
ESC-03	Proposed locations of other construction support activities
Refer to contract drawings	Site-specific procedures to implement final stabilization BMPs as soon as reasonably practicable

Section 3 Best Management Practices

3.1 SCHEDULE FOR BMP IMPLEMENTATION

BMPs will be implemented as per the schedule indicated in Table 3-1.

Table 3.1 BMP Implementation Schedule

Erosion Control BMP's		
BMP	Implementation	Duration
EC-1, Scheduling	Prior to Construction	Entirety of Project
EC-2, Preservation of Existing Vegetation	Start of Construction	Entirety of Project
EC-3 Hydraulic Mulch	Start of Demolition and Grading Activities	Final Site Stabilization
EC-4 Hydroseeding	Start of Demolition and Grading Activities	Final Site Stabilization
EC-5 Soil Binders	Start of Demolition and Grading Activities	Final Site Stabilization
EC-6 Straw Mulch	Start of Demolition and Grading Activities	Final Site Stabilization
EC-7 Geotextiles and Mats	Start of Demolition and Grading Activities	Final Site Stabilization
EC-15, Soil Preparation / Roughening	Start of Demolition and Grading Activities	Final Site Stabilization
Sediment Control BMP's		
BMP	Implementation	Duration
SE-5, Fiber Rolls	Start of Demolition and Grading Activities	Final Site Stabilization
SE-7, Street Sweeping and Vacuuming	Start of Demolition and Grading Activities	Entirety of Project
SE-10, Storm Drain Inlet Protection	Start of Demolition and Grading Activities	Final Site Stabilization
Wind Erosion Control BMP's		
WE-1, Wind Erosion Control	Prior to Construction	Entirety of Project
Tracking Control BMP's		
TC-1, Stabilized Construction Entrance and Exit	Start of Demolition	Final Site Stabilization
TC-3, Entrance / Outlet Tire Wash	Start of Demolition	Final Site Stabilization

Table 3.1 BMP Implementation Schedule

Non-Stormwater Control BMP's		
NS-1 Water Conservation Practices	Start of Demolition	Final Site Stabilization
NS-2 Dewatering Operations	Start of Demolition	Final Site Stabilization
NS-3, Paving and Grinding Operations	Start of Demolition	Final Site Stabilization
NS-6, Illicit Connection Discharge	Start of Demolition	Final Site Stabilization
NS-7, Potable Water/Irrigation	Start of Demolition	Final Site Stabilization
NS-8, Vehicle and Equipment Cleaning	Start of Demolition	Final Site Stabilization
NS-9, Vehicle and Equipment Fueling	Start of Demolition	Final Site Stabilization
NS-10, Vehicle and Equipment Maintenance	Start of Demolition	Final Site Stabilization
NS-12, Concrete Curing	Prior to Construction	Final Site Stabilization
NS-13, Concrete Finishing	Prior to Construction	Final Site Stabilization
Waste Management Control BMP's		
WM-1, Material Delivery and Storage	Prior to Construction	Final Site Stabilization
WM-2, Material Use	Prior to Construction	Final Site Stabilization
WM-3, Stockpile Prevention and Control	Prior to Construction	Final Site Stabilization
WM-4, Spill Prevention and Control	Start of Demolition	Final Site Stabilization
WM-5, Solid Waste Management	Start of Demolition	Final Site Stabilization
WM-6, Hazardous Waste Management	Start of Demolition	Final Site Stabilization
WM-7, Contaminated Soil Management	Start of Demolition	Final Site Stabilization
WM-8, Concrete Waste Management	Start of Demolition	Final Site Stabilization
WM-9, Sanitary/Septic Waste Management	Start of Demolition	Final Site Stabilization

Table 3.1 BMP Implementation Schedule

WM-10, Liquid Waste Management	Start of Demolition	Final Site Stabilization

3.2 EROSION AND SEDIMENT CONTROL

Erosion and sediment controls are required by the 2022 CGP to provide effective reduction or elimination of sediment related pollutants in stormwater discharges and authorized non-stormwater discharges from the Site. Applicable BMPs are identified in this section for erosion control, sediment control, tracking control, and wind erosion control.

3.2.1 Erosion Control

Erosion control, also referred to as soil stabilization, consists of source control measures that are designed to prevent soil particles from detaching and becoming transported in stormwater runoff. Erosion control BMPs protect the soil surface by covering and/or binding soil particles.

This construction project will implement the following practices to provide effective temporary and final erosion control during construction:

1. Preserve existing vegetation where required and when feasible.
2. The area of soil disturbing operations shall be controlled such that the Contractor is able to implement erosion control BMPs quickly and effectively.
3. Stabilize non-active areas within 14 days of cessation of construction activities or sooner if stipulated by local requirements.
4. Control erosion in concentrated flow paths by applying erosion control blankets, check dams, erosion control seeding, or alternate methods.
5. Prior to the completion of construction, apply permanent erosion control to remaining disturbed soil areas.

Sufficient erosion control materials shall be maintained onsite to allow implementation in conformance with this SWPPP.

The following erosion control BMP selection table, Table 3-2 indicates the BMPs that will be implemented to control erosion on the construction site. Fact Sheets for temporary erosion control BMPs are provided in Appendix G. Refer to Appendix A for locations of all BMP's to be implemented.

These temporary erosion control BMPs shall be implemented in conformance with the following guidelines and as outlined in the BMP Factsheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Table 3.2 Temporary Erosion Control BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project	BMP Used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
EC-1	Scheduling	✓	X		
EC-2	Preservation of Existing Vegetation	✓	X		
EC-3	Hydraulic Mulch	✓	X		
EC-4	Hydroseed	✓	X		
EC-5	Soil Binders	✓	X		
EC-6	Straw Mulch	✓	X		
EC-7	Geotextiles and Mats	✓	X		
EC-8	Wood Mulching	✓		X	Alternative measures to be used as noted.
EC-9	Earth Dike and Drainage Swales	✓		X	Alternative measures to be used as noted.
EC-10	Velocity Dissipation Devices			X	Project will not require use of this measure due to site conditions.
EC-11	Slope Drains			X	Project will not require use of this measure due to site conditions.
EC-12	Stream Bank Stabilization			X	Not adjacent to streambank.
EC-14	Compost Blankets	✓		X	Project will not require use of this measure (due to low slopes).
EC-15	Soil Preparation-Roughening		X		
EC-16	Non-Vegetated Stabilization	✓		X	Project will not require use of this measure (due to low slopes).
WE-1	Wind Erosion Control	✓	X		
Alternate BMPs Used:					**If used, state reason:**

Scheduling

The Contractor shall create a schedule to include major activity sequences with the implementation of construction site BMP's. The contractor shall sequence construction activities with the installation of both soil stabilization and sediment control measure BMP's to reduce the discharge of sediment and pollutants to the storm drain facilities. The schedule shall detail implementation and deployment of BMP's, and identify dates where non-stormwater discharges may be produced. The Contractor shall keep a copy of the latest construction schedule, and any changes / updates, in the SWPPP under the Appendix.

Preservation of Existing Vegetation

Existing site vegetation within the construction area [will be removed / protected in place]. The Contractor is responsible for protecting existing vegetated areas to remain, including but not limited to adjacent properties, planting areas, landscaping, and playing fields from damage due to demolition and construction activities. Damaged areas will be repaired and/or replaced as required. Additionally, following establishment of proposed landscaped / vegetated areas, the Contractor will also implement measures as required to protect new landscaped / vegetated areas

Hydraulic Mulch

Hydraulic mulch, if selected as a temporary BMP, shall be per the requirements of the referenced CASQA BMP. Hydraulic mulch may be used generally throughout the construction site as required.

Hydroseed

Hydroseed, if selected as a temporary BMP, shall be per the requirements of the referenced CASQA BMP. Hydroseed shall be a native or adaptive seed blend; the mix shall be reviewed and approved by the QSP prior to application. Hydroseeding shall be applied in conjunction with the following BMP's: straw mulch, rolled erosion control products such as blankets, mats, or jute mesh netting, etc. Refer to the referenced CASQA BMP's for additional information. Hydroseed may be used generally throughout the construction site as required.

Soil Binders

Soil binders, if selected as a temporary BMP, shall be per the requirements of the referenced CASQA BMP. Soil binders shall be reviewed and approved by the QSP prior to application. Soil binder runoff may require implementation of a sediment basin or trap depending on the binder selected; the contractor shall coordinate with the QSP with regards to selection. Soil binders may be used generally throughout the construction site as required.

Straw Mulch

Straw mulch, if selected as a temporary BMP, shall be per the requirements of the referenced CASQA BMP. Straw mulch may be used generally throughout the construction site as required.

Geotextiles and Mats

Geotextiles and mats shall be per the requirements of the referenced CASQA BMP. The following geotextiles and mats shall be used accordingly:

- Plastic or woven covers for stockpile areas, etc.
- Erosion control blankets (such as rolled blankets, jute mesh, netting, etc.) at the following locations: General site protections, sloped areas (e.g. landscaping), stockpiles, etc.
- The following shall be limited on-site without prior approval of the QSP: Non-biodegradable products such as plastic netting, plastic covers, etc.

Soil Preparation-Roughening

Soil preparation such as roughening, track-walking, etc., shall be per the requirements of the referenced CASQA BMP. Soil shall be prepared by the referenced methods generally throughout the construction site as required. Roughened areas shall be temporarily stabilized with the following additional measures: hydroseeding, hydraulic mulching. Roughening shall

be minimized in areas where geotextiles and mats shall be applied (e.g. sloped areas, etc.) to prevent “bridging” of the mats over roughened soils.

Wind Erosion Control

Wind erosion control measures (such as spraying of water or other approved palliative materials) will be implemented to provide dust control and prevent discharges from dust control activities and water supply equipment. Water application rates will be minimized as necessary to prevent runoff and ponding. Water equipment leaks will be repaired immediately. During winding conditions (forecast or actual wind conditions of approximately 25 mph or greater), dust control will be applied to disturbed areas, including haul roads, to adequately control erosion.

3.2.2 Sediment Controls

Sediment controls are temporary or permanent structural measures that are intended to complement the selected erosion control measures and reduce sediment discharges from active construction areas. Sediment controls are designed to intercept and settle out soil particles that have been detached and transported by the force of water.

The following sediment control BMP selection table indicates the BMPs that will be implemented to control sediment on the construction site. Fact Sheets for temporary sediment control BMPs are provided in Appendix G.

These temporary sediment control BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Table 3.3 Temporary Sediment Control BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
SE-1	Silt Fence	✓		X	Alternative measures to be used as noted.
SE-2	Sediment Basin			X	Alternative measures to be used as noted.
SE-3	Sediment Trap			X	Alternative measures to be used as noted.
SE-4	Check Dams			X	Alternative measures to be used as noted.
SE-5	Fiber Rolls	✓	X		
SE-6	Gravel Bag Berm	✓		X	Alternative measures to be used as noted.
SE-7	Street Sweeping	✓	X		
SE-8	Sandbag Barrier	✓		X	Alternative measures to be used as noted.
SE-9	Straw Bale Barrier			X	Alternative measures to be used as noted.
SE-10	Storm Drain Inlet Protection	✓ RL2&3	X		
SE-11	ATS			X	Site has a calculated Risk Level of 1; ATS is not required.
SE-12	Manufactured Linear Sediment Controls			X	Alternative measures to be used as noted.
SE-13	Compost Sock and Berm	✓		X	Alternative measures to be used as noted.
SE-14	Biofilter Bags	✓		X	Alternative measures to be used as noted.
N/A	Passive Treatment System			X	Passive treatment will not be implemented on the site.
TC-1	Stabilized Construction Entrance and Exit		X		
TC-2	Stabilized Construction Roadway	✓		X	Alternative measures to be used as noted.
TC-3	Entrance Outlet Tire Wash		X		
Alternate BMPs Used:					**If used, state reason:**

Table 3.3 Temporary Sediment Control BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	

Fiber Rolls

Fiber rolls shall be per the requirements of the referenced CASQA BMP. Fiber rolls will be installed in locations as shown per the Exhibits in Appendix A.

Gravel Bag Berm

Gravel bag berms will be constructed per the referenced CASQA BMP. Berms shall be used, at a minimum, in the following locations:

- At locations identified with the potential for off-site run-on, to direct flows away from construction areas.
- Within curb and gutter along Fairview Drive and Hall Canyon Road to provide barriers against potential sediment transport.
- At the perimeter of all stockpile and storage areas.
- Within valley gutters or onsite curbs
- Adjacent to all operational inlets to the storm drain system, and at adjacent susceptible offsite inlets (see Site Maps in the Appendix).
- Perimeters of water quality storage areas (bioretention areas); see the Site Plans in Appendix B for locations.

Street Sweeping

Street sweeping and vacuuming will occur during soil hauling and as necessary to keep street surfaces clear of soil and debris. Washing of sediment tracked onto streets into storm drains shall not occur. Additionally, the Contractor shall perform sweeping of on-site asphalt pavement areas prior to predicted storm events (during BMP inspections) to prevent sediments from entering drainage inlets.

Sandbag Barrier

Sandbag barriers will be constructed per the referenced CASQA BMP. Sandbags may be used in lieu of fiber rolls for perimeter controls. If selected, sand bags shall be installed in the same locations as described under the “Gravel Bag Berm” section, with the following exception: Sandbags shall not be used for drainage inlet protection or barriers within curb and gutters.

Storm Drain Inlet Protection

Storm drain inlet protections will be provided around all operational internal inlets to the storm drain system, and at adjacent susceptible offsite inlets to the storm drain system, as show on the drawings in Appendix B.

Drainage inlets located within bioretention areas (set above adjacent grade) shall be protected with inline inlet filter bags or screens. Inlet bags / screens shall be inspected weekly (at a minimum), and in accordance with inspections required for storm events. Refer to the manufacturer's instructions for removal and replacement.

For drains that are too small for installation of inlet bags (e.g. area drains, inline drains, etc.), the following protection methods shall be used: (1) Filter fabric wrapped around the inlet grate to form a complete barrier against sediment entry, or (2) gravel bags around the inlet per (BMP's). Alternatively, in-line planter and area drain laterals may be stubbed up 30 inches with the top wrapped in plastic for protection. (Once inlets are installed, they shall be protected as noted above.)

Stabilized Construction Entrance and Exit

Stabilized construction entrances and exits will be constructed per the referenced CASQA BMP. The Contractor shall comply with the referenced CASQA BMP for installation, maintenance, and removal of the construction entrance/exit. Prior to installation of the crushed rock, the Contractor shall provide a layer of filter fabric or geotextile beneath the rock. The Contractor shall periodically inspect the fabric where visible and will repair / replace the fabric as needed (or when obvious damage is observed). At a minimum, the site will have one entrance and exit, located on the Site Plans in Appendix B.

Stabilized Construction Roadway

Stabilized construction roadways shall be constructed per the referenced CASQA BMP. The Contractor shall comply with the referenced CASQA BMP for installation, maintenance, and removal of the roadway. Prior to installation of the crushed rock, the Contractor shall provide a layer of filter fabric or geotextile beneath the rock. The Contractor shall periodically inspect the fabric where visible, and will repair / replace the fabric as needed (or when obvious damage is observed). The site entrance/exit will be located as shown on the Site Plans in Appendix B.

Entrance Outlet Tire Wash

An entrance/outlet tire wash station will be installed adjacent to the stabilized construction entrance and exit to minimize sediment tracking to public streets. Wash water use will be minimized. Wash water will be filtered as required to prevent sediment and pollutants from either exiting the construction area, or entering the storm drainage system. Water filtration will be accomplished by use of settling basin, flow-through filtration bag. If a pre-manufactured settling structure will be used for filtration, such as a flow-through bag, provide reference to manufacturer's data in Appendix H.

3.3 NON-STORMWATER CONTROLS AND WASTE AND MATERIALS MANAGEMENT

3.3.1 Non-Stormwater Controls

Non-stormwater discharges into storm drainage systems or waterways which are not authorized under the 2022 CGP are prohibited. Non-stormwater discharges for which a separate NPDES permit is required by the local Regional Water Board are prohibited unless coverage under the separate NPDES permit has been obtained for the discharge. The selection of non-stormwater BMPs is based on the list of construction activities with a potential for non-stormwater discharges identified in Section 2.7 of this SWPPP.

The following non-stormwater control BMP selection table indicates the BMPs that will be implemented to control sediment on the construction site. Fact Sheets for temporary non-stormwater control BMPs are provided in Appendix G.

Non-stormwater BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Table 3.4 Temporary Non-Stormwater BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project [1]	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
NS-1	Water Conservation Practices	✓	X		
NS-2	Dewatering Operation		X		
NS-3	Paving and Grinding Operation		X		
NS-4	Temporary Stream Crossing			X	Project is not adjacent to a stream.
NS-5	Clear Water Diversion			X	Project will not require clear water diversion.
NS-6	Illicit Connection-Illegal Discharge Connection	✓	X		
NS-7	Potable Water Irrigation Discharge Detection		X		
NS-8	Vehicle and Equipment Cleaning	✓	X		
NS-9	Vehicle and Equipment Fueling	✓	X		
NS-10	Vehicle and Equipment Maintenance	✓	X		
NS-11	Pile Driving Operation		X		
NS-12	Concrete Curing		X		
NS-13	Concrete Finishing		X		
NS-14	Material and Equipment Use Over Water			X	Project is not adjacent to a waterbody.

Table 3.4 Temporary Non-Stormwater BMPs

CASQA Fact Sheet	BMP Name	Considered for the Project [1]	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
NS-15	Demolition Removal Adjacent to Water			X	Project is not adjacent to a waterbody.
NS-16	Temporary Batch Plants			X	Project will not require the use of batch plants.
Alternate BMPs Used:					**If used, state reason:**

Water Conservation Practices

Water conservation practices shall be implemented for all demolition and construction activities that use water.

Dewatering Operation

The project will be constructed in a location that requires the use of dewatering. The Contractor shall comply with the requirements of the referenced CASQA BMP and the site-specific details included with the Site Plans in Appendix B. All water produced from dewatering operations shall be subject to the NAL's previously described and must comply before being discharged from the site. Water produced shall be discharged into the storm drain system. Water shall not be used for other activities such as temporary irrigation, wind erosion controls, etc. without prior approval from the QSP.

Paving and Grinding Operation

The project will include (but is not limited to) the following pavement operations: demolition and removal of existing pavements, grinding of existing pavements, asphalt concrete installation, regular concrete installation. BMP's shall be implemented sufficiently to prevent paving materials from being discharged off-site. Inlet protections (per SE-10, see previous) shall be verified as functioning and properly installed prior to paving operations. Following paving operations, the area will be swept, inlet covers will be removed, and the inlets will be inspected for paving materials. Inlet filters shall be repaired and/or replaced as needed to provide sufficient protection.

Illicit Connection/Discharge

The Contractor shall comply with the referenced CASQA BMP for prevention of illicit connections and/or illegal discharges, including detection and reporting, throughout the duration of the project.

Potable Water/Irrigation

The Contractor shall comply with the referenced CASQA BMP requirements for potable water irrigation discharges and detection throughout the duration of the project.

Vehicle and Equipment Cleaning

The Contractor shall comply with the referenced CASQA BMP requirements for vehicle equipment and cleaning throughout the duration of the project. Vehicle and equipment cleaning shall be limited to specific measures to prevent sediment and pollutant transport off the site (e.g. tire washing, pollutant clean-up, etc.).

Vehicle and Equipment Fueling

Several types of vehicles and equipment will be used on-site throughout the project, including: graders, scrapers, excavators, loaders, paving equipment, rollers, trucks, trailers, backhoes, forklifts, generators, compressors, and traffic control equipment. The Contractor shall comply with the referenced CASQA BMP to prevent discharges of fuel and other vehicle fluids. Fuel shall be limited to equipment only; no vehicle refueling shall take place on the site without prior approval from the QSP and/or LRP.

Vehicle and Equipment Maintenance

The Contractor shall comply with the referenced CASQA BMP to prevent discharges of fuel and other vehicle fluids. Vehicle and equipment maintenance shall be limited to minor maintenance; major maintenance (including but not limited to major equipment or vehicle failure, etc.) shall not take place on the site without prior approval from the QSP and/or LRP.

Pile Driving Operation

Construction of this project will include pile driving operations for the following structures: retaining walls. The Contractor shall comply with the requirements of the referenced CASQA BMP, as well as all other BMP's selected for sediment and pollutant protection that may result from pile driving operations.

Concrete Curing

The project will include placement and curing of concrete pavement, structures and foundations. The Contractor shall comply with the referenced CASQA BMP, as well as implement additional measures and procedures as necessary, to prevent concrete curing materials from entering drainage systems.

Concrete Finishing

See above notes for Concrete Curing

3.3.2 Materials Management and Waste Management

Materials management control practices consist of implementing procedural and structural BMPs for handling, storing, and using construction materials to prevent the release of those materials into stormwater discharges. The amount and type of construction materials to be utilized at the Site will depend upon the type of construction and the length of the construction period. The materials may be used continuously, such as fuel for vehicles and equipment, or the materials may be used for a discrete period, such as soil binders for temporary stabilization.

Waste management consist of implementing procedural and structural BMPs for handling, storing, and ensuring proper disposal of wastes to prevent the release of those wastes into stormwater discharges.

Materials and waste management pollution control BMPs will be implemented to minimize stormwater contact with construction materials, wastes, and service areas; and to prevent materials and wastes from being discharged off-site. The primary mechanisms for stormwater contact that shall be addressed include:

- Direct contact with precipitation
- Contact with stormwater run-on and runoff
- Wind dispersion of loose materials
- Direct discharge to the storm drain system through spills or dumping
- Extended contact with some materials and wastes, such as asphalt cold mix and treated wood products, which can leach pollutants into stormwater.

A list of construction activities is provided in Section 2.6. The following Materials and Waste Management BMP selection table, Table 3-5, indicates the BMPs that shall be implemented to handle materials and control construction site wastes associated with these construction activities. Fact Sheets for Materials and Waste Management BMPs are provided in Appendix G.

Material management BMPs will be implemented in conformance with the following guidelines and in accordance with the BMP Fact Sheets provided in Appendix G. If there is a conflict between documents, the Site Map will prevail over narrative in the body of the SWPPP or guidance in the BMP Fact Sheets. Site specific details in the Site Map prevail over standard details included in the Site Map. The narrative in the body of the SWPPP prevails over guidance in the BMP Fact Sheets.

Table 3.5 Temporary Materials Management BMPs

CASQA Fact Sheet	BMP Name	Considered for Project	BMP used		If not used, state reason and alternate BMP, if applicable
			YES	NO	
WM-01	Material Delivery and Storage	✓	X		
WM-02	Material Use	✓	X		
WM-03	Stockpile Management	✓	X		
WM-04	Spill Preservation and Control	✓	X		
WM-05	Solid Waste Management	✓	X		
WM-06	Hazardous Waste Management	✓	X		
WM-07	Contaminated Soil Management		X		
WM-08	Concrete Waste Management	✓	X		
WM-09	Sanitary-Septic Waste Management	✓	X		
WM-10	Liquid Waste Management		X		
Alternate BMPs Used:					**If used, state reason:**

Material Delivery and Storage

The Contractor shall comply with the referenced BMP's to prevent discharges of construction materials during delivery, storage, and use. The general material storage area will be located in the Contractor's yard as shown on the WPCDs. Sandbag or gravel barriers will be provided around the storage area to prevent run-on from adjacent areas.

Very large items, such as light standards, framing materials, and stockpiled lumber, will be stored in the open in the general storage area. Such materials will be elevated with wood blocks to minimize contact with run-on. Spill clean-up materials, material safety data sheets, a material inventory, and emergency contact numbers will be maintained and stored onsite.

Material Use

The Contractor shall comply with the referenced CASQA BMP's for material usage.

Stockpile Management

Any on-site stockpile locations must be approved by both the QSP and the LRP. The Contractor shall comply with the referenced CASQA BMP to reduce or eliminate pollution of storm water from stockpiles of soil and paving materials such as Portland Cement Concrete (PCC) rubble, asphalt concrete (AC), asphalt concrete rubble, aggregate base, aggregate sub-base, pre-mixed aggregate, and asphalt minder (so called "cold mix" asphalt). Stockpiles will be surrounded with sediment controls (sand or gravel bags), and plastic covers. Soil stockpiles, when approved, shall be temporarily stabilized with plastic covers and sand/gravel bag barriers at the toe. Alternatively, soil stockpiles may be stabilized with other measures such as hydraulic mulch, soil binders, and/or straw mulch (see Temporary Sediment Control BMP's for further instructions).

Spill Prevention and Control

The Contractor shall implement the referenced CASQA BMP to contain and clean-up spills and prevent material discharges to the storm drain system. Spill prevention is also discussed above in Material Delivery, Storage, and below in the following waste management and equipment maintenance sections.

Solid Waste Management

The Contractor shall comply with the referenced CASQA BMP's to minimize storm water contact with waste materials and prevent waste discharges. Solid wastes will be loaded directly into trucks for off-site disposal. When on-site storage is necessary, solid wastes will be stored in watertight dumpsters in the general storage area of the Contractor's yard. AC and PCC rubble will be stockpiled in the general storage area and will be surrounded with sediment controls (sand bag or gravel bag barriers) and covered when necessary. Solid waste, including rubble stockpiles, will be removed and disposed off-site at least weekly.

Hazardous Waste Management

When dealing with hazardous waste: petroleum products, concrete curing compounds, palliatives, septic wastes, stains, wood preservatives, roofing tar, solvents, paints, acids, pesticides, asphalt products and any materials deemed hazardous waste in California, Title 22 Division 4.5, or listed in 40 CFR Parts 110, 117, 261 or 302 will be contained and disposed of per WM-6, or as required by the authorities having jurisdiction. Hazardous wastes will be stored in the shipping containers or covered containment area discussed above for materials storage. Hazardous wastes will be appropriate and clearly marked containers and segregated from other non-waste materials.

Contaminated Soil Management

At the time of the preparation of the SWPPP, there were no known areas of contaminated soils. However, if or when contaminated soils are encountered, both the LRP and the City Engineer will be notified, the contaminated soils will be contained, covered if stockpiled, and disposed of per WM-7, Contaminated Soil Management, and the contract documents. Employees will be instructed to recognize evidence of contaminated soil, such as buried debris, discolored soil, and unusual odors. Impaired soils from spills and leaks will be properly and promptly cleaned up and stages/stores disposed of.

Concrete Waste Management

This project includes placement of concrete. Discharges will consist of rinse water and residual concrete (Portland cement, aggregates, admixture, and water). Estimated pour dates are shown on the project schedule in Appendix F. Concrete pours will not be conducted during or immediately prior to rainfall events.

The Contractor shall comply with the referenced CASQA BMP. The Contractor shall provide concrete washout(s) as required to contain both the concrete washout wastes collected from concrete operations, and additional volume for any anticipated rainfall. Concrete wash-outs may consist of at-grade washouts, below-grade washouts, and/or portable (e.g. "roll-off") washouts, so long as sufficient volume is provided. All excess concrete and concrete washout slurries will be discharged to the washout facility for drying. BMP maintenance, waste disposal, and BMP removal will be conducted as described in WM-8. Dried-off concrete will be used as fill material if permitted by the City Engineer.

Concrete waste solids/liquids will be removed and disposed of as required by WM-8.

Sanitary-Septic Waste Management

Portable toilets will be located and maintained at the Contractor's yard for the duration of the project. Toilets shall have sufficient leak protections (e.g. plastic pans, traps, etc.) to prevent any accidental discharges from entering flow paths. Additionally, toilets shall be secured to the ground or other stable structures to prevent tipping or falling over during high wind events. Weekly maintenance will be provided by the contractor and wastes will be disposed off-site. The toilets will be located away from concentrated flow paths and traffic flow.

Liquid Waste Management

The Contractor will comply with the referenced CASQA BMP when construction involves non-hazardous by-products, residuals, or wastes, such as drilling slurries and fluids, and grease-free and oil-free rinse water. Liquid wastes will be contained and disposed of, and not allowed to enter drainage systems.

3.4 TMDL-RELATED BMPS

This project is not subject to TMDL compliance.

Bacteria TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Chloride and Salts TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Diazinon TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Nutrient TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Sediment TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Temperature BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

Metals and Toxics TMDL BMPs:

- No additional BMPs are identified for this pollutant category in the 2022 CGP.

3.5 POST CONSTRUCTION STORMWATER MANAGEMENT MEASURES

Post construction BMPs are permanent measures installed during construction, designed to reduce or eliminate pollutant discharges from the site after construction is completed.

This site is subject to the post-construction requirements of an existing NPDES Phase I or Phase II MS4. ☐ Yes ☒ No

The post construction runoff reduction requirements have been satisfied through compliance with 2022 CGP Provision IV.N.3 and use of the SMARTS water balance calculator. The post construction requirements will be uploaded as part of the PRDs as required by 2022 CGP Provision IV.N.2.

The following source control, site design, and treatment control post-construction BMPs to comply with 2022 CGP Section IV.N.3 have been identified for the site:

- Site Design: Tree planting.

A plan for the post construction funding and maintenance of these BMPs has been developed to address at minimum five years following construction. The post construction BMPs that are described above will be funded and maintained as described in the Operations and Maintenance Plan that will be uploaded with the NOT.

Section 4 BMP Inspection and Maintenance

4.1 BMP INSPECTION AND MAINTENANCE

The 2022 CGP requires routine weekly inspections of BMPs, along with inspections before, during, and after qualifying precipitation events. A BMP inspection checklist must be filled out for inspections and maintained on-site with the SWPPP. The inspection checklist must include the necessary information covered in Section 7.6. A blank BMP Inspection Form can be found in Appendix H. Completed forms will be kept in Appendix N.

Maintenance, repair, or design and implementation of new BMPs alternatives will begin withing 72 hours of the identification of failures or other shortcomings. Corrections will be completed as soon as possible, prior to the next forecasted precipitation event (2022 CGP Appendix D Section II.J).

The QSP will verify that all BMP maintenance and repairs were appropriately implemented during the next visual inspection following completion.

The QSP may delegate BMP maintenance and repair verification to an appropriately trained QSP Delegate.

Specific details for maintenance, inspection, and repair of Construction Site BMPs can be found in the BMP Factsheets in Appendix G.

Section 5 Training

Appendix J identifies the QSPs and QSP Delegates for the project. To promote stormwater management awareness specifically for this project, periodic training of job-site personnel will be included as part of routine project meetings (e.g., daily/weekly tailgate safety meetings), or task specific training as needed. Refresher training will be provided as necessary.

The QSP will be responsible for providing this information at the meetings and subsequently completing the Training Reporting Form shown in Appendix I, which identify the site-specific stormwater topics covered as well as the names of site personnel who attended the meeting.

The QSP may delegate specific tasks to trained QSP Delegates who have received the following training based on the guidelines developed by the Construction General Permit Training Team.

1. **Foundational training** for all QSP Delegate(s) regarding stormwater compliance roles and responsibilities, forecast information, and documentation and reporting procedures; and
2. **Site-specific training** regarding visual inspections, sampling procedures, and/or SWPPP and BMP implementation activities relevant to the responsibilities assigned to the QSP Delegate(s).

The delegate cannot perform the QSD and QSP inspections required in Section V.C.4 or Section V.D.2, respectively.

Documentation of training activities will be retained in Appendix I.

Section 6 Responsible Parties and Operators

6.1 RESPONSIBLE PARTIES

Duly Authorized Representative(s) (DARs) who are responsible for SWPPP implementation and have authority to sign permit-related documents are listed below. The DAR(s) assigned to this project are:

Name	Title	Phone Number

QSD(s) identified for the project are identified in Appendix J. The QSD will have primary responsibility for assessing how construction activities will affect sediment transport, erosion, and other discharges of pollutants in stormwater runoff throughout the project. The QSD is required to revise the SWPPP to address potential problems identified by visual inspections, sampling data, comments from a QSP, or their own site observations. The QSD is required to perform the following on-site visual inspections:

- Within 30 days of construction activities commencing on site;
- Within 30 days when a new QSD is assigned to the project;
- Twice annually, once August through October and once January through March;
- Within 14 calendar days after a numeric action level exceedance; and
- Within the time period requested in writing from Regional Water Board staff.

QSPs and QSP Delegates identified for the project are identified in Appendix J. The QSP will have primary responsibility and significant authority for the implementation, maintenance, and inspection/monitoring of SWPPP requirements. The QSP will always be available throughout the duration of the project.

Duties of the QSP include but are not limited to:

- Implementing all elements of the 2022 CGP and SWPPP, including, but not limited to:
    - Performing the following on-site visual inspections:
        - One inspection per calendar month; other weekly inspections in the month can be delegated to a trained QSP Delegate under the specific direction of the QSP.
        - Within 72 hours prior to a forecasted qualifying precipitation event, to inspect any areas of concern and to verify the status of any deficient BMPs, or other identified issues at the site. If extended forecast precipitation data (greater than 72 hours) is available from the *National Weather Service*, then the Pre-Precipitation Event inspection may be done up to 120 hours in advance.

        - Within 14 days after a NAL exceedance, the QSP shall visually inspect the drainage area for exceedance and document any areas of concern.
        - Prior to the submittal for the NOT or COI (for acreage changes) for all or part of the site.
    - Ensuring that all BMPs are implemented, inspected, and properly maintained;
    - Ensure that the SMARTS generated WDID Number Notification form is posted on-site, in a location viewable by the public or readily available upon request, and the dates are correct and match the dates listed in SMARTS.
- Implementing non-stormwater management, and materials and waste management activities such as: monitoring discharges; general Site clean-up; vehicle and equipment cleaning, fueling and maintenance; spill control; ensuring that no materials other than stormwater are discharged in quantities which will have an adverse effect on receiving waters or storm drain systems, etc.;
- Ensuring elimination of unauthorized discharges.
- The QSPs shall be assigned authority by the LRP to mobilize crews in order to make immediate repairs to the control measures.
- Coordinate with the Contractor(s) to assure the necessary corrections/repairs are made immediately and that the project complies with the SWPPP, the 2022 CGP, and approved plans at all times.
- Notifying the LRP or Duly Authorized Representative immediately of off-site discharges or other non-compliance events.
- Providing foundation and site-specific training to QSP Delegates and overseeing QSP Delegate work. Tasks that may be delegated to appropriately trained QSP-delegates include:
    - Performing non-stormwater and stormwater visual observations and inspections;
    - Performing stormwater sampling and analysis, as required; and
    - Performing routine inspections and observations.

Table 6-1. QSP and QSP Delegate Authorized Inspections

	Weekly BMP and NSW	Pre-QPE	Daily-QPE Visual Inspections	Post-QPE Visual Inspections	Post NAL Exceedances	Monthly BMP and NSW	NOT
QSP	X	X	X	X	X	X	X
QSP Delegate	X		X	X			

6.2 CONTRACTOR LIST

Refer to Appendix K for a list of contractors and subcontractors.

Section 7 Construction Site Monitoring Program

7.1 Purpose

This Construction Site Monitoring Program was developed to address the following objectives:

1. To demonstrate that the site is in compliance with the Discharge Prohibitions ;
2. To determine whether non-visible pollutants discharged from the construction site and are causing or contributing to exceedances of water quality objectives;
3. To determine whether immediate corrective actions, additional BMP implementation, or SWPPP revisions are necessary to reduce pollutants in stormwater discharges and authorized non-stormwater discharges;
4. To determine whether BMPs included in the SWPPP are effective in preventing or reducing pollutants in stormwater discharges and authorized non-stormwater discharges.

7.2 Applicability of Permit Requirements

This project has been determined to be a Risk Level 1 project. The 2022 CGP identifies the following types of monitoring as being applicable for a Risk Level 1 project.

Risk Level 1

- Visual inspections of BMPs;
- Visual monitoring of the site related to qualifying precipitation events;
- Visual monitoring of the site for non-stormwater discharges;
- Sampling and analysis of construction site runoff for non-visible pollutants [including TMDL pollutants] identified during the pollutant source assessments when applicable; and
- Sampling and analysis of construction site runoff as required by the Regional Water Board when applicable.

7.3. Weather and Precipitation Event Tracking

Visual monitoring and inspections requirements of the 2022 CGP are triggered by a Qualifying Precipitation Event. The 2022 CGP defines a Qualifying Precipitation Event as any weather pattern that is forecast to have a 50 percent or greater Probability of Precipitation (PoP) and a Quantitative Precipitation Forecast (QPF) of 0.5 inches or more within a 24-hour period. The event begins with the 24-hour period when 0.5 inches has been forecast and continues on subsequent 24-hour periods when 0.25 inches of precipitation or more is forecast.

7.3.1 Weather Tracking

The QSP should daily consult the National Oceanographic and Atmospheric Administration (NOAA) for the Forecast Weather Table Interface. These forecasts can be obtained at http://forecast.weather.gov. Weather reports should be printed and maintained with the SWPPP in Appendix M. Record the date and time the forecast was printed.

7.3.2 Rain Gauges

The QSP shall install a minimum of two (2) rain gauges on the project site. Locate the gauge in an open area away from obstructions such as trees or overhangs. Mount the gauge on a post at a height of 3 to 5 feet with the gauge extending several inches beyond the post. Make sure that the top of the gauge is level. Make sure the post is not in an area where rainwater can indirectly splash from sheds, equipment, trailers, etc.

The rain gauge(s) shall be read daily during normal site scheduled hours. The rain gauge should be read at approximately the same time every day and the date and time of each reading recorded. An example rain gauge log sheet is provided in Appendix O. Retain rain gauge readings in Appendix N. Follow the rain gauge instructions to obtain accurate measurements.

Once the rain gauge reading has been recorded, accumulated rain shall be emptied, and the gauge reset.

For comparison with the site rain gauge, the nearest appropriate governmental rain gauge(s) is located at

- **Name:** Ventura, California, USA
- **Station name:** Ventura-Hall Canyon
- **Site ID:** 93-0167
- **Latitude:** 34.2810°
- **Longitude:** -119.2584°
- **Elevation:** 180 ft

7.4 Monitoring Locations

Monitoring locations are shown on the Site Maps in Appendix A. Monitoring locations are described in Sections 7.6 and 7.7.

Whenever changes in the construction site might affect the appropriateness of sampling locations, the sampling locations shall be revised accordingly. All such revisions should be implemented as soon as feasible and the SWPPP amended. Temporary changes that result in a one-time additional sampling location do not require a SWPPP amendment.

7.5 Safety and Monitoring Exemptions

Safety practices for sample collection will be in accordance with the contractor's Health and Safety Plan for the project. The Contractor provide a copy of the Plan to the QSP prior to any sampling to take place on the site.

A summary of the safety requirements that apply to sampling personnel is provided below (the QSP shall fill out this section upon receipt of the Health and Safety Plan).

-
-

This project is not required to collect samples or conduct visual observations (inspections) under the following conditions (see Section III.B of the 2022 CGP):

- During dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour;

- Outside of scheduled site operating hours; or
- When the site is not accessible to personnel. Scheduled site business hours are: Monday through Friday, 7:30a.m. to 6:00p.m

If monitoring (visual monitoring or sample collection) of the site is unsafe because of the dangerous conditions noted above, then the QSP shall document the conditions for why an exception to performing the monitoring was necessary. The exemption documentation will be filed in Appendix N and must be included in the Annual Report.

7.6 Visual Monitoring

Visual monitoring includes observations and inspections. Inspections of BMPs are required to identify and record BMPs that need maintenance to operate effectively, that have failed, or that could fail to operate as intended. Visual observations of the site are required to observe storm water drainage areas to identify any spills, leaks, or uncontrolled pollutant sources.

Table 7-1 identifies the required frequency of visual observations and inspections. Inspections and observations will be conducted at the locations identified in Section 7.6.3.

Table 7-1 Summary of Visual Monitoring and Inspections

Type of Inspection	Frequency
Routine Inspections[1]	
BMP Inspections	Weekly[2]
Qualifying Precipitation Event Triggered Inspections	
Site Inspections Prior to a Qualifying Precipitation Event	Within 72 hours of a qualifying precipitation event or up to 120 hours prior if supported with forecast [2]
BMP Inspections During an Extended Qualifying Precipitation Event	Once every 24-hour period of a qualifying precipitation event[3]
Site Inspections Following a Qualifying Precipitation Event	Within 96 hours of a qualifying precipitation event[2]

[1] Inspections are required during scheduled site operating hours.

[2] Most BMPs must be inspected weekly; those identified below must be inspected more frequently.

[3] Inspections are required during scheduled site operating hours on days that the forecast predicts at least 0.25 inches of precipitation once the qualifying precipitation event commences.

7.6.1 Routine Observations and Inspections

Routine site inspections and visual monitoring are necessary to confirm that the project is in compliance with the requirements of the 2022 CGP.

7.6.1.1 Routine BMP Inspections

Inspections of BMPs are conducted to identify and record:

- BMPs that are properly installed;
- BMPs that need maintenance to operate effectively;
- BMPs that have failed; or
- BMPs that could fail to operate as intended.

7.6.1.2 Non-Stormwater Discharge Observations

Each drainage area will be inspected for the presence of or indications of prior unauthorized and authorized non-stormwater discharges. Inspections will record:

- Presence or evidence of any non-stormwater discharge (authorized or unauthorized);
- Identification and elimination of unauthorized non-stormwater discharges
- Pollutant characteristics (floating and suspended material, sheen, discoloration, turbidity, odor, etc.); and
- Source of discharge.

7.6.2 Qualifying Precipitation Event Triggered Observations and Inspections

Visual observations of the site and inspections of BMPs are required prior to a qualifying precipitation event; following a qualifying precipitation event, and every 24-hour period during a qualifying precipitation event. Pre-Qualifying Precipitation Event inspections will be conducted after consulting NOAA and determining that a precipitation event with a 50 percent or greater PoP and a QPF of 0.5 inches or more precipitation within a 24-hour period has been predicted by the National Weather Service Forecast Office.

7.6.2.1 Visual Observations Prior to a Forecasted Qualifying Precipitation Event

Within 72 hours prior to a qualifying precipitation event or up to 120 hours prior if extended forecast precipitation data is available, a stormwater visual monitoring site inspection will include observations of the following locations:

- All stormwater drainage areas to identify leaks, spills, or uncontrolled pollutant sources and when necessary, implement appropriate corrective actions.
- All BMPs to identify whether they have been properly implemented per the SWPPP and implement appropriate corrective actions, as necessary.
- All stormwater storage and containment areas to detect leaks and check for available capacity to prevent overflow.

The QSP must conduct the inspection prior to the qualifying precipitation event. Consistent with the requirements for a qualifying precipitation event, pre-rain BMP inspections and visual monitoring will be triggered by a NOAA forecast that indicates a 50 percent or greater probability of 0.5 inches of precipitation or more in a 24-hour period in the project area.

7.6.2.2 BMP Inspections During a Qualifying Precipitation Event

During an extended qualifying precipitation event, BMP inspections will be conducted at least once every 24 hours. Qualifying precipitation events are extended for each subsequent 24-hour period forecast to have at least 0.25 inches of precipitation. The BMP inspections are to identify and record:

- If BMPs were adequately designed, implemented and effective.
- BMPs that require repair or replacement due to damage.
- Additional BMPs that need to be implemented and revise the SWPPP accordingly.

If the construction site is not accessible during the rain event, visual inspections shall be performed at all relevant outfalls, discharge points, downstream locations. The inspections should record any projected maintenance activities.

7.6.2.3 Visual Observations Following a Qualifying Precipitation Event

Within 96 hours following the end of a qualifying precipitation event a stormwater visual monitoring site inspection is required to observe:

- If BMPs were adequately designed, implemented and effective.
- BMPs that require repair or replacement due to damage.
- Additional BMPs that need to be implemented and revise the SWPPP accordingly.

7.6.3 Visual Monitoring Procedures

Visual monitoring shall be conducted by the QSP or QSP Delegates.

The name(s) and contact number(s) of the QSPs or QSP Delegates assigned to conduct visual observations are listed below and their training qualifications are provided in Appendix J.

QSP Name	Phone Number

QSP Delegate Name	Phone Number

Stormwater observations shall be documented on the *Visual Inspection Field Log Sheet* (see Appendix O). BMP inspections shall be documented on the site-specific BMP inspection checklist and include photographs of areas of concern along with the QSP's description of the problem.

The QSP shall within two (2) business days of the inspection submit copies of the completed inspection report to LRP.

The completed reports will be kept in Appendix N. Results of visual monitoring must be summarized and reported in the Annual Report.

7.6.4 Visual Monitoring Follow-Up and Reporting

Maintenance, repairs, and correction of deficiencies, including design changes to BMPs, identified by the observations or inspections, including required repairs or maintenance of BMPs, shall be initiated within 72 hours of identification and completed as soon as possible, prior to the next forecasted precipitation event.

When design changes to BMPs are required, the SWPPP shall be amended to reflect the changes.

Deficiencies identified in site inspection reports and correction of deficiencies will be tracked on the *Inspection Field Log Sheet* or *BMP Inspection Report* shall be kept in Appendix N. QSP Delegates shall report issues identified during inspections that require corrective action to the QSP within 24 hours of the observation.

The QSP shall within two (2) days of the inspection submit copies of the completed *Inspection Field Log Sheet* or *BMP Inspection Report* with the corrective actions to LRP.

Results of visual monitoring must be summarized and reported in the Annual Report.

7.6.5 Visual Monitoring Locations

The inspections and observations identified in Sections 7.6.1 and 7.6.2 will be conducted at the locations identified in this section.

BMP locations are shown on the Site Maps in Appendix A.

There are two (2) discharge location(s) on the project site. Site stormwater discharge location(s) are shown on the Site Maps in Appendix A and Table 7-4 identifies each stormwater discharge location.

Table 7-4 Site Stormwater Discharge Locations

Location No.	Location
D1	Existing storm drain outfall near Fairview Drive, east of the retaining wall
D2	Storm drain connection to existing culvert in Hall Canyon Road in the southeast corner of the site.

7.7 Water Quality Sampling and Analysis

7.7.1 Sampling and Analysis Plan for Non-Visible Pollutants in Stormwater Runoff Discharges

This Sampling and Analysis Plan for Non-Visible Pollutants describes the sampling and analysis strategy and schedule for monitoring non-visible pollutants in stormwater runoff discharges from the project site.

Sampling for non-visible pollutants, including those associated with TMDLs will be conducted when (1) a breach, leakage, malfunction, or spill is observed; and (2) the leak or spill has not been cleaned up prior to the rain event; and (3) there is the potential for discharge of non-visible pollutants to surface waters or drainage system.

Table 7-5 summarizes the potential non-visible pollutants identified in the pollutant source assessment Sections 2.6 and 2.7 and the water quality constituent or indicator for that pollutant. Drainage areas where the source is present are shown on the Site Maps in Appendix A.

Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Site Drainage Area
Adhesives		Construction Materials or waste	No	Varies
Asphalt Work		Site work within asphalt pavement areas	No	Varies
Cleaning	VOCs	Contractor's yard	No	Varies
Acids		Contractor's yard	No	Varies
Bleaches	pH	Contractor's yard	No	Varies
TSP	Residual chlorine	Contractor's yard	No	Varies
Solvents	Phosphate	Contractor's yard	No	Varies
Detergents	VOCs, SVOCs	Contractor's yard	No	Varies
Concrete / Masonry Work	MBAS	Site work	No	Varies
Sealant (Methyl methacrylate)		Site work	No	Varies
Curing compounds	SVOC	Site work	No	Varies
Ash, slag, sand	VOCs, SVOCs, pH	Site work	No	Varies
Untreated wood	Formaldehyde	Site work	No	Varies
Grading / Earthworks	BOD	Site grading	No	Varies
Landscaping	Al, Zn	Various landscape planting throughout the site	No	Varies
Pesticides / Herbicides		Various landscape planting throughout the site	No	Varies

Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Site Drainage Area
Fertilizers	Product dependent, see label and check with Laboratory	Various landscape planting throughout the site	No	Varies
Aluminum sulfate	TKN, NO_3, BOD, COD, DOC, Sulfate, NH_3, Phosphate, Potassium	Various landscape planting throughout the site	No	Varies
Liquid Waste	Al, TDS, Sulfate	Contractor's yard	No	Varies
Painting	Constituents specific to materials, check with Laboratory	Site work	No	Varies
Resins		Site work	No	Varies
Thinners	COD, SVOCs	Site work	No	Varies
Paint strippers	COD, VOCs	Site work	No	Varies
Lacquers, varnishes, enamels	VOCs, SVOCs, metals	Site work	No	Varies
Sealants	COD, VOCs, SVOCs	Site work	No	Varies
Adhesives	COD	Site work	No	Varies
Planting / Vegetation Management	Phenols, SVOCs	Various landscape planting throughout the site	No	Varies
Vegetation stockpiles		Various landscape planting throughout the site	No	Varies
Fertilizers	BOD	Various landscape planting throughout the site	No	Varies
Pesticides / Herbicides	TKN, NO_3, BOD, COD, DOC, sulfate, NH_3,	Various landscape planting throughout the site	No	Varies

Table 7-5 Potential Non-Visible Pollutants and Water Quality Indicator Constituents Based on the Pollutant Source Assessment

Pollutant	Water Quality Indicator or Constituent	Source/Reason from Pollutant Source Assessment	TMDL Pollutant	Site Drainage Area
	Phosphate, Potassium			
Sanitary Waste Sewer line breaks and Portable Toilets (using clear fluid – blue fluid is visible if discharged)	Cu, Pb, VOCs	Contractor's yard and any other location where portable toilets are stored	Yes	Varies
Soil Preparation / Amendments/Dust Control	BOD, Total/Fecal coliform		No	Varies
Polymer / Co-polymers			No	Varies
Lignin sulfate	TKN, NO_3, BOD, COD, DOC, Sulfate, Ni		No	Varies
Psyllium	TDS, alkalinity		No	Varies
Guar/Plant Gums	COD, TOC		No	Varies
Solid Waste (leakage)	COD, TOC, Ni	Site piping areas	Yes	Varies
Utility Line Testing and Flushing	BOD	Sitework areas (utilities)	No	Varies
Vehicle and Equipment Use	Residual chlorine, chloramines	Various locations throughout the site	No	Varies
Batteries	Sulfuric acid; Pb, pH	Various locations throughout the site	No	Varies

Risk Level 1 projects are not required by the 2022 CGP to collect run-on samples. However, the QSP shall review areas where the project has the potential for run-on, and whether this run-on

has the potential contribute non-visible pollutants to stormwater discharges from the project. Locations of such run-on to the project site are shown on the Site Maps in Appendix A.

- Northern side of the site from existing parking.

7.7.1.1 Sampling Schedule

Samples for the potential non-visible pollutant(s) and a sufficiently large unaffected background sample shall be collected during the first eight hours of discharge from rain events that result in a sufficient discharge for sample collection. Samples shall be collected during the site's scheduled hours and shall be collected regardless of the time of year and phase of the construction.

Collection of discharge samples for non-visible pollutant monitoring will be triggered only when any of the following conditions are observed during site inspections conducted prior to or during a rain event.

- Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions. Watertight conditions are defined as (1) storage in a watertight container, (2) storage under a watertight roof or within a building, or (3) protected by temporary cover and containment that prevents stormwater contact and runoff from the storage area.
- Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but (1) a breach, malfunction, leakage, or spill is observed, (2) the leak or spill is not cleaned up prior to the rain event, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- A construction activity, including but not limited to those in Section 2.6, with the potential to contribute non-visible pollutants (1) was occurring during or within 24 hours prior to the rain event, (2) BMPs were observed to be breached, malfunctioning, or improperly implemented, and (3) there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Soil amendments that have the potential to change the chemical properties, engineering properties, or erosion resistance of the soil have been applied, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.
- Stormwater runoff from an area contaminated by historical usage of the site has been observed to combine with stormwater runoff from the site, and there is the potential for discharge of non-visible pollutants to surface waters or a storm drain system.

7.7.1.2 Sampling Locations

Sampling locations are based on proximity to planned non-visible pollutant storage, occurrence or use, accessibility for sampling, and personnel safety. Planned non-visible pollutant sampling locations are shown on the Site Maps in Appendix A and include the locations identified in Table 7-6a through Table 7-6e. (grouped by sample locations).

One (1) sampling location(s) on the project site and the contractor's yard have been identified for the collection of samples of runoff from planned material and waste storage areas and areas where non-visible pollutant producing construction activities are planned.

Table 7-6a Non-Visible Pollutant Sample Locations (Contractor's yard)

Sample Location Identifier	Sample Location Description	Sample Location
C1	Contractor's construction yard	To be determined for each phase – Contractor and QSP to coordinate locations with the LRP

At the time of writing this SWPPP, agronomic soil testing had not been completed. The QSP will coordinate with the Landscape Architect to determine the type and extents of fertilizers and/or soil amendments to be applied. Additional testing points shall be added to Table 7-6b below as required.

Table 7-6b Non-Visible Pollutant Sample Locations (Soil Amendments)

Sample Location Identifier	Sample Location Description	Sample Location

No sampling locations have been identified for the collection of samples of runoff from drainage areas contaminated by historical usage of the site, as historical soil contamination is not expected. Should any contamination be discovered during construction, the QSP and the Contractor shall identify sampling locations to be placed in Table 7-6c below.

Table 7-6c Non-Visible Pollutant Sample Locations (Historical Usage)

Sample Location Identifier	Sample Location Description	Sample Location

Table 7-6c Non-Visible Pollutant Sample Locations (Historical Usage)

Sample Location Identifier	Sample Location Description	Sample Location

One (1) sampling location shall be determined by the QSP for the collection of an uncontaminated sample of runoff as a background sample for comparison with the samples being analyzed for non-visible pollutants. The location selected should be such that the sample will not have come in contact with the operations, activities, or areas identified in Section 7.7.1 or with disturbed soils areas. The QSP is responsible for reviewing site activities and selecting a sampling location as required, depending on site disturbance activities.

Table 7-6d Non-Visible Pollutant Sample Locations (Background – Unaffected Sample)

Sample Location Identifier	Sample Location Description	Sample Location
B1	Proposed storm drain inlet	West of new ADA ramp at top of existing ret wall.

One (2) sampling location have been identified for the collection of samples of run-on to the project site. Run-on from these locations has the potential to combine with discharges from the site being sampled for non-visible pollutants. These samples are intended to identify potential sources of non-visible pollutants that originate off the project site.

Table 7-6e Non-Visible Pollutant Sample Locations

Sample Location Identifier	Sample Location Description	Sample Location	Runoff or Run-on
R1	Existing storm inlet	Existing storm inlet in the eastern side of home bleechers.	Run-on

If a stormwater visual monitoring site inspection conducted prior to or during a storm event identifies the presence of a material storage, waste storage, operations area with spills, or the potential for the discharge of non-visible pollutants to surface waters or a storm drain system that is at a location not listed above and has not been identified on the Site Maps, sampling locations will be selected by the QSP using the same rationale as that used to identify planned locations. Non-visible pollutant sampling locations shall be documented by the QSP on the pre-rain event inspection form prior to a forecasted qualifying precipitation event and the *Effluent Sampling Field Log Sheet*, which are provided in Appendix O.

7.7.1.3 Monitoring Preparation

Non-visible pollutant samples will be collected by:

QSP _____ ☐ Yes ☐ No

QSD Delegate _____ ☐ Yes ☐ No

An adequate stock of monitoring supplies and equipment for monitoring non-visible pollutants will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. The QSP or QSP Delegates responsible for sampling will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the project site will include, but are not limited to, clean powder-free nitrile gloves, sample collection equipment, coolers, appropriate number and volume of sample bottles, identification labels, re-sealable storage bags, paper towels, personal rain gear, ice, and *Effluent Sampling Field Log Sheets* and Chain of Custody (CoC) forms, which are provided in Appendix O.

7.7.1.4 Analytical Constituents

Table 7-7 lists the specific sources and types of potential non-visible pollutants based on the project pollutant source assessment and the water quality indicator constituent(s) for that pollutant. Table 7-7 provides the specific analytical methods and reporting limits for the potential non-visible pollutants. Analytical methods were selected in compliance with U.S. EPA sufficiently sensitive method requirements in 40 Code of Federal Regulations Part 136, as evidenced by the method detection limit and minimum level.

7.7.1.5 Sample Collection

Samples of discharge shall be collected at the designated non-visible pollutant sampling locations identified in Table 7-6 and shown on the Site Maps in Appendix A or in the locations determined by observed breaches, malfunctions, leakages, spills, operational areas, soil amendment application areas, and historical site usage areas that triggered the sampling event.

Grab samples shall be collected and preserved in accordance with the methods identified in the Table 7-7, "Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants" provided in Section 7.7.1.6. Only the QSP, or QSP Delegates trained on sample collection identified in Section 7.7.1.3 shall collect samples.

Sample collection and handling requirements are described in Section 7.7.7.

Table 7-7 Sample Collection, Preservation and Analysis for Monitoring Non-Visible Pollutants

Constituent	Analytical Method	Minimum Sample Volume	Sample Containers	Sample Preservation	Minimum Level	Method Detection Limit	Maximum Holding Time
Notes: Analytical laboratories may use the term Reporting Level in lieu of Minimum Level							

7.7.1.6 Sample Analysis

Samples shall be analyzed using the analytical methods identified in Table 7-7.

Samples will be analyzed by:

Laboratory Name: _____

Street Address: _____

City, State Zip: _____

Telephone Number: _____

Point of Contact: _____

ELAP Certification Number: _____

Samples will be delivered to the laboratory by:

Driven by QSP/QSP Delegate/Contractor	☐	Yes	☐	No
Picked up by Laboratory Courier	☐	Yes	☐	No
Shipped	☐	Yes	☐	No

7.7.1.7 Data Evaluation and Reporting

The QSP shall complete an evaluation of the water quality sample analytical results based on a comparison of the results to the unaffected sample.

Runoff/downgradient results shall be compared with the associated upgradient/unaffected results and any associated run-on results. Should the runoff/downgradient sample show an increased level of the tested analyte relative to the unaffected background sample, which cannot be explained by run-on results, the BMPs, site conditions, and surrounding influences shall be assessed to determine the probable cause for the increase.

As determined by the site and data evaluation, appropriate BMPs shall be repaired or modified to mitigate discharges of non-visible pollutant concentrations. Any revisions to the BMPs shall be recorded as an amendment to the SWPPP.

Analytical results of non-visible pollutant monitoring shall be submitted to SMARTS within 30 days of obtaining the analytical results.

The 2022 CGP prohibits the storm water discharges that contain hazardous substances equal to or in excess of reportable quantities established in 40 C.F.R. §§ 117.3 and 302.4. The results of any non-stormwater discharge results that indicate the presence of a hazardous substance in excess of established reportable quantities shall be immediately reported to the Regional Water Board and other agencies as required by 40 C.F.R. §§ 117.3 and 302.4.

7.7.2 Sampling and Analysis Plan for pH and Turbidity in Stormwater Runoff Discharges

Sampling and analysis of runoff for pH and turbidity is not required for Risk Level 1 projects.

7.7.3 Sampling and Analysis Plan for pH and Turbidity in Receiving Water

This project is not subject to Receiving Water Monitoring.

7.7.4 Sampling and Analysis Plan for Dewatering Discharges

☒ Dewatering activities planned for this project will be conducted and monitored according to the requirements of the 2022 CGP Attachment J.

This project does not have any planned groundwater dewatering as part of the construction. However, there is a potential of rainstorm events wherein the QSP and the Contractor determine that dewatering of small unintentional collection areas is necessary (e.g. ponding due to a rainstorm), or to empty out one of the stormwater collection devices.

This Sampling and Analysis Plan for dewatering discharges describes the sampling and analysis strategy and schedule for monitoring dewatering discharges in accordance with the requirements of the 2022 CGP.

7.7.4.1 Sample Schedule

Sampling of dewatering discharges will be conducted within the first hour of the commencement of discharge and daily each day that the discharge continues.

7.7.4.2 Sample Locations

Sampling locations will be determined as necessary based on locations where dewatering is required. The QSP shall coordinate with the Contractor to select representative locations and record them when performing sampling. Dewatering sampling locations shall be documented by the QSP on the Effluent Sampling Field Log Sheet, which are provided in Appendix O.

7.7.4.3 Monitoring Preparation

Dewatering samples will be collected by:

QSP _____ ☐ Yes ☐ No

QSD Delegate _____ ☐ Yes ☐ No

An adequate stock of monitoring supplies and equipment for monitoring turbidity will be available on the project site prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. The QSP or QSP Delegates will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the project site will include, but are not limited to, field meters, extra batteries, clean powder-free nitrile gloves, sample collection equipment, appropriate sample containers, paper towels, personal rain gear, and *Effluent Sampling Field Log Sheets* and CoC forms provided in Appendix O.

The QSP or QSP Delegates will obtain and maintain the field-testing instruments, as identified in Section 7.7.2.6, for analyzing samples in the field.

7.7.4.4 Sample Collection and Field Analysis

Dewatering samples shall be collected at the designated sampling locations as field-determined by the QSP and the Contractor.

Samples for field parameters shall be analyzed for the constituents indicated in Table 7-11 "Sample Collection, and Analysis for Monitoring Turbidity and pH." Turbidity and pH samples shall be analyzed immediately.

Sample collection and handling requirements are described in Section 7.7.7.

7.7.4.5 Data Evaluation and Reporting

At least 24 hours prior to the beginning of a dewatering discharge, the QSP and/or QSP Delegate shall notify the Regional Water Board via email of the anticipated dewatering discharge. Copy the following project staff on the notifications QSP and/or QSP Delegate.

The QSP shall within two (2) business days of the sample collection submit copies of the completed *Effluent Sampling Field Log Sheets* to LRP.

Compliance with the NALs for pH and turbidity in dewatering discharges is based on a single sample evaluation. A NAL exceedance occurs when any sample exceeds the turbidity NAL or is outside of the pH range shown in Table 7-13.

In the event that the pH or turbidity NAL is exceeded, the QSP shall immediately notify the LRP and the QSD and investigate the cause of the exceedance and identify corrective actions.

The QSP and/or QSP Delegate shall immediately cease dewatering discharges if the NALs are exceeded. If the discharge is necessary to protect human life and health or prevent severe property damage and cannot be ceased, the QSP and/or QSP Delegate shall notify the Regional Water Board and the Local Stormwater Agency within 24 hours.

Table 7-17 Dewatering Notification Contacts

Agency	Name	Email/Phone
Regional Water Board	Los Angeles Regional	r4_stormwater@waterboards.ca.gov
Local Stormwater Agency	Ventura County Public Works	David.Laak@venturacounty.gov

Exceedances of NALs shall be electronically reported to the State Water Board by the LRP or DAR through SMARTS within 10 days of receiving the results.

Following a NAL exceedance, the QSD shall revise the SWPPP to incorporate corrective actions to prevent further exceedances within 10 days of the measurement.

7.7.5 Sampling and Analysis Plan for Other Pollutants Required by the Regional Water Board

The Regional Water Board has not specified monitoring for additional pollutants. Should the Regional Board require additional monitoring during SWPPP implementation, the QSP shall notify the QSD to amend the following sampling and analysis plan included below.

7.7.6 Training of Sampling Personnel

QSP Delegates assigned to conduct sampling shall be trained by the QSP to collect, maintain, and ship samples in accordance with the 2022 CGP Sample Collection and Handling Instructions and supplemental information as needed. Training records of QSP Delegates assigned to sample are provided in Appendix I.

The QSP and QSP Delegates have received the following stormwater sampling training: (QSP shall fill out the list as appropriate, and add additional lines as required)

Name	Training
	INSERT LIST OF TRAINING COURSES

The QSP and QSP Delegates have the following stormwater sampling experience: (QSP shall fill out the list as appropriate, and add additional lines as required)

Name	Experience
	INSERT LIST OF STORMWATER SAMPLING EXPERIENCE

7.7.7 Sample Collection and Handling

7.7.7.1 Sample Collection

Samples shall be collected at the designated sampling locations shown on the Site Maps and listed in the preceding sections. Samples shall be collected, maintained and shipped in accordance with the 2022 CGP Sample Collection and Handling Instructions.

Grab samples shall be collected and preserved in accordance with the methods identified in preceding sections.

To maintain sample integrity and prevent cross-contamination, sample collection personnel shall follow the protocols below.

- Collect samples (for laboratory analysis) in analytical laboratory-provided or specified sample containers;
    - Use of any other type of containers could cause sample contamination and may result in NAL or NEL exceedances.
- Wear clean, powder-free nitrile gloves when collecting samples;
- Change gloves whenever something not known to be clean has been touched;
- Change gloves between sampling locations;
- Decontaminate all equipment (e.g., bucket, tubing) prior to sample collection;
    - using a trisodium phosphate water wash, distilled water rinse, and final rinse with distilled water..
    - Dispose of wash and rinse water appropriately (i.e., do not discharge to storm drain or receiving water).
    - Do not decontaminate laboratory provided sample containers;
- Do not smoke during sampling events;
- Never sample near a running vehicle;
- Do not park vehicles in the immediate sample collection area (even non-running vehicles);
- Do not eat or drink during sample collection; and
- Do not breathe, sneeze, or cough in the direction of an open sample container.

The most important aspect of grab sampling is to collect a sample that represents the entire runoff stream. Typically, samples are collected by dipping the collection container in the runoff flow paths and streams as noted below.

i. For small streams and flow paths, simply dip the bottle facing upstream until full.
ii. For larger stream that can be safely accessed, collect a sample in the middle of the flow stream by directly dipping the mouth of the bottle. Once again making sure that the opening of the bottle is facing upstream as to avoid any contamination by the sampler.
iii. For larger streams that cannot be safely waded, pole-samplers may be needed to safely access the representative flow.
iv. Avoid collecting samples from ponded, sluggish or stagnant water.
v. Avoid collecting samples directly downstream from a bridge as the samples can be affected by the bridge structure or runoff from the road surface.

Note, that depending upon the specific analytical test, some containers may contain preservatives. These containers should **never** be dipped into the stream but filled indirectly from the collection container.

7.7.7.2 Sample Handling

Turbidity and pH measurements must be conducted immediately. Do not store turbidity or pH samples for later measurement.

Samples for laboratory analysis must be handled as follows. Immediately following sample collection:

- Cap sample containers;

- Complete sample container labels;
- Place sealed containers in a re-sealable storage bag;
- Place sample containers into an ice-chilled cooler;
- Document sample information on the *Effluent Sampling Field Log Sheet* (Appendix O); and
- Complete the CoC.

All samples for laboratory analysis must be maintained between 0-6 degrees Celsius during delivery to the laboratory. Samples must be kept on ice, or refrigerated, from sample collection through delivery to the laboratory. Place samples to be shipped inside coolers with ice. Make sure the sample bottles are well packaged to prevent breakage and secure cooler lids with packaging tape.

Ship samples that will be laboratory analyzed to the analytical laboratory right away. Hold times are measured from the time the sample is collected to the time the sample is analyzed. The 2022 CGP requires that samples be received by the analytical laboratory within 48 hours of the physical sampling (unless required sooner by the analytical laboratory to meet all hold times).

Laboratory Name: _____

Street Address: _____

City, State Zip: _____

Telephone Number: _____

Point of Contact: _____

ELAP Certification Number: _____

7.7.7.3 Sample Documentation Procedures

All original data documented on sample container identification labels, *Effluent Sampling Field Log Sheet* (Appendix O), and CoCs shall be recorded using waterproof ink. These shall be considered as accountable documents. If an error is made on an accountable document, the individual shall make corrections by lining through the error and entering the correct information. The erroneous information shall not be obliterated. All corrections shall be initialed and dated.

Duplicate samples shall be identified consistent with the numbering system for other samples to prevent the laboratory from identifying duplicate samples. Duplicate samples shall be identified in the Effluent Sampling Field Log Sheet.

Sample documentation procedures include the following:

Sample Bottle Identification Labels: Sampling personnel shall attach an identification label to each sample bottle. Sample identification shall uniquely identify each sample location. (These location identifiers should be listed in the tables in the SWPPP.)

Field Log Sheets: Sampling personnel shall complete the *Effluent Sampling Field Log Sheet* and *Receiving Water Sampling Field Log Sheet* (Appendix O) for each sampling event, as appropriate.

Chain of Custody: Sampling personnel shall complete the CoC for each sampling event for which samples are collected for laboratory analysis. The sampler will sign the CoC (Appendix O) when the sample(s) is turned over to the testing laboratory or courier.

7.8 Active Treatment System Monitoring

Will an Active Treatment System (ATS) be deployed on the site?

☐ Yes ☒ No

This project does not require a project specific Sampling and Analysis Plan for an ATS because deployment of an ATS is not planned.

7.9 Passive Treatment Monitoring

Will passive treatment technologies be deployed on the site?

☐ Yes ☒ No

This project does not require a project specific Sampling and Analysis Plan for passive treatment because deployment of passive treatment is not planned.

7.10 Watershed Monitoring Option

This project is participating in a watershed monitoring option.

Core monitoring includes receiving water quality, mass emission sites, and bioassessment sampling across major local areas like the Ventura River, Santa Clara River, and Calleguas Creek. Assess the chemical, physical, and biological impacts of municipal stormwater discharges on receiving waters. Assess the overall health and evaluate long-term trends in receiving water quality. Assess compliance with TMDL targets and water quality objectives. Characterize the quality of stormwater discharges and identify sources of pollutants. Improve the effectiveness of the Permittee stormwater programs.

7.11 Quality Assurance and Quality Control

An effective Quality Assurance and Quality Control (QA/QC) plan shall be implemented as part of the CSMP to ensure that analytical data can be used with confidence. QA/QC procedures to be initiated include the following:

- Field logs;
- Clean sampling techniques;
- CoCs;
- QA/QC Samples; and
- Data verification.

Each of these procedures is discussed in more detail in the following sections.

7.11.1 Field Logs

The purpose of field logs is to record sampling information and field observations during monitoring that may explain any uncharacteristic analytical results. Sampling information to be included in the field log include the date and time of water quality sample collection, sampling personnel, sample container identification numbers, and types of samples that were collected. Field observations should be noted in the field log for any abnormalities at the sampling location (color, odor, BMPs, etc.). Field measurements for pH and turbidity should also be recorded in the field log. A Visual Inspection Field Log, an Effluent Sampling Field Log Sheet, and a Receiving Water Sampling Field Log Sheet are included in Appendix O.

7.11.2 Clean Sampling Techniques

Clean sampling techniques involve the use of certified clean containers for sample collection and clean powder-free nitrile gloves during sample collection and handling. As discussed in Section 7.7.7, adoption of a clean sampling approach will minimize the chance of field contamination and questionable data results.

7.11.3 Chain of Custody

The sample CoC is an important documentation step that tracks samples from collection through analysis to ensure the validity of the sample. Sample CoC procedures include the following:

- Proper labeling of samples;
- Use of CoC forms for all samples; and
- Prompt sample delivery to the analytical laboratory.

Analytical laboratories usually provide CoC forms to be filled out for sample containers. An example CoC is included in Appendix O.

7.11.4 QA/QC Samples

QA/QC samples provide an indication of the accuracy and precision of the sample collection; sample handling; field measurements; and analytical laboratory methods. The following types of QA/QC will be conducted for this project:

☒ Field Duplicates at a frequency of 5 percent or 1 duplicate minimum per sampling event

(Required for all sampling plans with field measurements or laboratory analysis)

☒ Equipment Blanks at a frequency of 1 per sampling event

(Only needed if the equipment used to collect samples could add the pollutants to sample)

☒ Field Blanks at a frequency of 1 per sampling event

(Only required if sampling method calls for field blanks)

☒ Travel Blanks at a frequency of 1 per sampling event

(Required for sampling plans that include VOC laboratory analysis)

7.11.4.1 Field Duplicates

Field duplicates provide verification of laboratory or field analysis and sample collection. Duplicate samples shall be collected, handled, and analyzed using the same protocols as

primary samples. The sample location where field duplicates are collected shall be randomly selected from the discharge locations. Duplicate samples shall be collected immediately after the primary sample has been collected. Duplicate samples must be collected in the same manner and as close in time as possible to the original sample. Duplicate samples shall not influence any evaluations or conclusion.

7.11.4.2 Equipment Blanks

Equipment blanks provide verification that equipment has not introduced a pollutant into the sample. Equipment blanks are typically collected when:

- New equipment is used;
- Equipment that has been cleaned after use at a contaminated site;
- Equipment that is not dedicated for surface water sampling is used; or
- Whenever a new lot of filters is used when sampling metals.

7.11.4.3 Field Blanks

Field blanks assess potential sample contamination levels that occur during field sampling activities. De-ionized water field blanks are taken to the field, transferred to the appropriate container, and treated the same as the corresponding sample type during the course of a sampling event.

7.11.4.4 Travel Blanks

Travel blanks assess the potential for cross-contamination of volatile constituents between sample containers during shipment from the field to the laboratory. De-ionized water blanks are taken along for the trip and held unopened in the same cooler with the VOC samples.

7.11.5 Data Verification

After results are received from the analytical laboratory, the QSP or QSP Delegates shall verify the data to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data must be verified as soon as the data reports are received. Data verification shall include:

- Check the CoC and laboratory reports.
  Make sure all requested analyses were performed and all samples are accounted for in the reports.
- Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Check data for outlier values and follow up with the laboratory.
  Occasionally typographical errors, unit reporting errors, or incomplete results are reported and should be easily detected. These errors need to be identified, clarified, and corrected quickly by the laboratory. The QSP or QSP Delegates should especially note data that is an order of magnitude or more different than similar locations or is inconsistent with previous data from the same location.
- Check laboratory QA/QC results.
  EPA establishes QA/QC checks and acceptable criteria for laboratory analyses. These data are typically reported along with the sample results. The QSP or QSP Delegates shall evaluate the reported QA/QC data to check for contamination (method, field, and equipment blanks), precision (laboratory matrix spike duplicates), and accuracy (matrix

spikes and laboratory control samples). When QA/QC checks are outside acceptable ranges, the laboratory must flag the data, and usually provides an explanation of the potential impact to the sample results.

- Check the data set for outlier values and, accordingly, confirm results and re-analyze samples where appropriate.
  Sample re-analysis should only be undertaken when it appears that some part of the QA/QC resulted in a value out of the accepted range. Sample results may not be discounted unless the analytical laboratory identifies the required QA/QC criteria were not met and confirms this in writing.

Field data including inspections and observations must be verified as soon as the field logs are received, typically at the end of the sampling event. Field data verification shall include:

- Check field logs to make sure all required measurements were completed and appropriately documented;
- Check reported values that appear out of the typical range or inconsistent; Follow-up immediately to identify potential reporting or equipment problems, if appropriate, recalibrate equipment after sampling;
- Verify equipment calibrations;
- Review observations noted on the field logs; and
- Review notations of any errors and actions taken to correct the equipment or recording errors.

7.12 Records Retention

All records of stormwater monitoring information and copies of reports (including Annual Reports) must be retained for a period of at least three years from date of submittal or longer if required by the Regional Water Board.

Results of visual monitoring, field measurements, and laboratory analyses must be kept in the SWPPP along with CoCs, and other documentation related to the monitoring.

Records are to be kept onsite while construction is ongoing. Records to be retained include:

- The date, place, and time of inspections, sampling, visual observations, and/or measurements, including precipitation;
- The individual(s) who performed the inspections, sampling, visual observation, and/or field measurements;
- The date and approximate time of field measurements and laboratory analyses;
- The individual(s) who performed the laboratory analyses;
- A summary of all analytical results, the method detection limits and reporting limits, and the analytical techniques or methods used;
- Rain gauge readings from site inspections;
- QA/QC records and results;
- Calibration records;
- Visual observation and sample collection exception records;
- The records of any corrective actions and follow-up activities that resulted from analytical results, visual observations, or inspections;
- Dewatering notifications to the Regional Water Board;
- Dewatering exception notifications to the Regional Water Board and local stormwater agency; as needed.

Section 8 References

Project Plans and Specifications No. 32321 dated July 2026, prepared by LPA Design Studios, Inc.

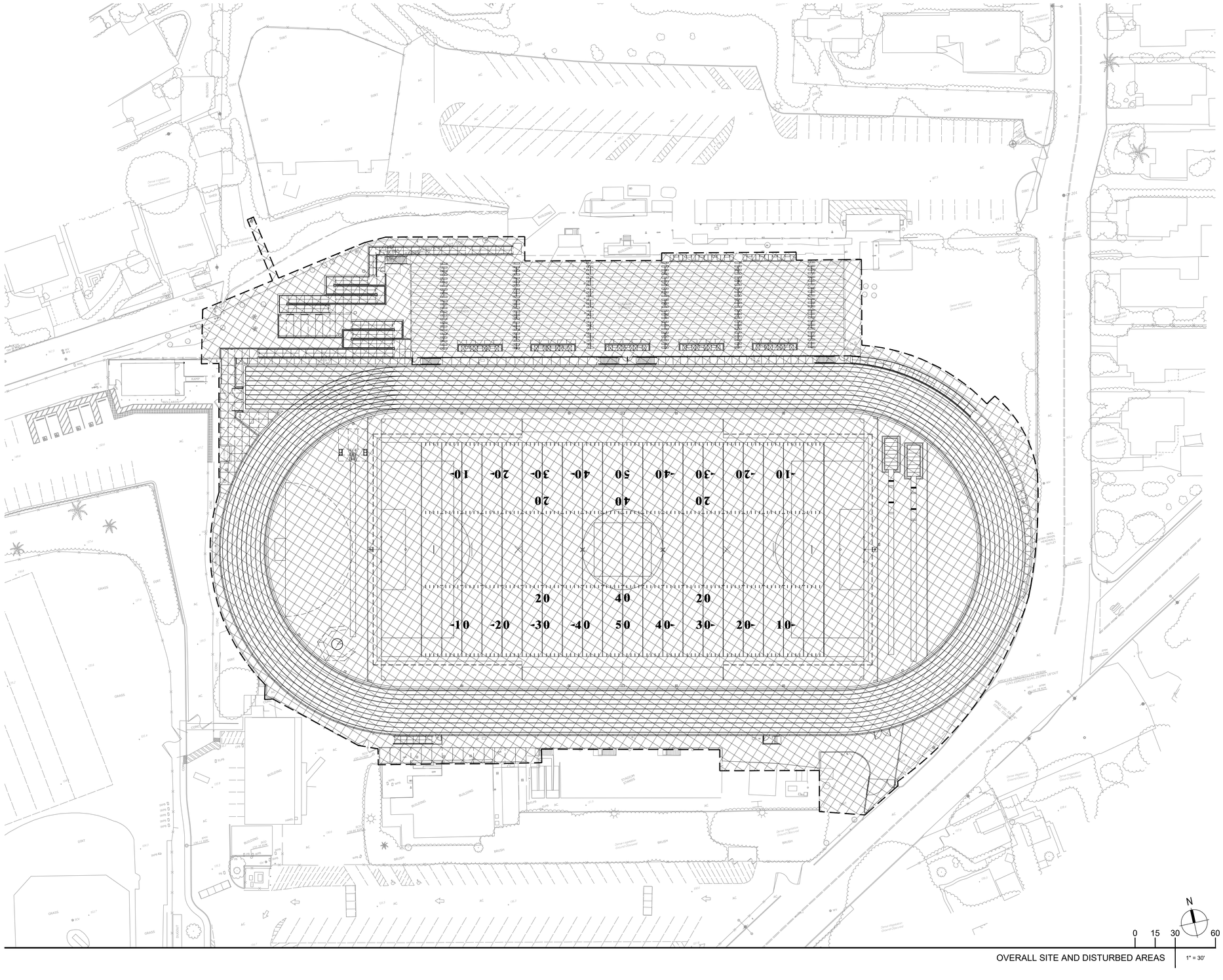
SWRCB (State Water Resources Control Board). (2022). Order 2022-0057-DWQ, NPDES General Permit No. CAS000002: Stormwater Discharges Associated with Construction and Land Disturbing Activities. Available online at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction/general_permit_reissuance.html.

CASQA 2023. *Stormwater BMP Handbook: Construction.* Available online at: www.casqa.org

Appendix A: Site Maps and Drawings

EROSION CONTROL NOTES

SYMBOL	DESCRIPTION
	OVERALL DISTURBED AREA LIMITS TOTAL AREA: 4.82± ACRES



OVERALL SITE AND DISTURBED AREAS 1" = 30'

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2 NORTH CATALINA STREET
VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

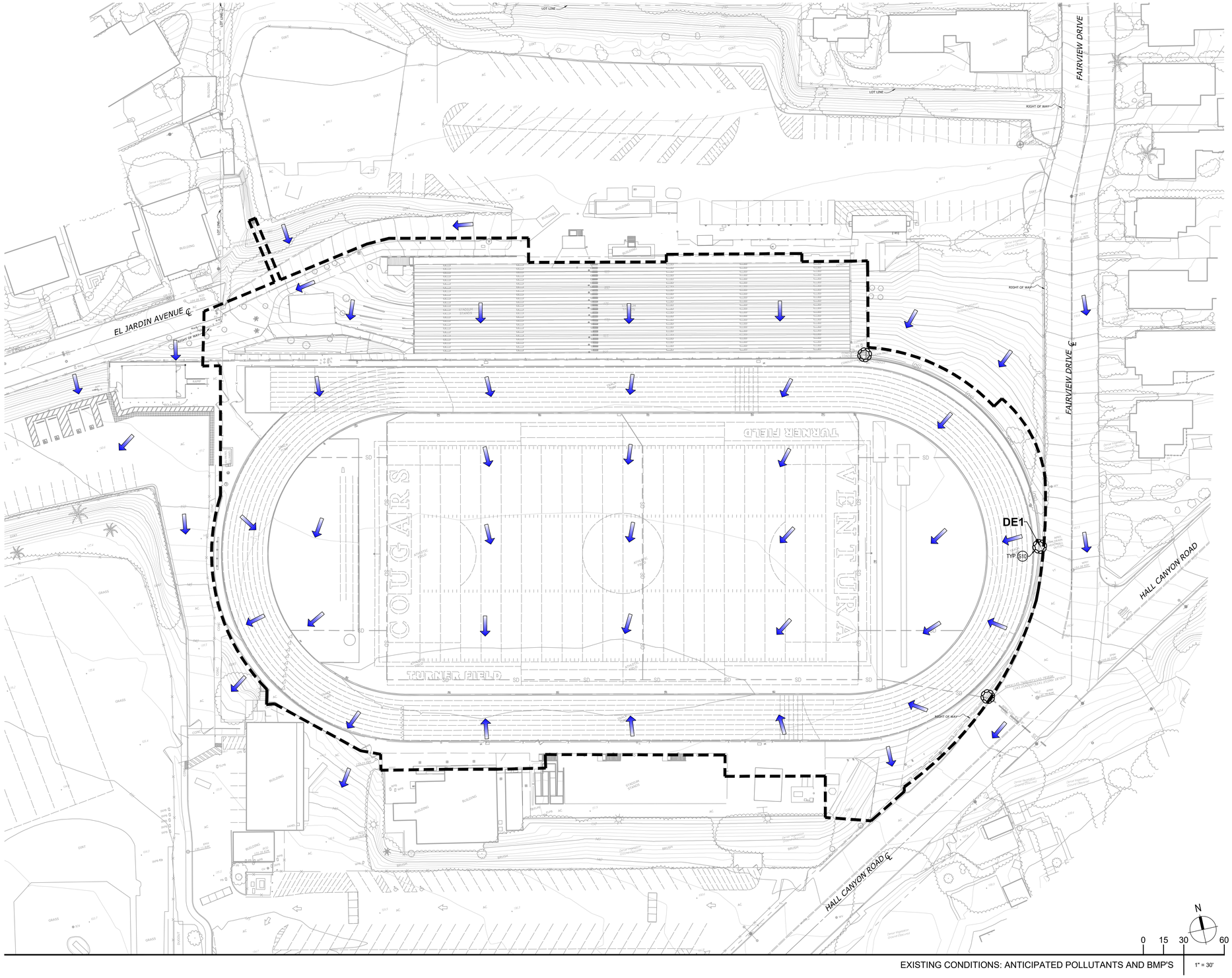
Revision	Date

Submittal	Date

Job Number	32321
Checked By	CD
Scale	1" = 30'

OVERALL SITE AND DISTURBED AREAS

ESC-01



EXISTING CONDITIONS: ANTICIPATED POLLUTANTS AND BMP'S 1" = 30'

EROSION CONTROL NOTES

-SEE SHEET C0.01 FOR EROSION AND SEDIMENT CONTROL NOTES.

-SEE SHEET C0.01 FOR BMP MAINTENANCE NOTES.

-ALL BMPS PER CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA)(UNLESS NOTED OTHERWISE) AND ARE AVAILABLE AT www.casqa.org.

-AT THE COMPLETION OF PROJECT, CONTRACTOR SHALL REMOVE ALL CONSTRUCTION BMPS FROM SITE AND DISPOSE IN A LEGAL MANNER.

LEGEND

SYMBOL	DESCRIPTION
	GRAVEL BAGS AND/OR SANDBAGS PER BMP KEYNOTES
	APPROXIMATE LIMIT OF GRADING
	FLOW DIRECTION

OVERALL SITE BMP'S (PROJECT-WIDE APPLICATION)

- EC-1, SCHEDULING
- EC-2, PRESERVATION OF EXISTING VEGETATION
- SE-7, STREET SWEEPING AND VACUUMING (APPLIES TO ALL PAVED AREAS)
- NS-1, WATER CONSERVATION PRACTICES
- NS-2, DEWATERING OPERATIONS
- NS-3, PAVING AND GRINDING OPERATIONS
- NS-6, ILLICIT CONNECTION/DISCHARGE
- NS-7, POTABLE WATER/IRRIGATION
- NS-8, VEHICLE AND EQUIPMENT CLEANING
- NS-9, VEHICLE AND EQUIPMENT FUELING
- NS-10, VEHICLE AND EQUIPMENT MAINTENANCE
- NS-11, PILE DRIVING OPERATIONS
- NS-12, CONCRETE CURING
- NS-13, CONCRETE FINISHING
- SC-10, NON-STORMWATER DISCHARGES
- WE-1, WIND EROSION CONTROL
- WM-1, MATERIAL DELIVERY AND STORAGE
- WM-2, MATERIAL USE
- WM-3, STOCKPILE MANAGEMENT
- WM-4, SPILL PREVENTION AND CONTROL
- WM-5, SOLID WASTE MANAGEMENT
- WM-6, HAZARDOUS WASTE MANAGEMENT
- WM-7, CONTAMINATED SOIL MANAGEMENT
- WM-8, CONCRETE WASTE MANAGEMENT
- WM-9, SANITARY/SEPTIC WASTE MANAGEMENT
- WM-10, LIQUID WASTE MANAGEMENT

EROSION CONTROL BMPs: ***

KEY NOTE	DESCRIPTION
E3	EC-3, HYDRAULIC MULCH
E4	EC-4, HYDROSEEDING
E5	EC-5, SOIL BINDERS
E6	EC-6, STRAW MULCH
E7	EC-7, GEOTEXTILES AND MATS
E15	EC-15, SOIL PREPARATION/ROUGHENING

*** EROSION CONTROL BMP KEYNOTES NOT SHOWN ON PLAN ARE LISTED AS ALTERNATIVE SURFACE STABILIZATION METHODS; COORDINATE USE AND LOCATION WITH QSP.

SEDIMENT CONTROL BMPs:

S5	SE-5, FIBER ROLLS
S10	SE-10, STORM DRAIN INLET PROTECTION

TRACKING CONTROL BMPs:

T1	TC-1, STABILIZED CONSTRUCTION ENTRANCE/EXIT
T3	TC-3, ENTRANCE/OUTLET TIRE WASH

STORM WATER QUALITY LOCATIONS

W#	STORMWATER QUALITY (TREATMENT OR STORAGE)

DISCHARGE LOCATIONS

D#	STORMWATER DISCHARGE LOCATION

SAMPLING LOCATIONS

B#	POLLUTANT SAMPLE LOCATION - BACKGROUND SAMPLE
C#	POLLUTANT SAMPLE LOCATION - CONTRACTORS YARD
S#	POLLUTANT SAMPLE LOCATION - OTHER SITE LOCATION
R#	POLLUTANT SAMPLE LOCATION - RUN-ON

NOTE:
THE SAMPLE LOCATIONS SHOWN ARE THE MINIMUM REQUIREMENT FOR THE PROJECT SITE AND RISK LEVEL 1. SAMPLE LOCATIONS MAY BE RELOCATED IF FIELD CONDITIONS WILL NOT ALLOW FOR SATISFACTORY SAMPLING. ANY ADJUSTMENTS TO SAMPLING LOCATIONS MUST MEET THE INTENDED PURPOSE ORIGINALLY DESIGNATED FOR THAT LOCATION AND MUST BE DOCUMENTED WITH A SWPPP AMENDMENT FORM.

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SWPPP EXHIBITS

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Developed for
VENTURA UNIFIED SCHOOL DISTRICT

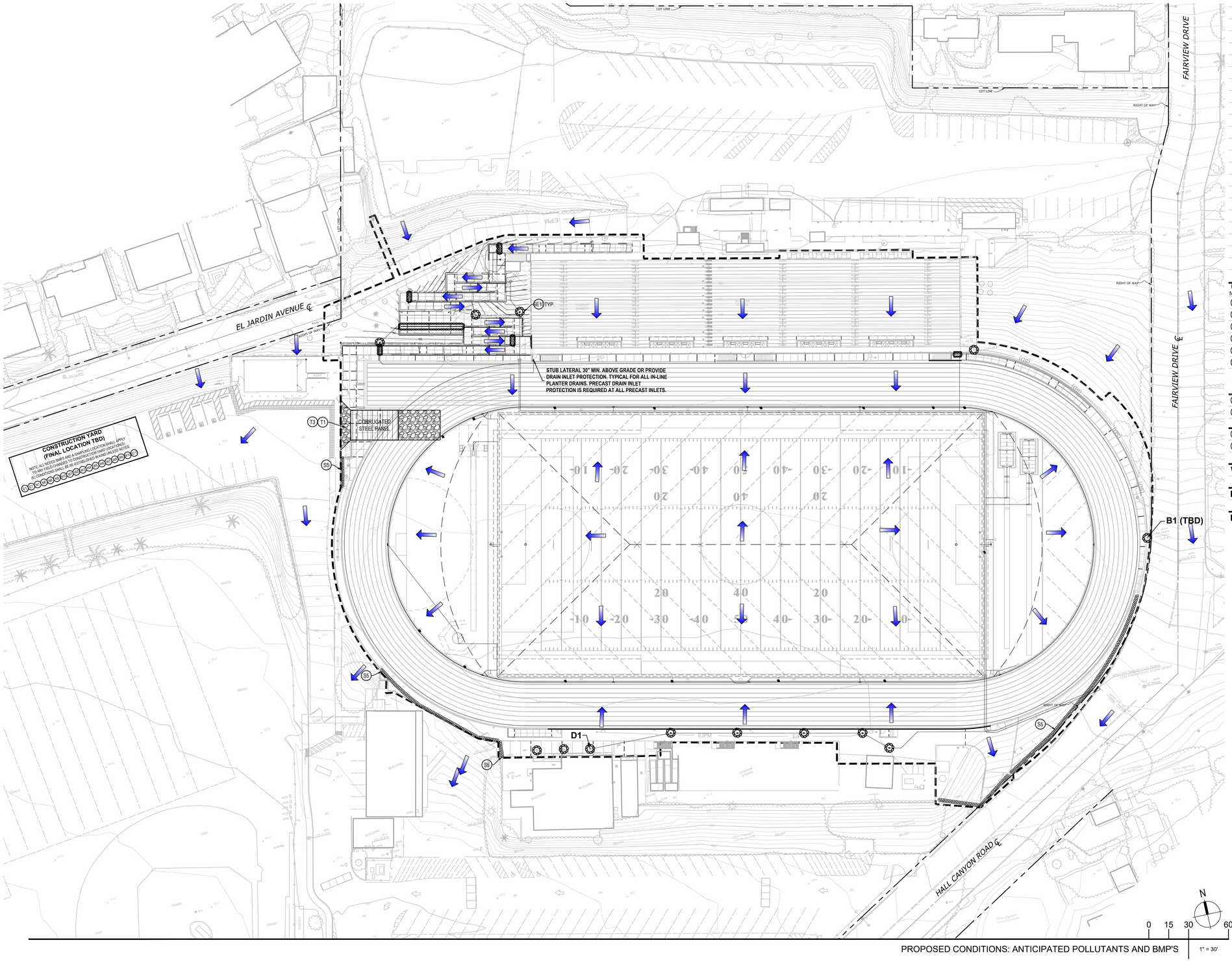
Revision	Date

Submittal	Date

Job Number	32321
Checked By	CD
Scale	1" = 30'

EXISTING CONDITIONS: ANTICIPATED POLLUTANTS AND BMP'S

ESC-02



PROPOSED CONDITIONS: ANTICIPATED POLLUTANTS AND BMP'S

EROSION CONTROL NOTES

-SEE SHEET C0.01 FOR EROSION AND SEDIMENT CONTROL NOTES.

-SEE SHEET C0.01 FOR BMP MAINTENANCE NOTES.

-ALL BMPS PER CALIFORNIA STORMWATER QUALITY ASSOCIATION (CASQA)(UNLESS NOTED OTHERWISE) AND ARE AVAILABLE AT www.casqa.org.

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LEGEND

SYMBOL	DESCRIPTION
	GRAVEL BAGS AND/OR SANDBAGS PER BMP KEYNOTES
	APPROXIMATE LIMIT OF GRADING
	FLOW DIRECTION

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- WM-10, LIQUID WASTE MANAGEMENT

EROSION CONTROL BMPs: ***

KEY NOTE	DESCRIPTION
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E4	EC-4, HYDROSEEDING
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E7	EC-7, GEOTEXTILES AND MATS
E15	EC-15, SOIL PREPARATION/ROUGHENING

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S10	SE-10, STORM DRAIN INLET PROTECTION

TRACKING CONTROL BMPs:

T1	TC-1, STABILIZED CONSTRUCTION ENTRANCE/EXIT
T3	TC-3, ENTRANCE/OUTLET TIRE WASH

STORM WATER QUALITY LOCATIONS

W# STORMWATER QUALITY (TREATMENT OR STORAGE)

DISCHARGE LOCATIONS

D# STORMWATER DISCHARGE LOCATION

SAMPLING LOCATIONS

B# POLLUTANT SAMPLE LOCATION - BACKGROUND SAMPLE

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VENTURA, CA 93001

Developed for
VENTURA UNIFIED SCHOOL DISTRICT

Revision	Date

Submittal	Date

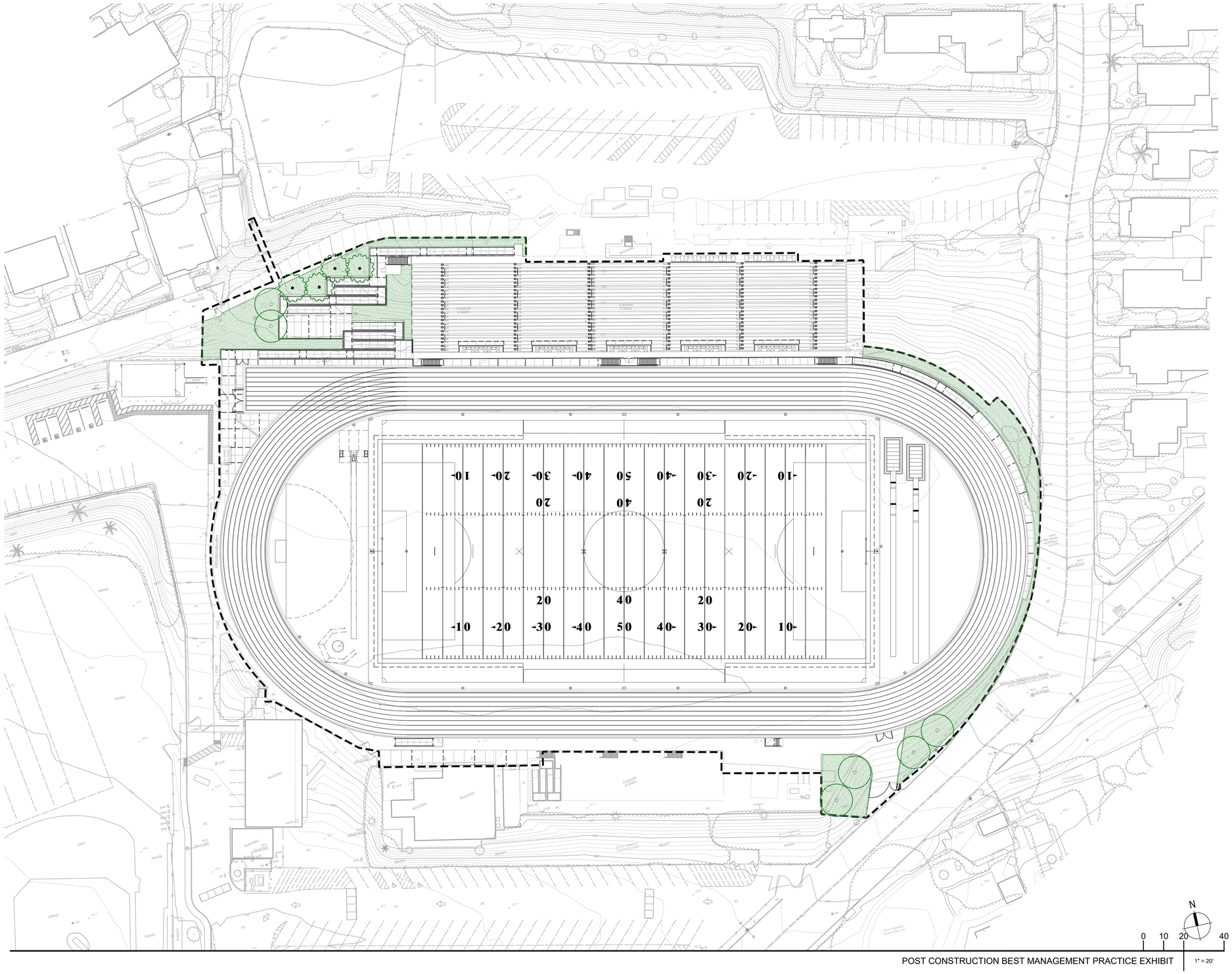
Job Number	32321
Checked By	CD
Scale	1" = 30'

PROPOSED CONDITIONS: ANTICIPATED POLLUTANTS AND BMP'S

ESC-03

LEGEND

SYMBOL / LABEL	DESCRIPTION
	LANDSCAPED AREAS; REFER TO LANDSCAPE PLANS FOR PLANTING, IRRIGATION, AND DETAILS.
	NEW TREES; REFER TO LANDSCAPE PLANS FOR DETAILS.



POST CONSTRUCTION BEST MANAGEMENT PRACTICE EXHIBIT 1" = 20'

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Revision	Date

Submittal	Date

Job Number	32321
Checked By	CD
Scale	1"=30'

POST CONSTRUCTION BMP EXHIBIT

PC-01

Appendix B: Permit Registration Documents

Permit Registration Documents included in this Appendix:

Location in SWPPP	**Permit Registration Document** (in addition to a copy of the SWPPP)
SMARTS Online	Notice of Intent
Appendix B	Risk Level Determination
SMARTS Online	Certification
SMARTS Online	Post-Construction Requirements
SMARTS Online	Copy of Annual Fee Receipt
Appendix A	Site Maps and Drawings, see Appendix A

Facility Information

Start Date: 01/01/2027	**Latitude:** 34.2787
End Date: 09/30/2027	**Longitude:** -119.2681

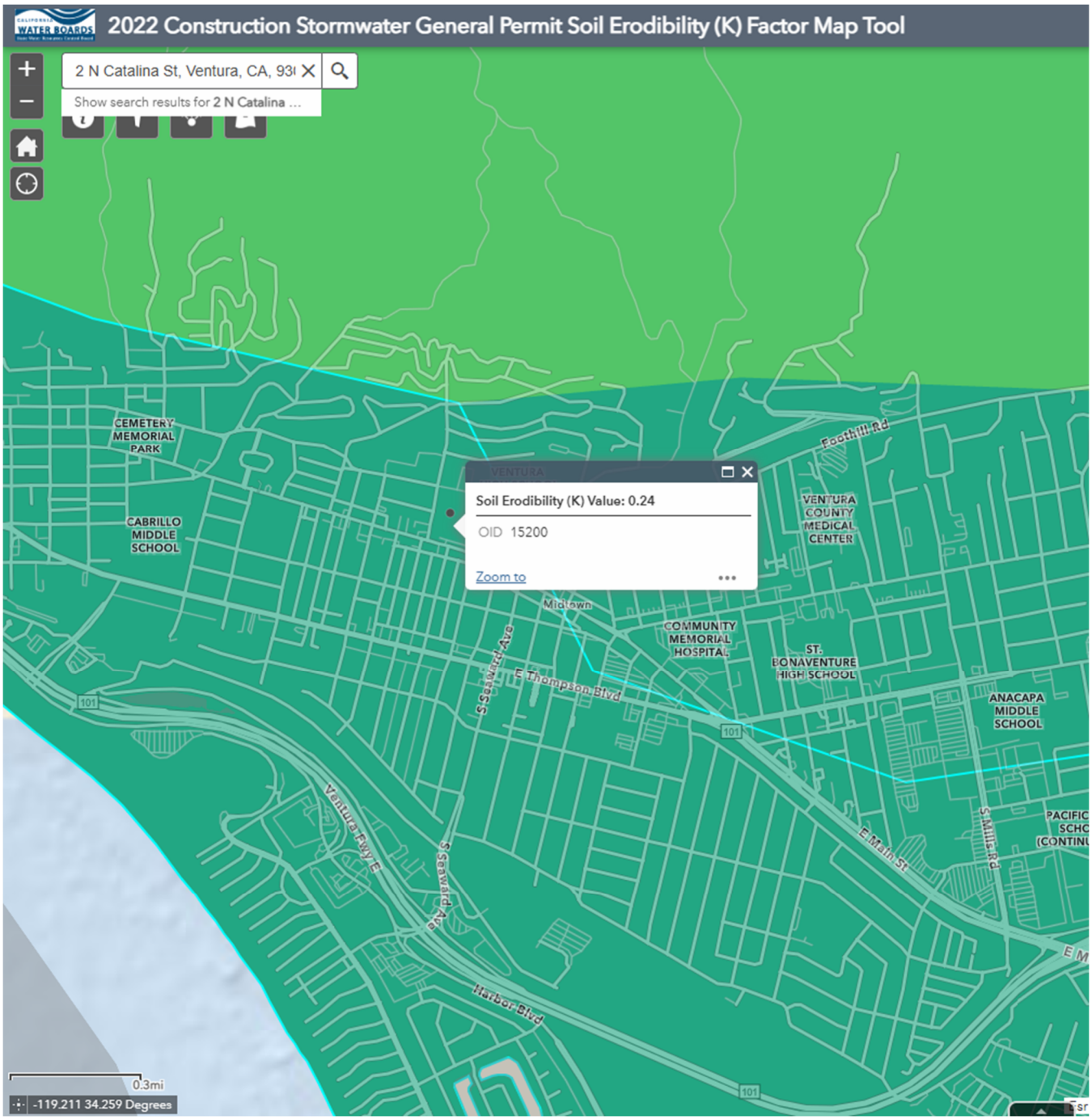
Calculation Results

Rainfall erosivity factor (R Factor) = **40.22**

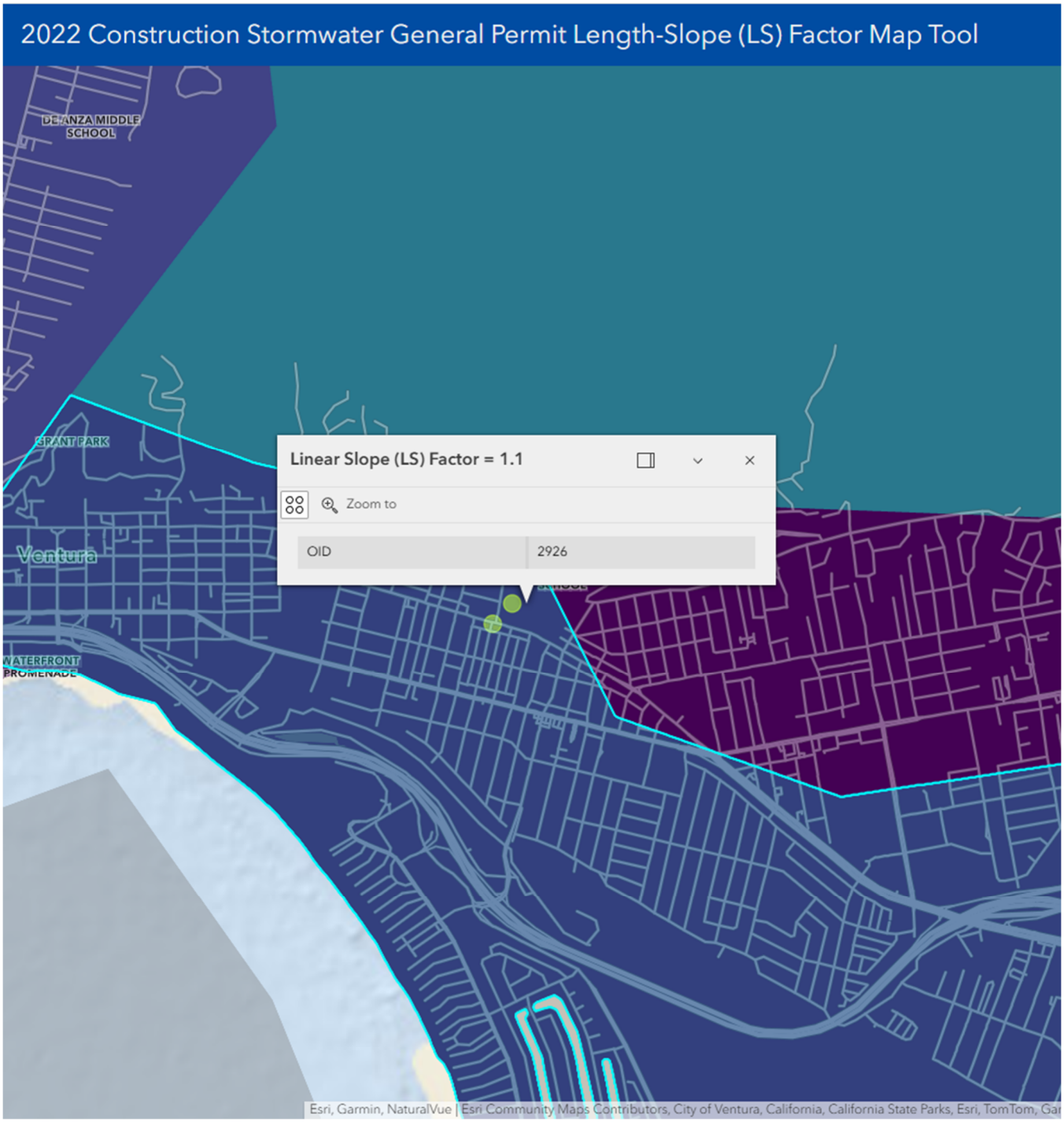
A rainfall erosivity factor of 5.0 or greater has been calculated for your site's period of construction.

You do NOT qualify for a waiver from NPDES permitting requirements and must seek Construction General Permit (CGP) coverage. If you are located in an area where EPA is the permitting authority (pdf), you must submit a Notice of Intent (NOI) through the NPDES eReporting Tool (NeT).Otherwise, you must seek coverage under your state's CGP.

"R" Factor: 40.22

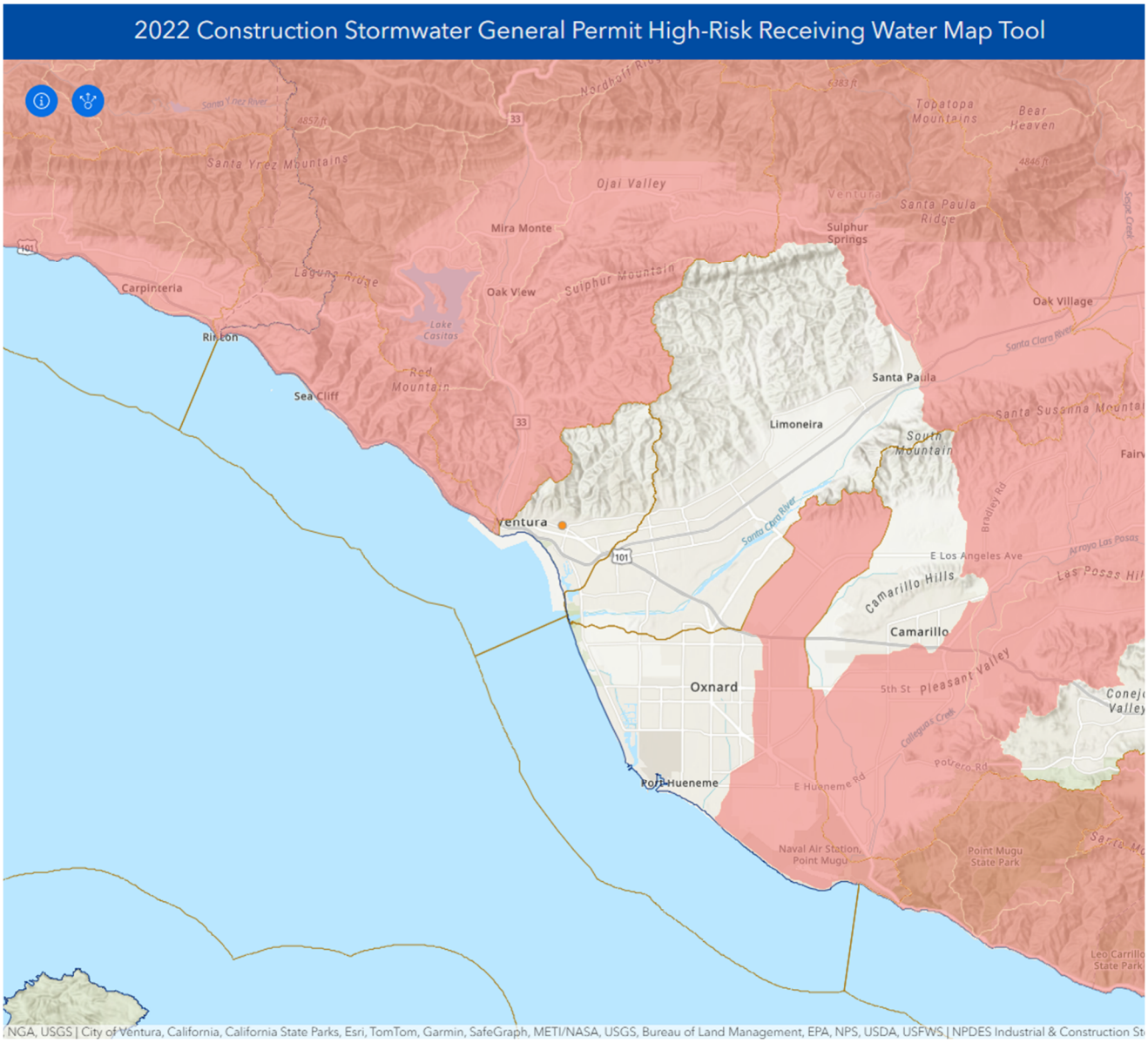

2022 Construction Stormwater General Permit Soil Erodibility (K) Factor Map Tool
2 N Catalina St, Ventura, CA, 93
Show search results for 2 N Catalina ...
Soil Erodibility (K) Value: 0.24
OID 15200
Zoom to
CEMETERY MEMORIAL PARK
CABRILLO MIDDLE SCHOOL
VENTURA COUNTY MEDICAL CENTER
COMMUNITY MEMORIAL HOSPITAL
ST. BONAVENTURE HIGH SCHOOL
ANACAPA MIDDLE SCHOOL
Foothill Rd
Midtown
S Seaward Ave
E Thompson Blvd
Ventura Fwy E
E Main St
S Mills Rd
Harbor Blvd
101
0.3mi
-119.211 34.259 Degrees

“K” Value: 0.24


2022 Construction Stormwater General Permit Length-Slope (LS) Factor Map Tool
DE ANZA MIDDLE SCHOOL
GRANT PARK
Ventura
WATERFRONT PROMENADE
Linear Slope (LS) Factor = 1.1
Zoom to
OID
2926
Esri, Garmin, NaturalVue | Esri Community Maps Contributors, City of Ventura, California, California State Parks, Esri, TomTom, Gar

“LS” Value: 1.1

	A	B	C
1	**Sediment Risk Factor Worksheet**		**Entry**
2	**A) R Factor**		
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
4	https://lew.epa.gov/		
5	**R Factor Value**		48.33
6	**B) K Factor (weighted average, by area, for all site soils)**		
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
8	K factors provided by the State Water Board (Google KMZ file)		
9	**K Factor Value**		0.24
10	**C) LS Factor (weighted average, by area, for all slopes)**		
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
12	LS factors provided by the State Water Board (Google KMZ file)		
13	**LS Factor Value**		1.1
14			
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**		12.75912
16	**Site Sediment Risk Factor**		**Low**
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			



High Risk Receiving Watersheds

Spawn, Migratory and Cold Beneficial Uses plus TMDL's and 303d

Receiving Water (RW) Risk Factor Worksheet	Entry	Score
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? California 2020-2022 Integrated Report link: https://gispublic.waterboards.ca.gov/portal/apps/webappviewer/index.html?id=6cca2a3a1815465599201266373cbb7b **OR** A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? California 2022 CGP High-Risk Receiving Watershed Tool link: https://gispublic.waterboards.ca.gov/portal/apps/webappviewer/index.html?id=cf80c11f7f514c4598662aeea76ccc38	**No**	**Low**

Combined Risk Level Matrix

Sediment Risk

Receiving Water Risk

	Low	Medium	High
Low	Level 1	Level 2	
High	Level 2		Level 3

Project Sediment Risk: **Low**

Project RW Risk: **Low**

Project Combined Risk: **Level 1**

Appendix C: SWPPP Amendment QSD Certifications

SWPPP Amendment No. _____

Project Name: _____

Project Number: _____

Qualified SWPPP Developer's Certification of the

Stormwater Pollution Prevention Plan Amendment

"This Stormwater Pollution Prevention Plan and its appendices were prepared under my direction to meet the requirements of the 2022 CGP (SWRCB Order No. 2022-0057-DWQ). I certify that I am a Qualified SWPPP Developer in good standing as of the date signed below."

QSD's Signature	Date
QSD Name	QSD Certificate Number
Title and Affiliation	Telephone
Address	Email

Appendix D: Submitted Changes of Information

Log of Updated PRDs

The 2022 CGP allows for the reduction or increase of the total acreage when a portion of the project is complete and/or conditions for termination of coverage have been met; when ownership of a portion of the project is purchased by a different entity; or when new acreage is added to the project.

A Change of Information (COI) shall be filed electronically within the timeframe shown in the table below. The SWPPP shall be modified appropriately, with revisions and amendments recorded in the SWPPP Amendment Log at the front of the SWPPP. COIs submitted electronically via SMARTS can be found in this Appendix.

Reason for Filing COI	Timeline for Filing COI
Reduction or increase in total disturbed area	Within 30 days of the reduction or increase
Updating site specific BMPs	Within 14 days of design change
Change construction start or end date	At least 14 days prior to the date to be changed
Post-construction plans updated or approved by the municipal stormwater permittee	Within 14 days of approval

This appendix includes all of the following updated PRDs (check all that apply):

☐ Change of Information;

☐ Revised Site Map;

☐ Revised Risk Assessment;

☐ New landowner's information (name, address, phone number, email address); and

☐ New signed certification statement.

_____ _____

Signature of Legally Responsible Person or Duly Authorized Representative | Date

_____ _____

Name of Legally Responsible Person or Duly Authorized Representative | Telephone Number

Appendix E: Construction Schedule

Construction Start: November 30, 2026

Construction End: August 27, 2027

The contractor shall add the detailed construction schedule to this SWPPP when available.

Appendix F: Construction Activities, Materials Used, and Associated Pollutants

Table F.1 POLLUTANTS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

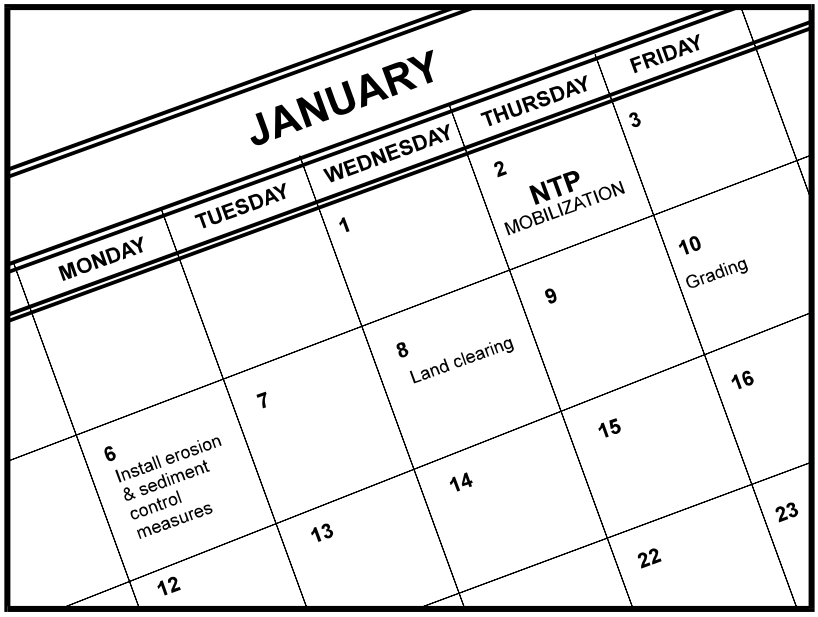
General Work Activity/ Products With Potential Stormwater Pollutants	Specific Work Activity/Products With Potential Stormwater Pollutants	Pollutant Categories
Adhesives	• Adhesives, glues, resins, epoxy synthetics, PVC cement • Caulks, sealers, putty, sealing agents and • Coal tars (naphtha, pitch)	Oil and Grease, Synthetic Organics[1]
Asphalt paving/curbs	• Hot and cold mix asphalt	Oil and Grease
Cleaners	• Polishes (metal, ceramic, tile) • Etching agents • Cleaners, ammonia, lye, caustic sodas, bleaching agents and chromate salts	Metals, Synthetic Organics
Concrete / Masonry	• Cement and brick dust • Colored chalks • Concrete curing compounds • Glazing compounds • Surfaces cleaners • Saw cut slurries • Tile cutting	Metals, Synthetic Organics
Liquid waste	• Wash waters • Irrigation line testing/flushing	Metals, Synthetic Organics
Painting	• Paint thinners, acetone, methyl ethyl ketone, stripper paints, lacquers, varnish, enamels, turpentine, gum spirit, solvents, dyes, stripping pigments and sanding	Metals, Synthetic Organics

Table F.1 POLLUTANTS ASSOCIATED WITH CONSTRUCTION ACTIVITIES

General Work Activity/ Products With Potential Stormwater Pollutants	Specific Work Activity/Products With Potential Stormwater Pollutants	Pollutant Categories
Planting / Vegetation Management	• Vegetation control (pesticides/herbicides) • Planting • Plant maintenance • Vegetation removal	Nutrients, Metals, Synthetic Organics
Sanitary waste	• Portable toilets • Disturbance of existing sewer lines.	Nutrients
Soil preparation/amendments	• Use of soil additives/amendments	Nutrients
Solid waste	• Litter, trash and debris • Vegetation	Gross Pollutants
Utility line testing and flushing	• Hydrostatic test water • Pipe flushing	Synthetic Organics
Vehicle and equipment use	• Equipment operation • Equipment maintenance • Equipment washing • Equipment fueling	Oil and Grease
[1] Synthetic Organics are defined in Table 1.2 of the CASQA *Stormwater BMP Handbook: Construction* as adhesives, cleaners, sealants, solvents, etc. These are generally categorized as VOCs or SVOCs.	•	
	•	
	•	

Appendix G: CASQA Stormwater BMP Handbook: Construction Fact Sheets

Scheduling EC-1



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 of construction. Clearly show how the rainy season relates

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	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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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.
- Avoid soil disturbance during periods with high wind velocities.

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

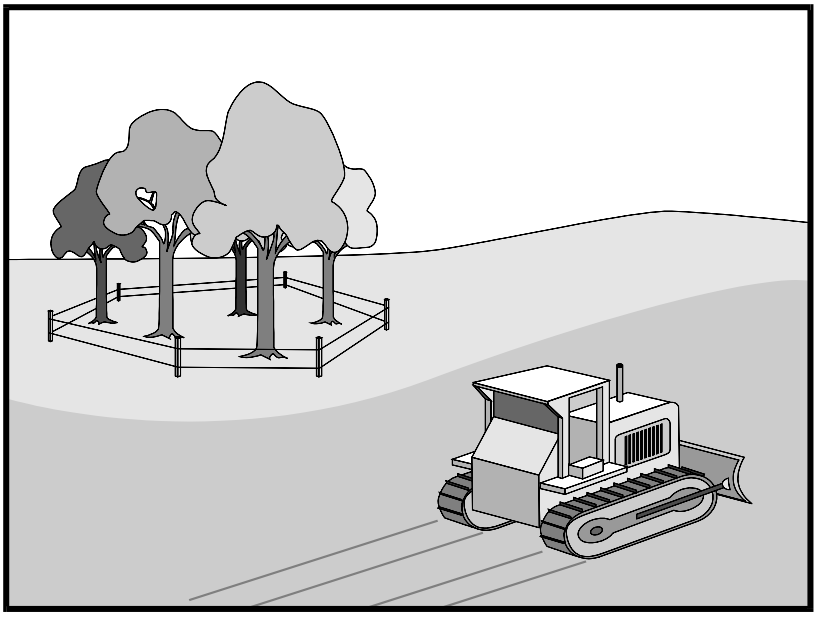
- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule prior to the rainy season to show updated information on the deployment and implementation of construction site BMPs.

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



Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	
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WM	Waste Management and Materials Pollution Control	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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.
- Protecting existing vegetation buffers and swales.

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Preservation of Existing Vegetation EC-2

Limitations

- Requires forward planning by the owner/developer, 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.

- Consider pruning or mowing vegetation instead of removing it to allow for regrowth.
- If possible, retain vegetation buffer around the site and adjacent waterways.

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 trees in the late fall or early spring. Although to note, many native species do not require fertilization.

- 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

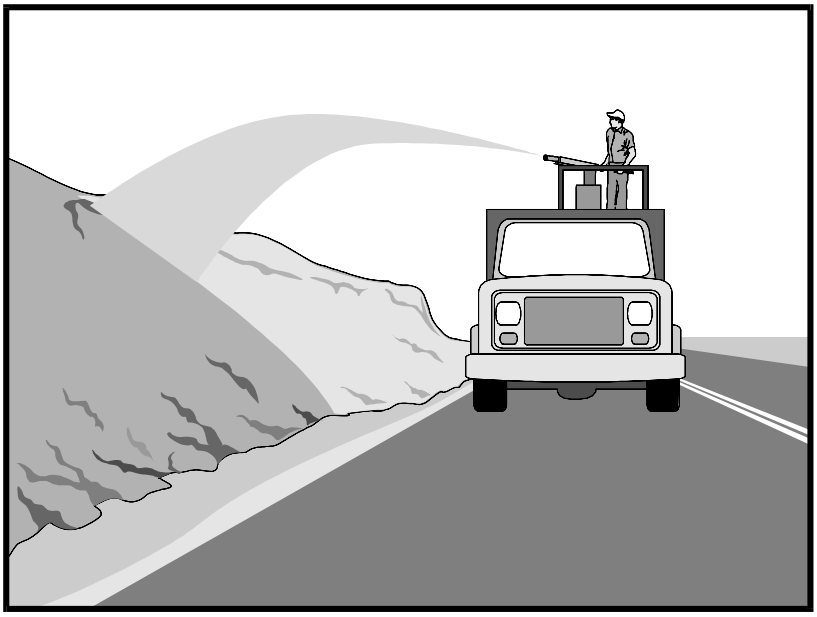
County of Sacramento Tree Preservation Ordinance, September 1981.

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.

Hydraulic Mulch EC-3



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	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-4 Hydroseeding
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket
EC-16 Non-Vegetative Stabilization

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Description and Purpose

Hydraulic Mulch consists of various types of fibrous materials mixed with water and sprayed onto the soil surface in slurry form to provide a layer of temporary protection from wind and water erosion.

Suitable Applications

Hydraulic mulch as a temporary, stand alone, erosion control BMP is suitable for disturbed areas that require temporary protection from wind and water erosion until permanent soil stabilization activities commence. Examples include:

- Rough-graded areas that will remain inactive for longer than permit-required thresholds (e.g., 14 days) or otherwise require stabilization to minimize erosion or prevent sediment discharges.
- Soil stockpiles.
- Slopes with exposed soil between existing vegetation such as trees or shrubs.
- Slopes planted with live, container-grown vegetation or plugs.
- Slopes burned by wildfire.
- To stabilize earthen berms
- Areas seeded by broadcasting or drilling

- Temporary stabilization during high wind conditions

Hydraulic mulch can also be applied to augment other erosion control BMPs such as:

- In conjunction with straw mulch (see EC-6 Straw Mulch) where the rate of hydraulic mulch is reduced to 100-500 lbs per acre and the slurry is applied over the straw as a tackifying agent to hold the straw in place.

- Supplemental application of soil amendments, such as fertilizer, lime, gypsum, soil bio-stimulants or compost.

Limitations

In general, hydraulic mulch is not limited by slope length, gradient or soil type. However, the following limitations typically apply:

- Most hydraulic mulch applications, particularly bonded fiber matrices (BFMs), require at least 24 hours to dry before rainfall occurs.

- Temporary applications (i.e., without a vegetative component) may require a second application in order to remain effective for an entire rainy season.

- Treatment areas must be accessible to hydraulic mulching equipment.

- Availability of water sources in remote areas for mixing and application.

- As a stand-alone temporary BMP, hydraulic mulches may need to be re-applied to maintain their erosion control effectiveness, typically after 6-12 months depending on the type of mulch used.

- Availability of hydraulic mulching equipment may be limited just prior to the rainy season and prior to storms due to high demand.

- Cellulose fiber mulches alone may not perform well on steep slopes or in course soils.

- This BMP consists of a mixture of several constituents (e.g., fibers/mulches, compost, tackifiers, and other chemical constituents), some of which may be proprietary and may come pre-mixed by the manufacturer. The water quality impacts of these constituents are relatively unknown, and some may have water quality impacts due to their chemical makeup. Refer to specific chemical properties identified in the product Safety Data Sheet (may not include ecological information); products should be evaluated for project-specific implementation by the SWPPP Preparer. Refer to factsheet EC-05 for further guidance on selecting soil binders.

- A water supply is needed to refill hydro mulch equipment tank.

- Cannot be disturbed by walking or driving on the surface after application.

- Recommend using in conjunction with other BMPs (i.e., fiber rolls, etc.).

Implementation

- Where feasible, it is preferable to prepare soil surfaces prior to application by roughening embankments and fill areas with a crimping or punching type roller or by track walking.
- The majority of hydraulic mulch applications do not necessarily require surface/soil preparation (See EC-15 Soil Preparation) although in almost every case where re-vegetation is included as part of the practice, soil preparation can be beneficial. One of the advantages of hydraulic mulch over other erosion control methods is that it can be applied in areas where soil preparation is precluded by site conditions, such as steep slopes, rocky soils, or inaccessibility.
- Avoid mulch over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Hydraulic mulching is generally performed utilizing specialized machines that have a large water-holding/mixing tank and some form of mechanical agitation or other recirculation method to keep water, mulch and soil amendments in suspension. The mixed hydraulic slurry can be applied from a tower sprayer on top of the machine or by extending a hose to areas remote from the machine.
- Where possible apply hydraulic mulch from multiple directions to adequately cover the soil. Application from a single direction can result in shadowing, uneven coverage and failure of the BMP.
- Hydraulic mulch can also include a vegetative component, such as seed, rhizomes, or stolons (see EC-4 Hydraulic Seed).
- Typical hydraulic mulch application rates range from 2,000 pounds per acre for standard mulches (SMs) to 3,500 lbs. per acre for BFMs. However, the required amount of hydraulic mulch to provide adequate coverage of exposed topsoil may appear to exceed the standard rates when the roughness of the soil surface is changed due to soil preparation methods (see EC-15 Soil Preparation) or by slope gradient.
- Other factors such as existing soil moisture and soil texture can have a profound effect on the amount of hydraulic mulch required (i.e. application rate) applied to achieve an erosion-resistant covering.
- Avoid use of mulch without a tackifier component, especially on slopes.
- Mulches used in the hydraulic mulch slurry can include:
  - Cellulose fiber (paper- or corn-based)
  - Wood fibers
  - Cotton
  - Synthetics
  - Compost (see EC-14, Compost Blanket)
  - Straw

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Categories of Hydraulic Mulches

Standard Hydraulic Mulch (SM)

Standard hydraulic mulches are generally applied at a rate of 2,000 lbs. per acre and are manufactured containing around 5% tackifier (i.e. soil binder), usually a plant-derived guar or psyllium type. Most standard mulches are green in color derived from food-color based dyes.

Hydraulic Matrices (HM) and Stabilized Fiber Matrices (SFM)

Hydraulic matrices and stabilized fiber matrices are slurries which contain increased levels of tackifiers/soil binders; usually 10% or more by weight. HMs and SFMs have improved performance compared to a standard hydraulic mulch (SM) because of the additional percentage of tackifier and because of their higher application rates, typically 2,500 – 4,000 lbs. per acre. Hydraulic matrices can include a mixture of fibers, for example, a 50/50 blend of paper and wood fiber. In the case of an SFM, the tackifier/soil binder is specified as a polyacrylamide (PAM).

Bonded Fiber Matrix (BFM)

Bonded fiber matrices (BFMs) are hydraulically-applied systems of fibers, adhesives (typically guar- or polymer-based) and chemical cross-links. Upon drying, the slurry forms an erosion-resistant blanket that prevents soil erosion and promotes vegetation establishment. The cross-linked adhesive in the BFM should be biodegradable and should not dissolve or disperse upon re-wetting. BFMs are typically applied at rates from 3,000 to 4,000 lbs. per acre based on the manufacturer's recommendation. BFMs should not be applied immediately before, during or immediately after rainfall or if the soil is saturated. Depending on the product, BFMs typically require 12 to 24 hours to dry and become effective.

Hydraulic Compost Matrix (HCM)

Hydraulic compost matrix (HCM) is a field-derived practice whereby finely graded or sifted compost is introduced into the hydraulic mulch slurry. A guar-type tackifier can be added for steeper slope applications as well as any specified seed mixtures. An HCM can help to accelerate seed germination and growth. HCMs are particularly useful as an in-fill for three-dimensional re-vegetation geocomposites, such as turf reinforcement mats (TRM) (see EC-7 Geotextiles and Mats).

Costs

Average installed costs for hydraulic mulch categories are is provided in Table 1, below.

Table
HYDRAULIC MULCH BMPs
INSTALLED COSTS

BMP	Installed Cost/Acre
Standard Hydraulic Mulching (SM)	$2,100 - $4,700 per acre
Hydraulic Matrices (HM) and Stabilized Fiber Matrices	
Guar-based	$2,600 - $5,200 per acre
PAM-based	$3,200 - $7,200 per acre
Bonded Fiber Matrix (BFM)	$5,000 - $8,800 per acre
Hydraulic Compost Matrix (HCM)	$3,800 - $4,500 per acre

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

Inspection and Maintenance

- Maintain an unbroken, temporary mulched ground cover throughout the period of construction when the soils are not being reworked.
- 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.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Compare the number of bags or weight of applied mulch to the area treated to determine actual application rates and compliance with specifications.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Controlling Erosion of Construction Sites, Agricultural Information #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

Guides for Erosion and Sediment Control in California, USDA Soils Conservation Service, January 1991.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Sedimentation and Erosion Control, an Inventory of Current Practices Draft, US EPA, April 1990.

Soil Erosion by Water, Agriculture Information Bulletin #513, U.S. Department of Agriculture, Soil Conservation Service.

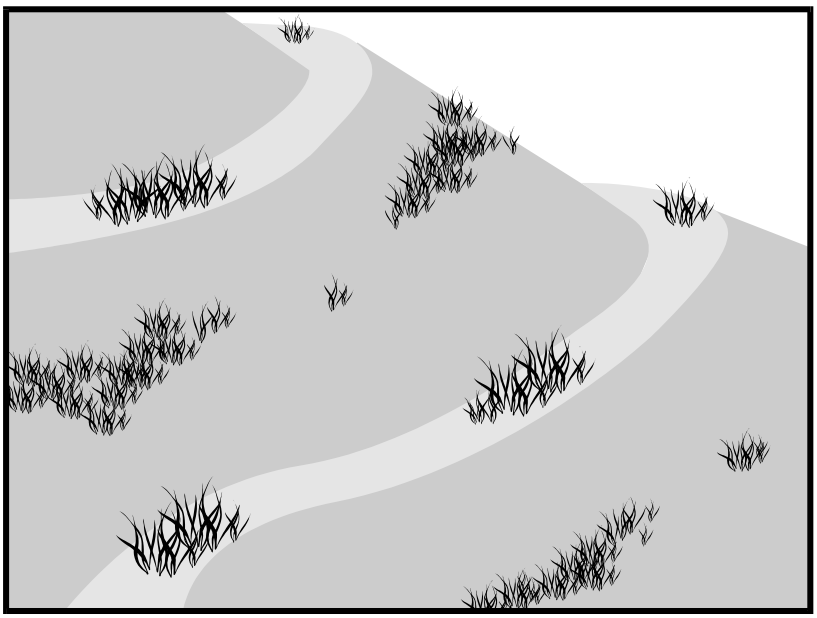
Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999

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.

Hydroseeding EC-4



Description and Purpose

Hydroseeding typically consists of applying a mixture of a hydraulic mulch, seed, and water with the possible addition of tackifier, compost, mycorrhizae inoculant, fertilizer, and/or soil conditioner, to temporarily protect exposed soils from erosion by water and wind. Hydraulic seeding, or hydroseeding, is simply the method by which temporary or permanent seed is applied to the soil surface and temporary erosion control is established by means of the mulch component.

Suitable Applications

Hydroseeding is suitable for disturbed areas requiring temporary protection until permanent stabilization is established, for disturbed areas that will be re-disturbed following an extended period of inactivity, or to apply permanent stabilization measures. Hydroseeding without mulch or other cover (e.g., EC-7, Geotextiles and Mats) is not a stand-alone erosion control BMP and should be combined with additional measures until vegetation establishment.

Typical applications for hydroseeding include:

- Disturbed soil/graded areas where permanent stabilization or continued earthwork is not anticipated prior to seed germination.
- Cleared and graded areas exposed to seasonal rains or temporary irrigation.
- To vegetate swales and earthen berms.

Categories

EC	Erosion Control	☑
SE	Sediment Control	
TC	Tracking Control	
WE	Wind Erosion Control	☒
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WM	Waste Management and Materials Pollution Control	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-5 Soil Binders
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket
EC-16 Non-Vegetative Stabilization

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- Areas not subject to heavy wear by construction equipment or high traffic.

Limitations

- Availability of hydroseeding equipment may be limited just prior to the rainy season and prior to storms due to high demand.
- Hydraulic seed should be applied with hydraulic mulch or a stand-alone hydroseed application should be followed by one of the following:
    - Straw mulch (see Straw Mulch EC-6)
    - Rolled erosion control products (see Geotextiles and Mats EC-7)
    - Application of Compost Blanket (see Compost Blanket EC-14)

  Hydraulic seed may be used alone only on small flat surfaces when there is sufficient time in the season to ensure adequate vegetation establishment and coverage to provide adequate erosion control.
- Hydraulic seed without mulch does not provide immediate erosion control.
- Temporary seeding may not be appropriate for steep slopes (i.e., slopes readily prone to rill erosion or without sufficient topsoil).
- Temporary seeding may not be appropriate in dry periods without supplemental irrigation.
- Temporary vegetation may have to be removed before permanent vegetation is applied.
- Temporary vegetation may not be appropriate for short term inactivity (i.e., less than 3-6 months).
- Vegetation may not establish when hydroseed is applied to very compact soils.
- Mulch may inhibit germination when applied at high rates.
- This BMP consists of a mixture of several constituents (e.g., fibers/mulches, tackifiers, and other chemical constituents), some of which may be proprietary and may come pre-mixed by the manufacturer. The water quality impacts of these constituents are relatively unknown, and some may have water quality impacts due to their chemical makeup. Additionally, these constituents may require non-visible pollutant monitoring. Refer to specific chemical properties identified in the product's Safety Data Sheet (SDS), although, note that not all SDS's provide ecological information; products should be evaluated for project-specific implementation by the QSD. Refer to fact sheet EC-05, Soil Binders, for further guidance on selecting soil binders.

Implementation

In order to select appropriate hydraulic seed mixtures, an evaluation of site conditions should be performed with respect to:

- Soil conditions
- Site topography and exposure (sun/wind)
- Season and climate
- Vegetation types
- Maintenance requirements
- Sensitive adjacent areas
- Water availability
- Plans for permanent vegetation

The local office of the U.S.D.A. Natural Resources Conservation Service (NRCS), Resource Conservation Districts and Agricultural Extension Service can provide information on appropriate seed mixes.

The following steps should be followed for implementation:

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying (See EC-15, Soil Preparation) the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.
- Avoid use of hydraulic seed in areas where the BMP would be incompatible with future earthwork activities.
- Hydraulic seed can be applied using a multiple step or one step process.
  - In a multiple step process, hydraulic seed is applied first, followed by mulch or a Rolled Erosion Control Product (RECP).
  - In the one step process, hydraulic seed is applied with hydraulic mulch in a hydraulic matrix. When the one step process is used to apply the mixture of fiber, seed, etc., the seed rate should be increased to compensate for all seeds not having direct contact with the soil.
- All hydraulically seeded areas should have mulch, or alternate erosion control cover to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow.
- All seeds should be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag should be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. The container should be labeled to clearly reflect the amount of Pure Live Seed (PLS) contained. All legume seed should be pellet inoculated. Inoculant sources should be species specific and should be applied at a rate of 2 lb of inoculant per 100 lb seed.
- Commercial fertilizer should conform to the requirements of the California Food and Agricultural Code, which can be found at: http://www.leginfo.ca.gov/.html/fac_table_of_contents.html. Fertilizer should be pelleted or granular form.
- Follow up applications should be made as needed to cover areas of poor coverage or germination/vegetation establishment and to maintain adequate soil protection.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Costs

Average cost for installation and maintenance may vary from as low as $2,400 per acre for flat slopes and stable soils, to $5,200 per acre for moderate to steep slopes and/or erosive soils. Cost of seed mixtures vary based on types of required vegetation.

BMP	Installed Cost per Acre
Hydraulic Seed	$2,400-$5,200

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

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.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.
- Where seeds fail to germinate, or they germinate and die, the area must be re-seeded, fertilized, and mulched within the planting season, using not less than half the original application rates.
- Irrigation systems, if applicable, should be inspected daily while in use to identify system malfunctions and line breaks. When line breaks are detected, the system must be shut down immediately and breaks repaired before the system is put back into operation.
- Irrigation systems should be inspected for complete coverage and adjusted as needed to maintain complete coverage.

References

Soil Stabilization BMP Research for Erosion and Sediment Controls: Cost Survey Technical Memorandum, State of California Department of Transportation (Caltrans), July 2007.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

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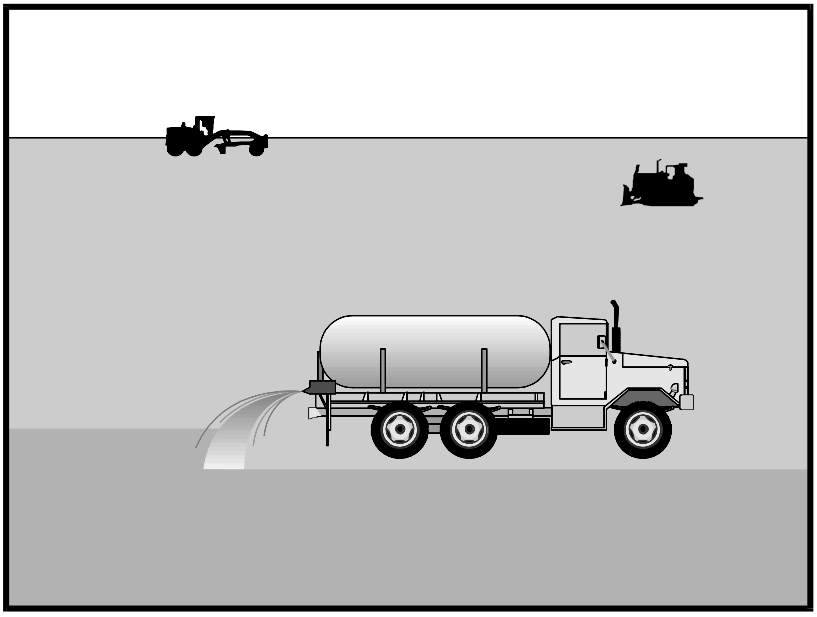
Soil Binders EC-5



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	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-4 Hydroseeding
EC-6 Straw Mulch
EC-7 Geotextiles and Mats
EC-8 Wood Mulching

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Description and Purpose

Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water and wind induced erosion of exposed soils on construction sites.

Suitable Applications

Soil binders are typically applied to disturbed areas requiring temporary protection. Because soil binders, when used as a stand-alone practice, can often be incorporated into the soil, they are a good alternative to mulches in areas where grading activities will soon resume. Soil binders are commonly used in the following areas:

- Rough graded soils that will be inactive for a short period of time.
- Soil stockpiles.
- Temporary haul roads prior to placement of crushed rock.
- Compacted soil road base.
- Construction staging, materials storage, and layout areas.
- Slopes and areas requiring stabilization prior to rain.
- Disturbed areas subject to high winds.

Limitations

- Soil binders are temporary in nature and may need reapplication.
- Soil binders require a minimum curing time until fully effective, as prescribed by the manufacturer. Curing time may be 24 hours or longer. Soil binders may need reapplication after a storm event.
- Soil binders will generally experience spot failures during heavy rainfall events. If runoff penetrates the soil at the top of a slope treated with a soil binder, it is likely that the runoff will undercut the stabilized soil layer and discharge at a point further down slope.
- Plant-material-based soil binders do not generally hold up to pedestrian or vehicular traffic across treated areas as well as polymeric emulsion blends or cementitious-based binders.
- Soil binders may not sufficiently penetrate compacted soils.
- Some soil binders are soil texture specific in terms of their effectiveness. For example, polyacrylamides (PAMs) work very well on silt and clayey soils but their performance decreases dramatically in sandy soils.
- Some soil binders may not perform well with low relative humidity. Under rainy conditions, some agents may become slippery or leach out of the soil.
- Soil binders may not cure if low temperatures occur within 24 hours of application.
- The water quality impacts of some chemical soil binders are relatively unknown, and some may have water quality impacts due to their chemical makeup. Additionally, these chemicals may require non-visible pollutant monitoring. Products should be evaluated for project-specific implementation by the SWPPP Preparer. Refer to the product Material Safety Data Sheet for chemical properties.

Implementation

General Considerations

- Soil binders should conform to local municipality specifications and requirements.
- Site soil types will dictate appropriate soil binders to be used.
- A soil binder must be environmentally benign (non-toxic to plant and animal life), easy to apply, easy to maintain, economical, and should not stain paved or painted surfaces. Soil binders should not pollute stormwater when cured. Obtain a Safety Data Sheet (SDS) from the manufacturer to ensure non-toxicity (note however, the SDS may not include ecological information).
- Stormwater runoff from PAM treated soils should pass through one of the following sediment control BMP prior to discharging to surface waters.
    - When the total drainage area is greater than or equal to 5 acres, PAM treated areas should drain to a sediment basin.

- Areas less than 5 acres should drain to sediment control BMPs, such as a sediment trap, or a series of check dams. The total number of check dams used should be maximized to achieve the greatest amount of settlement of sediment prior to discharging from the site. Each check dam should be spaced evenly in the drainage channel through which stormwater flows are discharged off site.

- Performance of soil binders depends on temperature, humidity, and traffic across treated areas.
- Avoid over spray onto roads, sidewalks, drainage channels, existing vegetation, etc.
- Some soil binders are designed for application to roads.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Selecting a Soil Binder

Properties of common soil binders used for erosion control are provided on Table 1 at the end of this Fact Sheet. Use Table 1 to select an appropriate soil binder. Refer to WE-1, Wind Erosion Control, for dust control soil binders.

Factors to consider when selecting a soil binder include the following:

- Suitability to situation - Consider where the soil binder will be applied, if it needs a high resistance to leaching or abrasion, and whether it needs to be compatible with any existing vegetation. Determine the length of time soil stabilization will be needed, and if the soil binder will be placed in an area where it will degrade rapidly. In general, slope steepness is not a discriminating factor for the listed soil binders.
- Soil types and surface materials - Fines and moisture content are key properties of surface materials. Consider a soil binder's ability to penetrate, likelihood of leaching, and ability to form a surface crust on the surface materials.
- Frequency of application - The frequency of application is related to the functional longevity of the binder, which can be affected by subgrade conditions, surface type, climate, and maintenance schedule.
- Frequent applications could lead to high costs. Application frequency may be minimized if the soil binder has good penetration, low evaporation, and good longevity. Consider also that frequent application will require frequent equipment clean up.

Plant-Material-Based (Short Lived, <6 months) Binders

Guar: Guar is a non-toxic, biodegradable, natural galactomannan-based hydrocolloid treated with dispersant agents for easy field mixing. It should be mixed with water at the rate of 11 to 15 lb per 1,000 gallons. Recommended minimum application rates are as follows:

Application Rates for Guar Soil Stabilizer

Slope (H:V):	Flat	4:1	3:1	2:1	1:1
lb/acre:	40	45	50	60	70

Psyllium: Psyllium is composed of the finely ground muciloid coating of plantago seeds that is applied as a dry powder or in a wet slurry to the surface of the soil. It dries to form a firm but rewettable membrane that binds soil particles together but permits germination and growth of seed. Psyllium requires 12 to 18 hours drying time. Application rates should be from 80 to 200 lb/acre, with enough water in solution to allow for a uniform slurry flow.

Starch: Starch is non-ionic, cold water soluble (pre-gelatinized) granular cornstarch. The material is mixed with water and applied at the rate of 150 lb/acre. Approximate drying time is 9 to 12 hours.

Plant-Material-Based (Long Lived, 6-12 months) Binders

Pitch and Rosin Emulsion: Generally, a non-ionic pitch and rosin emulsion has a minimum solids content of 48%. The rosin should be a minimum of 26% of the total solids content. The soil stabilizer should be non-corrosive, water dilutable emulsion that upon application cures to a water insoluble binding and cementing agent. For soil erosion control applications, the emulsion is diluted and should be applied as follows:

- For clayey soil: 5 parts water to 1-part emulsion
- For sandy soil: 10 parts water to 1-part emulsion

Application can be by water truck or hydraulic seeder with the emulsion and product mixture applied at the rate specified by the manufacturer.

Polymeric Emulsion Blend Binders

Acrylic Copolymers and Polymers: Polymeric soil stabilizers should consist of a liquid or solid polymer or copolymer with an acrylic base that contains a minimum of 55% solids. The polymeric compound should be handled and mixed in a manner that will not cause foaming or should contain an anti-foaming agent. The polymeric emulsion should not exceed its shelf life or expiration date; manufacturers should provide the expiration date. Polymeric soil stabilizer should be readily miscible in water, non-injurious to seed or animal life, non-flammable, should provide surface soil stabilization for various soil types without totally inhibiting water infiltration, and should not re-emulsify when cured. The applied compound typically requires 12 to 24 hours drying time. Liquid copolymer should be diluted at a rate of 10 parts water to 1-part polymer and the mixture applied to soil at a rate of 1,175 gallons/acre.

Liquid Polymers of Methacrylates and Acrylates: This material consists of a tackifier/sealer that is a liquid polymer of methacrylates and acrylates. It is an aqueous 100% acrylic emulsion blend of 40% solids by volume that is free from styrene, acetate, vinyl, ethoxylated surfactants or silicates. For soil stabilization applications, it is diluted with water in accordance with the manufacturer's recommendations and applied with a hydraulic seeder at the rate of 20 gallons/acre. Drying time is 12 to 18 hours after application.

Copolymers of Sodium Acrylates and Acrylamides: These materials are non-toxic, dry powders that are copolymers of sodium acrylate and acrylamide. They are mixed with water and applied to the soil surface for erosion control at rates that are determined by slope gradient:

Slope Gradient (H:V)	lb/acre
Flat to 5:1	3.0 – 5.0
5:1 to 3:1	5.0 – 10.0
2:1 to 1:1	10.0 – 20.0

Poly-Acrylamide (PAM) and Copolymer of Acrylamide**:** Linear copolymer polyacrylamide for use as a soil binder is packaged as a dry flowable solid, as a liquid. Refer to the manufacturer's recommendation for dilution and application rates as they vary based on liquid or dry form, site conditions and climate.

- Limitations specific to PAM are as follows:
  - Do not use PAM on a slope that flows into a water body without passing through a sediment trap or sediment basin.
  - The specific PAM copolymer formulation must be anionic. Cationic PAM should not be used in any application because of known aquatic toxicity problems. Only the highest drinking water grade PAM, certified for compliance with ANSI/NSF Standard 60 for drinking water treatment, should be used for soil applications.
  - PAM designated for erosion and sediment control should be "water soluble" or "linear" or "non-cross linked".
  - PAM should not be used as a stand-alone BMP to protect against water-based erosion. When combined with mulch, its effectiveness increases dramatically.

Hydro-Colloid Polymers: Hydro-Colloid Polymers are various combinations of dry flowable poly-acrylamides, copolymers and hydro-colloid polymers that are mixed with water and applied to the soil surface at rates of 55 to 60 lb/acre. Drying times are 0 to 4 hours.

Cementitious-Based Binders

Gypsum: This is a formulated gypsum-based product that readily mixes with water and mulch to form a thin protective crust on the soil surface. It is composed of high purity gypsum that is ground, calcined and processed into calcium sulfate hemihydrate with a minimum purity of 86%. It is mixed in a hydraulic seeder and applied at rates 4,000 to 12,000 lb/acre. Drying time is 4 to 8 hours.

Applying Soil Binders

After selecting an appropriate soil binder, the untreated soil surface must be prepared before applying the soil binder. The untreated soil surface must contain sufficient moisture to assist the agent in achieving uniform distribution. In general, the following steps should be followed:

- Follow manufacturer's written recommendations for application rates, pre-wetting of application area, and cleaning of equipment after use.
- Prior to application, roughen embankment and fill areas.
- Consider the drying time for the selected soil binder and apply with sufficient time before anticipated rainfall. Soil binders should not be applied during or immediately before rainfall.
- Avoid over spray onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.

- Soil binders should not be applied to frozen soil, areas with standing water, under freezing or rainy conditions, or when the temperature is below 40°F during the curing period.
- More than one treatment is often necessary, although the second treatment may be diluted or have a lower application rate.
- Generally, soil binders require a minimum curing time of 24 hours before they are fully effective. Refer to manufacturer's instructions for specific cure time.
- For liquid agents:
  - Crown or slope ground to avoid ponding.
  - Uniformly pre-wet ground at 0.03 to 0.3 gal/yd^2 or according to manufacturer's recommendations.
  - Apply solution under pressure. Overlap solution 6 to 12 in.
  - Allow treated area to cure for the time recommended by the manufacturer; typically, at least 24 hours.
  - Apply second treatment before first treatment becomes ineffective, using 50% application rate.
  - In low humidities, reactivate chemicals by re-wetting with water at 0.1 to 0.2 gal/yd^2.

Costs

Costs vary according to the soil stabilizer selected for implementation. The following are approximate installed costs:

Soil Binder	Cost per Acre
Plant-Material-Based (Short Lived) Binders	$900-$1,200
Plant-Material-Based (Long Lived) Binders	$1,500-$1,900
Polymeric Emulsion Blend Binders	$900-$1,900
Cementitious-Based Binders	$1,000-$1,500

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech Inc.

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.
- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.

- Reapply the selected soil binder as needed to maintain effectiveness.

Table 1 Properties of Soil Binders for Erosion Control

Evaluation Criteria	Binder Type			
	Plant Material Based (Short Lived)	**Plant Material Based (Long Lived)**	**Polymeric Emulsion Blends**	**Cementitious-Based Binders**
Relative Cost	Low	Moderate to High	Low to High	Low to Moderate
Resistance to Leaching	High	High	Low to Moderate	Moderate
Resistance to Abrasion	Moderate	Low	Moderate to High	Moderate to High
Longevity	Short to Medium	Medium	Medium to Long	Medium
Minimum Curing Time before Rain	9 to 18 hours	19 to 24 hours	0 to 24 hours	4 to 8 hours
Compatibility with Existing Vegetation	Good	Poor	Poor	Poor
Mode of Degradation	Biodegradable	Biodegradable	Photodegradable/ Chemically Degradable	Photodegradable/ Chemically Degradable
Labor Intensive	No	No	No	No
Specialized Application Equipment	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher	Water Truck or Hydraulic Mulcher
Liquid/Powder	Powder	Liquid	Liquid/Powder	Powder
Surface Crusting	Yes, but dissolves on rewetting	Yes	Yes, but dissolves on rewetting	Yes
Clean Up	Water	Water	Water	Water
Erosion Control Application Rate	Varies (1)	Varies (1)	Varies (1)	4,000 to 12,000 lbs/acre

(1) See Implementation for specific rates.

References

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Sedimentation and Erosion Control, An Inventory of Current Practices Draft, US EPA, April 1990.

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Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

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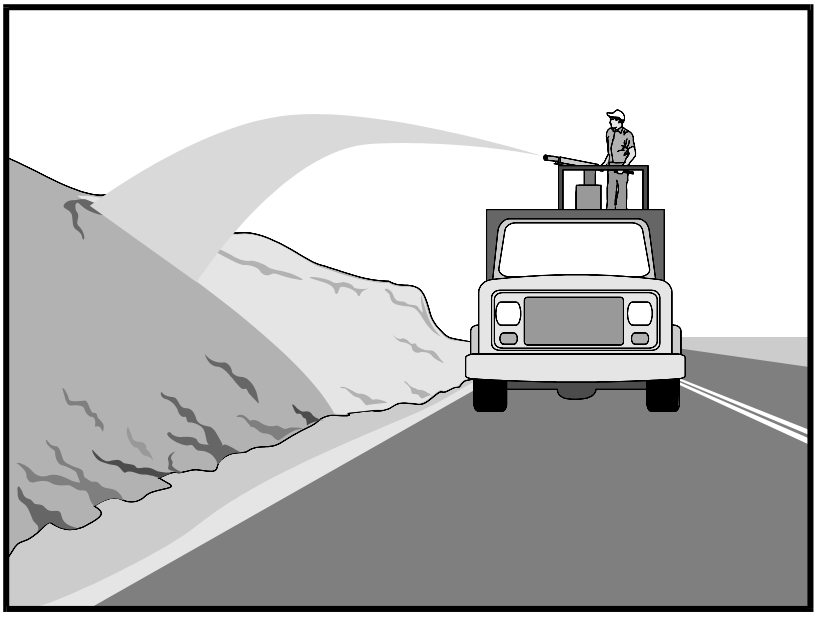
Straw Mulch EC-6



Categories

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WE	Wind Erosion Control	☒
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Legend:
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☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch
EC-4 Hydroseeding
EC-5 Soil Binders
EC-7 Geotextiles and Mats
EC-8 Wood Mulching
EC-14 Compost Blanket

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Description and Purpose

Straw mulch consists of placing a uniform layer of straw and incorporating it into the soil with a studded roller or crimper or anchoring it with a tackifier or stabilizing emulsion. Straw mulch protects the soil surface from the impact of rain drops, preventing soil particles from becoming dislodged.

Suitable Applications

Straw mulch is suitable for disturbed areas requiring temporary protection until permanent stabilization is established. Straw mulch can be specified for the following applications:

- As a stand-alone BMP on disturbed areas until soils can be prepared for permanent vegetation. The longevity of straw mulch is typically less than six months.
- Applied in combination with temporary seeding strategies
- Applied in combination with permanent seeding strategies to enhance plant establishment and final soil stabilization
- Applied around containerized plantings to control erosion until the plants become established to provide permanent stabilization

Limitations

Availability of straw and straw blowing equipment may be limited just prior to the rainy season and prior to storms due to high demand.

- There is a potential for introduction of weed seed and unwanted plant material if weed-free agricultural straw is not specified.
- Straw mulch applied by hand is more time intensive and potentially costly.
- Wind may limit application of straw and blow straw into undesired locations.
- May have to be removed prior to permanent seeding or prior to further earthwork.
- "Punching" of straw does not work in sandy soils, necessitating the use of tackifiers.
- Potential fugitive dust control issues associated with straw applications can occur. Application of a stabilizing emulsion or a water stream at the same time straw is being blown can reduce this problem.
- Use of plastic netting should be avoided in areas where wildlife may be entrapped and may be prohibited for projects in certain areas with sensitive wildlife species, especially reptiles and amphibians.

Implementation

- Straw should be derived from weed-free wheat, rice, or barley. Where required by the plans, specifications, permits, or environmental documents, native grass straw should be used.
- Use tackifier to anchor straw mulch to the soil on slopes.
- Crimping, punch roller-type rollers, or track walking may also be used to incorporate straw mulch into the soil on slopes. Track walking can be used where other methods are impractical.
- Avoid placing straw onto roads, sidewalks, drainage channels, sound walls, existing vegetation, etc.
- Straw mulch with tackifier should not be applied during or immediately before rainfall.
- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

Application Procedures

- When using a tackifier to anchor the straw mulch, roughen embankment or fill areas by rolling with a crimping or punching-type roller or by track walking before placing the straw mulch. Track walking should only be used where rolling is impractical.
- Apply straw at a rate of between 3,000 and 4,000 lb./acre, either by machine or by hand distribution and provide 100% ground cover. A lighter application is used for flat surfaces and a heavier application is used for slopes.
- Evenly distribute straw mulch on the soil surface.
- Anchoring straw mulch to the soil surface by "punching" it into the soil mechanically (incorporating) can be used in lieu of a tackifier.

- Methods for holding the straw mulch in place depend upon the slope steepness, accessibility, soil conditions, and longevity.

  - A tackifier acts to glue the straw fibers together and to the soil surface. The tackifier should be selected based on longevity and ability to hold the fibers in place. A tackifier is typically applied at a rate of 125 lb./acre. In windy conditions, the rates are typically 180 lb./acre.

  - On very small areas, a spade or shovel can be used to punch in straw mulch.

  - On slopes with soils that are stable enough and of sufficient gradient to safely support construction equipment without contributing to compaction and instability problems, straw can be "punched" into the ground using a knife blade roller or a straight bladed coulter, known commercially as a "crimper."

Costs

Average annual cost for installation and maintenance is included in the table below. Application by hand is more time intensive and potentially more costly.

BMP	Unit Cost per Acre
Straw mulch, crimped or punched	$3,150-$6,900
Straw mulch with tackifier	$2,300-$6,200

Source: Cost information received from individual product suppliers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

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.

- Areas where erosion is evident should be repaired and BMPs re-applied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require re-application of BMPs.

- The key consideration in inspection and maintenance is that the straw needs to last long enough to achieve erosion control objectives. Straw mulch as a stand-alone BMP is temporary and is not suited for long-term erosion control.

- Maintain an unbroken, temporary mulched ground cover while disturbed soil areas are inactive. Repair any damaged ground cover and re-mulch exposed areas.

- Reapplication of straw mulch and tackifier may be required to maintain effective soil stabilization over disturbed areas and slopes.

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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.

Controlling Erosion of Construction Sites, Agricultural Information Bulletin #347, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) (formerly Soil Conservation Service – SCS).

Guides for Erosion and Sediment Control in California, USDA Soils Conservation Service, January 1991.

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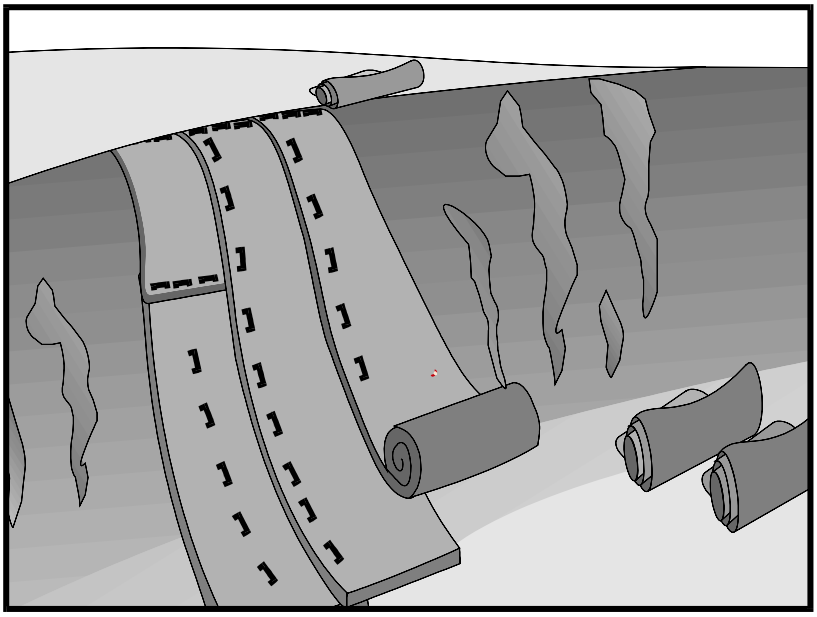
Geotextiles and Mats EC-7



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Targeted Constituents

Sediment	☑
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Trash	
Metals	
Bacteria	
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Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-4 Hydroseeding

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Description and Purpose

Rolled Erosion Control Products (RECPs), also known as erosion control matting or blankets, can be made of natural or synthetic materials or a combination of the two. RECPs are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, RECPs may be used to stabilize soils until vegetation is established or to reinforce non-woody surface vegetation.

Suitable Applications

RECPs are typically applied on slopes where erosion hazard is high, and vegetation will be slow to establish. Mattings are also used on stream banks, swales and other drainage channels where moving water at velocities between 3 ft/s and 6 ft/s are likely to cause scour and wash out new vegetation and in areas where the soil surface is disturbed and where existing vegetation has been removed. RECPs may also be used when seeding cannot occur (e.g., late season construction and/or the arrival of an early rain season). RECPs should be considered when the soils are fine grained and potentially erosive. RECPs should be considered in the following situations:

- Steep slopes, generally steeper than 3:1 (H:V).
- Long slopes.
- Slopes where the erosion potential is high.
- Slopes and disturbed soils where mulch must be anchored.

- Disturbed areas where temporary cover is needed, or plants are slow to establish or will not establish.
- Channels with flows exceeding 3.3 ft/s.
- Channels to be vegetated.
- Stockpiles.
- Slopes adjacent to water bodies.

Limitations

- RECP installed costs are generally higher than other erosion control BMPs, limiting their use to areas where other BMPs are ineffective (e.g., channels, steep slopes).
- RECPs may delay seed germination, due to reduction in soil temperature and/or sunlight.
- RECPs are generally not suitable for excessively rocky sites or areas where the final vegetation will be mowed (since staples and netting can catch in mowers). If a staple or pin cannot be driven into the soil because the underlying soil is too hard or rocky, then an alternative BMP should be selected.
- If used for temporary erosion control, RECPs should be removed and disposed of prior to application of permanent soil stabilization measures.
- The use of plastic sheeting should be limited to covering stockpiles or very small graded areas for short periods of time (such as through one imminent storm event) until other measures, such as seeding and mulching, may be installed.
    - Plastic sheeting is easily vandalized, easily torn, photodegradable, and must be disposed of at a landfill.
    - Plastic sheeting results in 100% runoff, which may cause serious erosion problems in the areas receiving the increased flow.
- According to the State Water Board's *CGP Review, Issue #2*, only RECPs that either do not contain plastic netting or contain netting manufactured from 100% biodegradable non-plastic materials, such as jute, sisal, or coir fiber should be used due to plastic pollution and wildlife concerns. If a plastic-netted product is used for temporary stabilization, it must be promptly removed when no longer needed and removed or replaced with non-plastic netted RECPs for final stabilization.
- RECPs may have limitations based on soil type, slope gradient, or channel flow rate; consult the manufacturer for proper selection.
- Not suitable for areas that have foot traffic (tripping hazard) – e.g., pad areas around buildings under construction.
- RECPs that incorporate a plastic netting (e.g. straw blanket typically uses a plastic netting to hold the straw in place) may not be suitable near known wildlife habitat. Wildlife can become trapped in the plastic netting. As per State Water Board guidance, RECPs that

contain plastic netting are discouraged for temporary controls and are not acceptable alternatives for permanent controls. RECPs that do not contain plastic netting or contain netting manufactured from 100% biodegradable non-plastic materials such as jute, sisal, or coir fiber should be used.

- RECPs may have limitations in extremely windy climates; they are susceptible to wind damage and displacement. However, when RECPs are properly trenched at the top and bottom and stapled in accordance with the manufacturer's recommendations, problems with wind can be minimized.

Implementation

Material Selection

- Natural RECPs have been found to be effective where re-vegetation will be provided by re-seeding. The choice of material should be based on the size of area, side slopes, surface conditions such as hardness, moisture, weed growth, and availability of materials.

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

- The following natural and synthetic RECPs are commonly used:

Geotextiles

- Material can be a woven or a non-woven polypropylene fabric with minimum thickness of 0.06 in., minimum width of 12 ft and should have minimum tensile strength of 150 lbs (warp), 80 lbs (fill) in conformance with the requirements in ASTM Designation: D 4632. The permittivity of the fabric should be approximately 0.07 sec^{-1} in conformance with the requirements in ASTM Designation: D4491. The fabric should have an ultraviolet (UV) stability of 70 percent in conformance with the requirements in ASTM designation: D4355. Geotextile blankets must be secured in place with wire staples or sandbags and by keying into tops of slopes to prevent infiltration of surface waters under geotextile. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Geotextiles may be reused if they are suitable for the use intended.

Plastic Covers

- Generally plastic sheeting should only be used as stockpile covering or for very small graded areas for short periods of time (such as through one imminent storm event). If plastic sheeting must be used, choose a plastic that will withstand photo degradation.

- Plastic sheeting should have a minimum thickness of 6 mils and must be keyed in at the top of slope (when used as a temporary slope protection) and firmly held in place with sandbags or other weights placed no more than 10 ft apart. Seams are typically taped or weighted down their entire length, and there should be at least a 12 in. to 24 in. overlap of all seams. Edges should be embedded a minimum of 6 in. in soil (when used as a temporary slope protection).

- All sheeting must be inspected periodically after installation and after significant rainstorms to check for erosion, undermining, and anchorage failure. Any failures must be repaired

immediately. If washout or breakages occur, the material should be re-installed after repairing the damage to the slope.

Erosion Control Blankets/Mats

- Biodegradable RECPs are typically composed of jute fibers, curled wood fibers, straw, coconut fiber, or a combination of these materials. In order for an RECP to be considered 100% biodegradable, the netting, sewing or adhesive system that holds the biodegradable mulch fibers together must also be biodegradable. See typical installation details at the end of this fact sheet.

  - **Jute** is a natural fiber that is made into a yarn that is loosely woven into a biodegradable mesh. The performance of jute as a stand-alone RECP is low. Most other RECPs outperform jute as a temporary erosion control product and therefore jute is not commonly used. It is designed to be used in conjunction with vegetation. The material is supplied in rolled strips, which should be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Excelsior** (curled wood fiber) blanket material should consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 6 in. or longer. The excelsior blanket should be of consistent thickness. The wood fiber must be evenly distributed over the entire area of the blanket. The top surface of the blanket should be covered with a photodegradable extruded plastic mesh. The blanket should be smolder resistant without the use of chemical additives and should be non-toxic and non-injurious to plant and animal life. Excelsior blankets should be furnished in rolled strips, a minimum of 48 in. wide, and should have an average weight of 0.8 lb/yd^2, ±10 percent, at the time of manufacture. Excelsior blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

  - **Straw blanket** should be machine produced mats of straw with a lightweight biodegradable netting top layer. The straw should be attached to the netting with biodegradable thread or glue strips. The straw blanket should be of consistent thickness. The straw should be evenly distributed over the entire area of the blanket. Straw blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

  - **Wood fiber blanket** is composed of biodegradable fiber mulch with extruded plastic netting held together with adhesives. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured to the ground with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Coconut fiber blanket** should be a machine produced mat of 100 percent coconut fiber with biodegradable netting on the top and bottom. The coconut fiber should be attached to the netting with biodegradable thread or glue strips. The coconut fiber blanket should be of consistent thickness. The coconut fiber should be evenly distributed over the entire area of the blanket. Coconut fiber blanket should be furnished in rolled strips with a minimum of 6.5 ft wide, a minimum of 80 ft. long and a minimum of 0.5

lb/yd^2. Coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- **Coconut fiber mesh** is a thin permeable membrane made from coconut or corn fiber that is spun into a yarn and woven into a biodegradable mat. It is designed to be used in conjunction with vegetation and typically has longevity of several years. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Straw coconut fiber blanket** should be machine produced mats of 70 percent straw and 30 percent coconut fiber with a biodegradable netting top layer and a biodegradable bottom net. The straw and coconut fiber should be attached to the netting with biodegradable thread or glue strips. The straw coconut fiber blanket should be of consistent thickness. The straw and coconut fiber should be evenly distributed over the entire area of the blanket. Straw coconut fiber blanket should be furnished in rolled strips a minimum of 6.5 ft wide, a minimum of 80 ft long and a minimum of 0.5 lb/yd^2. Straw coconut fiber blankets must be secured in place with wire staples. Staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.

- Non-biodegradable RECPs are typically composed of polypropylene, polyethylene, nylon or other synthetic fibers. In some cases, a combination of biodegradable and synthetic fibers is used to construct the RECP. Netting used to hold these fibers together is typically non-biodegradable as well. Only biodegradable RECPs can remain on a site applying for a Notice of Termination due to plastic pollution and wild life concerns (State Waterboard, 2016). RECPs containing plastic that are used on a site must be disposed of for final stabilization.

  - **Plastic netting** is a lightweight biaxially oriented netting designed for securing loose mulches like straw or paper to soil surfaces to establish vegetation. The netting is photodegradable. The netting is supplied in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Plastic mesh** is an open weave geotextile that is composed of an extruded synthetic fiber woven into a mesh with an opening size of less than ¼ in. It is used with re-vegetation or may be used to secure loose fiber such as straw to the ground. The material is supplied in rolled strips, which must be secured to the soil with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Synthetic fiber with netting** is a mat that is composed of durable synthetic fibers treated to resist chemicals and ultraviolet light. The mat is a dense, three-dimensional mesh of synthetic (typically polyolefin) fibers stitched between two polypropylene nets. The mats are designed to be re-vegetated and provide a permanent composite system of soil, roots, and geomatrix. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

  - **Bonded synthetic fibers** consist of a three-dimensional geometric nylon (or other synthetic) matting. Typically, it has more than 90 percent open area, which facilitates

root growth. It's tough root reinforcing system anchors vegetation and protects against hydraulic lift and shear forces created by high volume discharges. It can be installed over prepared soil, followed by seeding into the mat. Once vegetated, it becomes an invisible composite system of soil, roots, and geomatrix. The material is furnished in rolled strips that must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

- **Combination synthetic and biodegradable RECPs** consist of biodegradable fibers, such as wood fiber or coconut fiber, with a heavy polypropylene net stitched to the top and a high strength continuous filament geomatrix or net stitched to the bottom. The material is designed to enhance re-vegetation. The material is furnished in rolled strips, which must be secured with U-shaped staples or stakes in accordance with manufacturers' recommendations.

Site Preparation

- Proper soil preparation is essential to ensure complete contact of the RECP with the soil. Soil Roughening is not recommended in areas where RECPs will be installed.
- Grade and shape the area of installation.
- Remove all rocks, clods, vegetation or other obstructions so that the installed blankets or mats will have complete, direct contact with the soil.
- Prepare seedbed by loosening 2 to 3 in. of topsoil.

Seeding/Planting

Seed the area before blanket installation for erosion control and re-vegetation. Seeding after mat installation is often specified for turf reinforcement application. When seeding prior to blanket installation, all areas disturbed during blanket installation must be re-seeded. Where soil filling is specified for turf reinforcement mats (TRMs), seed the matting and the entire disturbed area after installation and prior to filling the mat with soil.

Fertilize and seed in accordance with seeding specifications or other types of landscaping plans. The protective matting can be laid over areas where grass has been planted and the seedlings have emerged. Where vines or other ground covers are to be planted, lay the protective matting first and then plant through matting according to design of planting.

Check Slots

Check slots shall be installed as required by the manufacturer.

Laying and Securing Matting

- Before laying the matting, all check slots should be installed and the seedbed should be friable, made free from clods, rocks, and roots. The surface should be compacted and finished according to the requirements of the manufacturer's recommendations.
- Mechanical or manual lay down equipment should be capable of handling full rolls of fabric and laying the fabric smoothly without wrinkles or folds. The equipment should meet the fabric manufacturer's recommendations or equivalent standards.

Anchoring

- U-shaped wire staples, metal geotextile stake pins, or triangular wooden stakes can be used to anchor mats and blankets to the ground surface.
- Wire staples should be made of minimum 11-gauge steel wire and should be U-shaped with 8 in. legs and 2 in. crown.
- Metal stake pins should be 0.188 in. diameter steel with a 1.5 in. steel washer at the head of the pin, and 8 in. in length.
- Wire staples and metal stakes should be driven flush to the soil surface.

Installation on Slopes

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Begin at the top of the slope and anchor the blanket in a 6 in. deep by 6 in. wide trench. Backfill trench and tamp earth firmly.
- Unroll blanket down slope in the direction of water flow.
- Overlap the edges of adjacent parallel rolls 2 to 3 in. and staple every 3 ft (or greater, per manufacturer's specifications).
- When blankets must be spliced, place blankets end over end (shingle style) with 6 in. overlap. Staple through overlapped area, approximately 12 in. apart.
- Lay blankets loosely and maintain direct contact with the soil. Do not stretch.
- Staple blankets sufficiently to anchor blanket and maintain contact with the soil. Staples should be placed down the center and staggered with the staples placed along the edges. Steep slopes, 1:1 (H:V) to 2:1 (H:V), require a minimum of 2 staples/yd^2. Moderate slopes, 2:1 (H:V) to 3:1 (H:V), require a minimum of 1 ½ staples/yd^2. Check manufacturer's specifications to determine if a higher density staple pattern is required.

Installation in Channels

Installation should be in accordance with the manufacturer's recommendations. In general, these will be as follows:

- Dig initial anchor trench 12 in. deep and 6 in. wide across the channel at the lower end of the project area.
- Excavate intermittent check slots, 6 in. deep and 6 in. wide across the channel at 25 to 30 ft intervals along the channels.
- Cut longitudinal channel anchor trenches 4 in. deep and 4 in. wide along each side of the installation to bury edges of matting, whenever possible extend matting 2 to 3 in. above the crest of the channel side slopes.

- Beginning at the downstream end and in the center of the channel, place the initial end of the first roll in the anchor trench and secure with fastening devices at 12 in. intervals. Note: matting will initially be upside down in anchor trench.
- In the same manner, position adjacent rolls in anchor trench, overlapping the preceding roll a minimum of 3 in.
- Secure these initial ends of mats with anchors at 12 in. intervals, backfill and compact soil.
- Unroll center strip of matting upstream. Stop at next check slot or terminal anchor trench. Unroll adjacent mats upstream in similar fashion, maintaining a 3 in. overlap.
- Fold and secure all rolls of matting snugly into all transverse check slots. Lay mat in the bottom of the slot then fold back against itself. Anchor through both layers of mat at 12 in. intervals, then backfill and compact soil. Continue rolling all mat widths upstream to the next check slot or terminal anchor trench.
- Alternate method for non-critical installations: Place two rows of anchors on 6 in. centers at 25 to 30 ft. intervals in lieu of excavated check slots.
- Staple shingled lap spliced ends a minimum of 12 in. apart on 12 in. intervals.
- Place edges of outside mats in previously excavated longitudinal slots; anchor using prescribed staple pattern, backfill, and compact soil.
- Anchor, fill, and compact upstream end of mat in a 12 in. by 6 in. terminal trench.
- Secure mat to ground surface using U-shaped wire staples, geotextile pins, or wooden stakes.
- Seed and fill turf reinforcement matting with soil, if specified.

Soil Filling (if specified for turf reinforcement mat (TRM))

Installation should be in accordance with the manufacturer's recommendations. Typical installation guidelines are as follows:

- After seeding, spread and lightly rake ½-3/4 inches of fine topsoil into the TRM apertures to completely fill TRM thickness. Use backside of rake or other flat implement.
- Alternatively, if allowed by product specifications, spread topsoil using lightweight loader, backhoe, or other power equipment. Avoid sharp turns with equipment.
- Always consult the manufacturer's recommendations for installation.
- Do not drive tracked or heavy equipment over mat.
- Avoid any traffic over matting if loose or wet soil conditions exist.
- Use shovels, rakes, or brooms for fine grading and touch up.
- Smooth out soil filling just exposing top netting of mat.

Temporary Soil Stabilization Removal

- Temporary soil stabilization removed from the site of the work must be disposed of if necessary.

Costs

Installed costs can be relatively high compared to other BMPs. Approximate costs for installed materials are shown below:

Rolled Erosion Control Products		Installed Cost per Acre
Biodegradable	Jute Mesh	$7,700-$9,000
	Curled Wood Fiber	$10,200-$13,400
	Straw	$10,200-$13,400
	Wood Fiber	$10,200-$13,400
	Coconut Fiber	$16,600-$18,000
	Coconut Fiber Mesh	$38,400-$42,200
	Straw Coconut Fiber	$12,800-$15,400
Non-Biodegradable	Plastic Netting	$2,600-$2,800
	Plastic Mesh	$3,800-$4,500
	Synthetic Fiber with Netting	$43,500-$51,200
	Bonded Synthetic Fibers	$57,600-$70,400
	Combination with Biodegradable	$38,400-$46,100

Source: Cost information received from individual product manufacturers solicited by Geosyntec Consultants (2004). Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.

Inspection and Maintenance

- RECPs 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.
- Areas where erosion is evident shall be repaired and BMPs reapplied as soon as possible. Care should be exercised to minimize the damage to protected areas while making repairs, as any area damaged will require reapplication of BMPs.
- If washout or breakage occurs, re-install the material after repairing the damage to the slope or channel.
- Make sure matting is uniformly in contact with the soil.
- Check that all the lap joints are secure.
- Check that staples are flush with the ground.

References

CGP Review #2, State Water Resources Control Board, 2014. Available online at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/training/cgp_review_issue2.pdf.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005

Erosion Control Pilot Study Report, State of California Department of Transportation (Caltrans), June 2000.

Guides for Erosion and Sediment Controls in California, USDA Soils Conservation Service, January 1991.

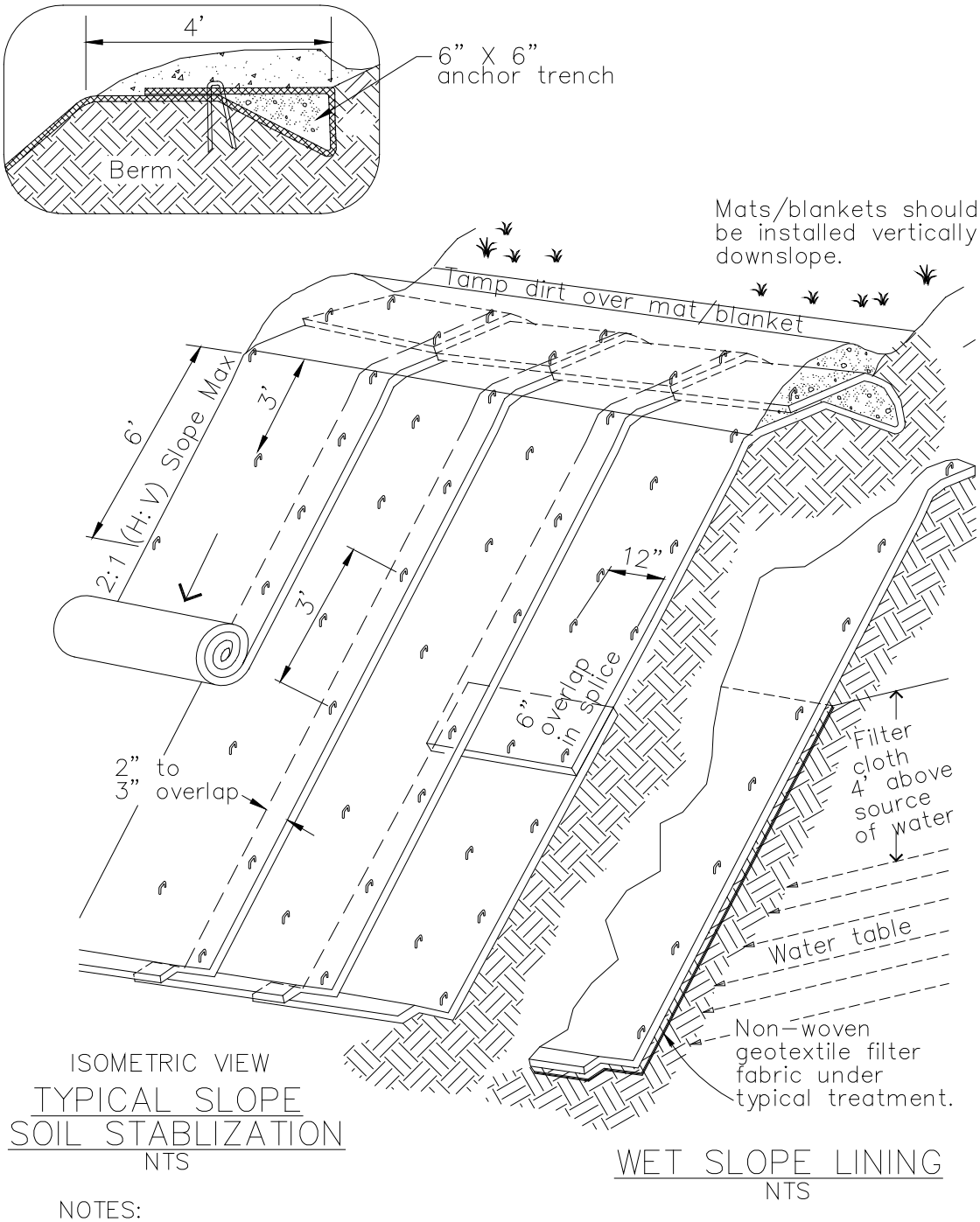
National Management Measures to Control Nonpoint Source Pollution from Urban Areas, United States Environmental Protection Agency, 2002.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Guidance Document: Soil Stabilization for Temporary Slopes, State of California Department of Transportation (Caltrans), November 1999.

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.



ISOMETRIC VIEW

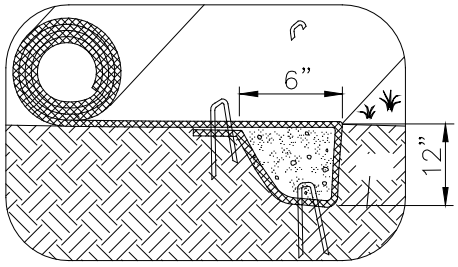
TYPICAL SLOPE
SOIL STABLIZATION
NTS

WET SLOPE LINING
NTS

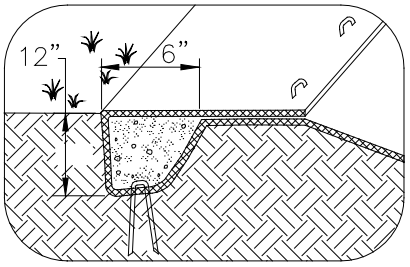
NOTES:

1. Slope surface shall be free of rocks, clods, sticks and grass. Mats/blankets shall have good soil contact.
2. Lay blankets loosely and stake or staple to maintain direct contact with the soil. Do not stretch.
3. Install per manufacturer's recommendations

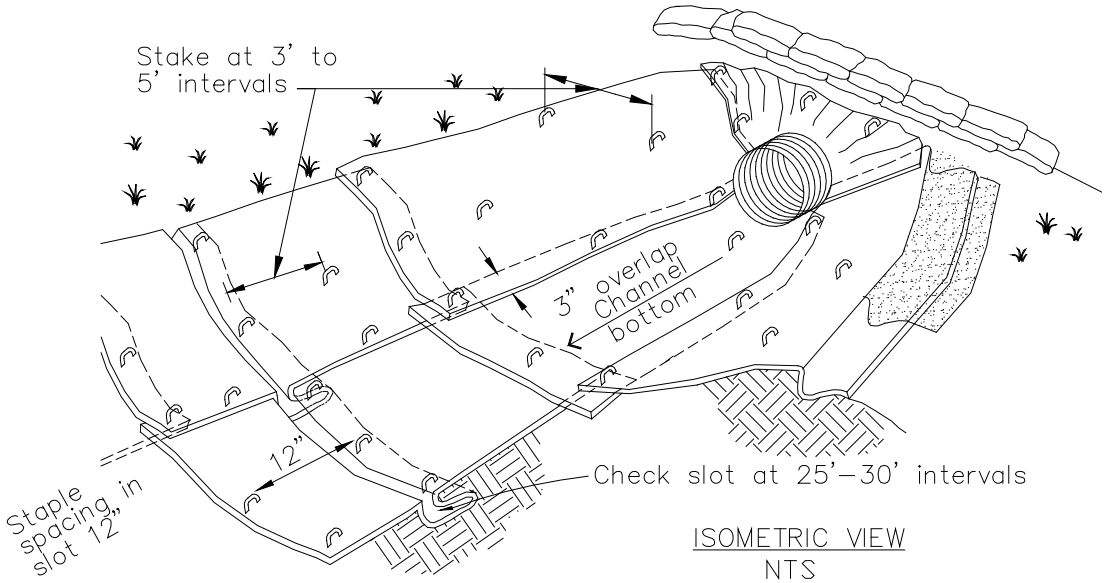
TYPICAL INSTALLATION DETAIL



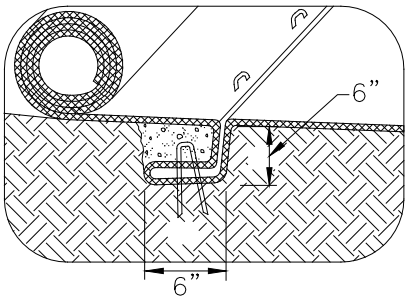
INITIAL CHANNEL ANCHOR TRENCH
NTS



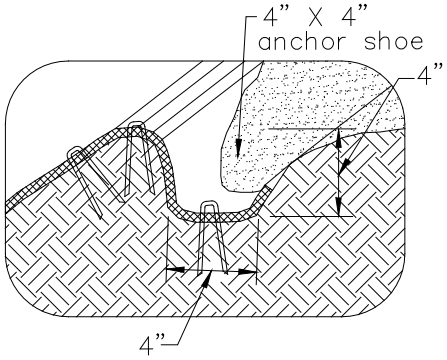
TERMINAL SLOPE AND CHANNEL ANCHOR TRENCH
NTS



ISOMETRIC VIEW
NTS



INTERMITTENT CHECK SLOT
NTS



LONGITUDINAL ANCHOR TRENCH
NTS

NOTES:
1. Check slots to be constructed per manufacturers specifications.
2. Staking or stapling layout per manufacturers specifications.
3. Install per manufacturer's recommendations

TYPICAL INSTALLATION DETAIL

Soil Preparation/Roughening EC-15

Description and Purpose

Soil Preparation/Roughening involves assessment and preparation of surface soils for BMP installation. This can include soil testing (for seed base, soil characteristics, or nutrients), as well as roughening surface soils by mechanical methods (including sheepsfoot rolling, track walking, scarifying, stair stepping, and imprinting) to prepare soil for additional BMPs, or to break up sheet flow. Soil Preparation can also involve tilling topsoil to prepare a seed bed and/or incorporation of soil amendments, to enhance vegetative establishment.

Suitable Applications

Soil preparation: Soil preparation is essential to proper vegetative establishment. In particular, soil preparation (i.e. tilling, raking, and amendment) is suitable for use in combination with any soil stabilization method, including Rolled Erosion Control Products (RECPs) or sod. Soil preparation should not be confused with roughening.

Roughening: Soil roughening is generally referred to as track walking (sometimes called imprinting) a slope, where treads from heavy equipment run parallel to the contours of the slope and act as mini terraces. Soil preparation is most effective when used in combination with erosion controls. Soil Roughening is suitable for use as a complementary process for controlling erosion on a site. Roughening is not intended to be used as a stand-alone BMP, and should be used with perimeter controls, additional erosion control measures, grade breaks, and vegetative establishment for maximum effectiveness. Roughening is intended to only affect surface soils and should not compromise slope stability or overall compaction. Suitable applications for soil roughening include:

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	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-3 Hydraulic Mulch

EC-5 Soil Binders

EC-7 Geotextiles and Mats

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- Along any disturbed slopes, including temporary stockpiles, sediment basins, or compacted soil diversion berms and swales.

- Roughening should be used in combination with hydraulically applied stabilization methods, compost blanket, or straw mulch; but should not be used in combination with RECPs or sod because roughening is intended to leave terraces on the slope.

Limitations

- Preparation and roughening must take place prior to installing other erosion controls (such as hydraulically applied stabilizers) or sediment controls (such as fiber rolls) on the faces of slopes.

- In such cases where slope preparation is minimal, erosion control/revegetation BMPs that do not require extensive soil preparation - such as hydraulic mulching and seeding applications - should be employed.

- Consideration should be given to the type of erosion control BMP that follows surface preparation, as some BMPs are not designed to be installed over various types of tillage/roughening, i.e., RECPs should not be used with soil roughening due to a "bridging" effect, which suspends the blanket above the seed bed.

- Surface roughness has an effect on the amount of mulch material that needs to be applied, which shows up as a general increase in mulch material due to an increase in surface area (Topographic Index -see EC-3 Hydraulic Mulch).

Implementation

- Additional guidance on the comparison and selection of temporary slope stabilization methods is provided in Appendix F of the Handbook.

General

A roughened surface can significantly reduce erosion. Based on tests done at the San Diego State Erosion Research Laboratory, various roughening techniques on slopes can result in a 12 - 76% reduction in the erosion rate versus smooth slopes.

Materials

Minimal materials are required unless amendments and/or seed are added to the soil. The majority of soil roughening/preparation can be done with equipment that is on hand at a normal construction site, such as bull dozers and compaction equipment.

Installation Guidelines

Soil Preparation

- Where appropriate or feasible, soil should be prepared to receive the seed by disking or otherwise scarifying the surface to eliminate crust, improve air and water infiltration and create a more favorable environment for germination and growth.

- Based upon soil testing conducted, apply additional soil amendments (e.g., fertilizers, additional seed) to the soil to help with germination. Follow EC-4, Hydroseeding, when selecting and applying seed and fertilizers.

Cut Slope Roughening:

- Stair-step grade or groove the cut slopes that are steeper than 3:1.
- Use stair-step grading on any erodible material soft enough to be ripped with a bulldozer. Slopes consisting of soft rock with some subsoil are particularly suited to stair-step grading.
- Make the vertical cut distance less than the horizontal distance, and slightly slope the horizontal position of the "step" in toward the vertical wall.
- Do not make individual vertical cuts more than 2 ft. (0.6 m) high in soft materials or more than 3 ft. (0.9 m) high in rocky materials.
- Groove the slope using machinery to create a series of ridges and depressions that run across the slope, on the contour.

Fill Slope Roughening:

- Place on fill slopes with a gradient steeper than 3:1 in lifts not to exceed 8 in. (0.2 m), and make sure each lift is properly compacted.
- Ensure that the face of the slope consists of loose, uncompacted fill 4-6 in. (0.1-0.2 m) deep.
- Use grooving or tracking to roughen the face of the slopes, if necessary.
- Do not blade or scrape the final slope face.

Roughening for Slopes to be Mowed:

- Slopes that require mowing activities should not be steeper than 3:1.
- Roughen these areas to shallow grooves by track walking, scarifying, sheepsfoot rolling, or imprinting.
- Make grooves close together (less than 10 in.), and not less than 1 in. deep, and perpendicular to the direction of runoff (i.e., parallel to the slope contours).
- Excessive roughness is undesirable where mowing is planned.

Roughening with Tracked Machinery:

- Limit roughening with tracked machinery to soils with a sandy textural component to avoid undue compaction of the soil surface.
- Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. Do not back-blade during the final grading operation.
- Seed and mulch roughened areas as soon as possible to obtain optimum seed germination and growth.

Costs

Costs are based on the additional labor of tracking or preparation of the slope plus the cost of any required soil amendment materials.

Inspection and Maintenance

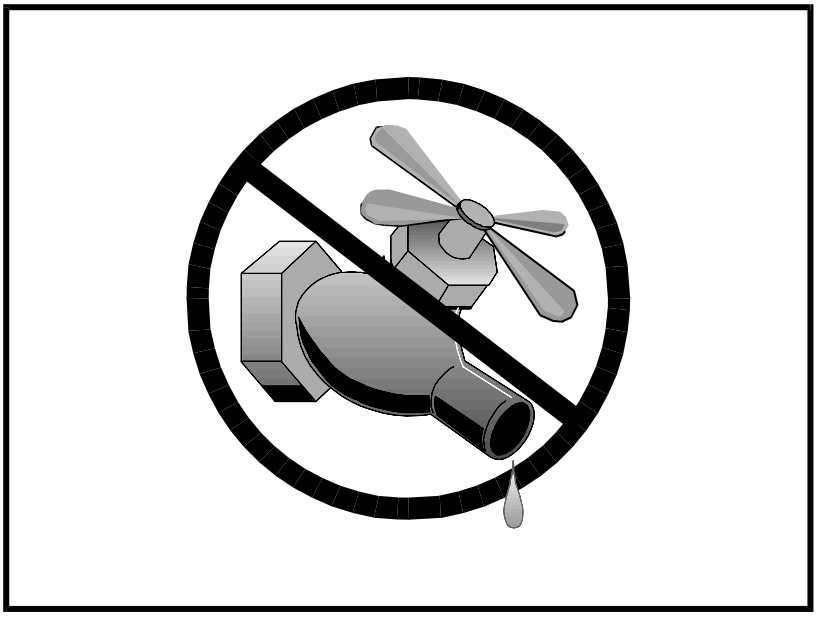
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Check the seeded slopes for signs of erosion such as rills and gullies. Fill these areas slightly above the original grade, then reseed and mulch as soon as possible.
- Inspect BMPs weekly during normal operations, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.

References

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.

Water Conservation Practices NS-1



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	

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

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.

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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- Direct construction water runoff to areas where it can soak into the ground or be collected and used.
- 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.

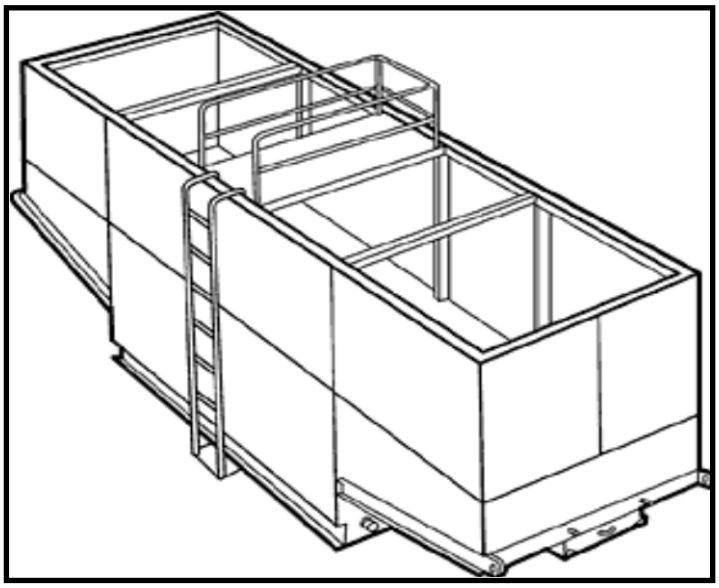
Inspection and Maintenance

- 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 occuring.
- 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.

Dewatering Operations NS-2



Categories		
EC	Erosion Control	
SE	Sediment Control	☒
TC	Tracking Control	
WE	Wind Erosion Control	
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Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents	
Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

SE-5: Fiber Roll

SE-6: Gravel Bag Berm

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Description and Purpose

Dewatering operations are practices that manage the discharge of pollutants when non-stormwater and accumulated precipitation (stormwater) must be removed from a work location to proceed with construction work or to provide vector control.

The General Permit incorporates Numeric Action Levels (NAL) for turbidity (see Section 2 of this handbook to determine your project's risk level and if you are subject to these requirements).

Discharges from dewatering operations can contain high levels of fine sediment that, if not properly treated, could lead to exceedances of the General Permit requirements or Basin Plan standards.

The dewatering operations described in this fact sheet are not Active Treatment Systems (ATS) and do not include the use of chemical coagulations, chemical flocculation or electrocoagulation.

Suitable Applications

These practices are implemented for discharges of non-stormwater from construction sites. Non-stormwaters include, but are not limited to, groundwater, water from cofferdams, water diversions, and waters used during construction activities that must be removed from a work area to facilitate construction.

Practices identified in this section are also appropriate for implementation when managing the removal of accumulated

precipitation (stormwater) from depressed areas at a construction site.

Stormwater mixed with non-stormwater should be managed as non-stormwater.

Limitations

- Dewatering operations will require and should comply with applicable local and project-specific permits and regulations. In some areas, all dewatering activities, regardless of the discharge volume, require a dewatering permit.
- Site conditions will dictate design and use of dewatering operations.
- The controls discussed in this fact sheet primarily address sediment. Other secondary pollutant removal benefits are discussed where applicable.
- The controls detailed in this fact sheet only allow for minimal settling time for sediment particles. Use only when site conditions restrict the use of the other control methods.
- Avoid dewatering discharges where possible by using the water for dust control.

Implementation

- A Construction Site Monitoring Plan (CSMP) should be included in the project Stormwater Pollution Prevention Plan (SWPPP).
- Regional Water Quality Control Board (RWQCB) Regions may require notification and approval prior to any discharge of water from construction sites.
- The destination of discharge from dewatering activities will typically determine the type of permit required for the discharge. For example, when discharging to a water of the U.S., a dewatering permit may be required through the site's governing RWQCB. When discharging to a sanitary sewer or Municipal Separate Storm Sewer System (MS4), a permit may need to be obtained from the owner of the sanitary sewer or MS4 in addition to obtaining an RWQCB dewatering permit. Additional permits or permissions from other agencies may be required for dewatering cofferdams or diversions.
- Dewatering discharges should not cause erosion at the discharge point. Appropriate BMPs should be implemented to maintain compliance with all applicable permits.
- Maintain dewatering records in accordance with all local and project-specific permits and regulations.

Sediment Treatment

A variety of methods can be used to treat water during dewatering operations. Several devices are presented below and provide options to achieve sediment removal. The sediment particle size and permit or receiving water limitations on sediment or turbidity are key considerations for selecting sediment treatment option(s); in some cases, the use of multiple devices may be appropriate. Use of other enhanced treatment methods (i.e., introduction of chemicals or electric current to enhance flocculation and removal of sediment) must comply with: 1) for storm drain or surface water discharges, the requirements for Active Treatment Systems (see SE-11); or 2) for sanitary sewer discharges, the requirements of applicable sanitary sewer discharge permits.

Sediment Basin (see also SE-2)

Description:

- A sediment basin is a temporary basin with a controlled release structure that is formed by excavation or construction of an embankment to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment basins are generally larger than Sediment Traps (SE-3) and have a designed outlet structure.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, silt, some metals that settle out with the sediment.

Implementation:

- Excavation and construction of related facilities is required.
- Temporary sediment basins should be fenced if safety is a concern.
- Outlet protection is required to prevent erosion at the outfall location.

Maintenance:

- Maintenance is required for safety fencing, vegetation, embankment, inlet and outlet, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Sediment Trap (See also SE-3)

Description:

- A sediment trap is a temporary basin formed by excavation and/or construction of an earthen embankment across a waterway or low drainage area to detain sediment-laden runoff and allow sediment to settle out before discharging. Sediment traps are generally smaller than Sediment Basins (SE-2) and do not have a designed outlet (but do have a spillway or overflow).

Appropriate Applications:

Effective for the removal of large and medium sized particles (sand and gravel) and some metals that settle out with the sediment.

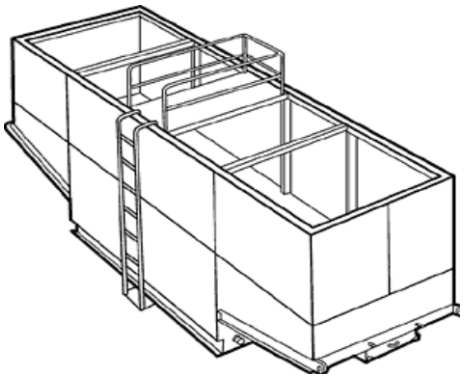
Implementation:

- Excavation and construction of related facilities is required.
- Trap inlets should be located to maximize the travel distance to the trap outlet.
- Use rock or vegetation to protect the trap outlets against erosion.

Maintenance:

- Maintenance is required for vegetation, embankment, inlet and outfall structures, as well as other features.
- Removal of sediment is required when the storage volume is reduced by one-third.

Weir Tanks



Description:

- A weir tank separates water and waste by using weirs. The configuration of the weirs (over and under weirs) maximizes the residence time in the tank and determines the waste to be removed from the water, such as oil, grease, and sediments.

Appropriate Applications:

- The tank removes trash, some settleable solids (gravel, sand, and silt), some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.
- Treatment capacity (i.e., volume and number of tanks) should provide at a minimum the required volume for discrete particle settling for treatment design flows.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by a licensed waste disposal company.

Dewatering Tanks

Description:

- A dewatering tank removes debris and sediment. Flow enters the tank through the top, passes through a fabric filter, and is discharged through the bottom of the tank. The filter separates the solids from the liquids.

Appropriate Applications:

- The tank removes trash, gravel, sand, and silt, some visible oil and grease, and some metals (removed with sediment). To achieve high levels of flow, multiple tanks can be used in parallel. If additional treatment is desired, the tanks can be placed in series or as pre-treatment for other methods.

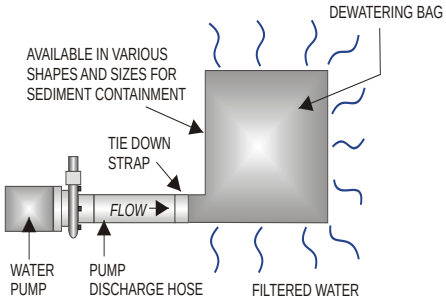
Implementation:

- Tanks are delivered to the site by the vendor, who can provide assistance with set-up and operation.
- Tank size will depend on flow volume, constituents of concern, and residency period required. Vendors should be consulted to appropriately size tank.

Maintenance:

- Periodic cleaning is required based on visual inspection or reduced flow.
- Oil and grease disposal should be conducted by licensed waste disposal company.

Gravity Bag Filter



Description:

- A gravity bag filter, also referred to as a dewatering bag, is a square or rectangular bag made of non-woven geotextile fabric that collects gravel, sand, silt, and fines.

Appropriate Applications:

- Effective for the removal of sediments (gravel, sand, silt, and fines). Some metals are removed with the sediment.

Implementation:

- Water is pumped into one side of the bag and seeps through the top, bottom, and sides of the bag.
- Place filter bag on pavement or a gravel bed or paved surface. Avoid placing a dewatering bag on unprotected bare soil. If placing the bag on bare soil is unavoidable, a secondary barrier should be used, such as a rock filter bed placed beneath and beyond the edges of the bag to, prevent erosion and capture sediments that escape the bag.
- Perimeter control around the downstream end of the bag should be implemented. Secondary sediment controls are important especially in the initial stages of discharge, which tend to allow fines to pass through the bag.

Maintenance:

- Inspection of the flow conditions, bag condition, bag capacity, and the secondary barrier (as applicable) is required.
- Replace the bag when it no longer filters sediment or passes water at a reasonable rate.
- Caution should be taken when removing and disposing of the bag, to prevent the release of captured sediment
- Properly dispose of the bag offsite. If sediment is removed from the bag prior to disposal (bags can potentially be reused depending upon their condition), dispose of sediment in accordance with the general maintenance procedures described at the end of this BMP Fact Sheet.

Sand Media Particulate Filter

Description:

- Water is treated by passing it through canisters filled with sand media. Generally, sand filters provide a final level of treatment. They are often used as a secondary or higher level of treatment after a significant amount of sediment and other pollutants have been removed using other methods.

Appropriate Applications:

- Effective for the removal of trash, gravel, sand, and silt and some metals, as well as the reduction of biochemical oxygen demand (BOD) and turbidity.
- Sand filters can be used for stand-alone treatment or in conjunction with bag and cartridge filtration if further treatment is required.
- Sand filters can also be used to provide additional treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filters require regular service to monitor and maintain the level of the sand media. If subjected to high loading rates, filters can plug quickly.
- Venders generally provide data on maximum head loss through the filter. The filter should be monitored daily while in use and cleaned when head loss reaches target levels.
- If cleaned by backwashing, the backwash water may need to be hauled away for disposal or returned to the upper end of the treatment train for another pass through the series of dewatering BMPs.

Pressurized Bag Filter

Description:

- A pressurized bag filter is a unit composed of single filter bags made from polyester felt material. The water filters through the unit and is discharged through a header. Vendors provide bag filters in a variety of configurations. Some units include a combination of bag filters and cartridge filters for enhanced contaminant removal.

Appropriate Applications:

- Effective for the removal of sediment (sand and silt) and some metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Oil absorbent bags are available for hydrocarbon removal.

- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance with installation and operation.

Maintenance:

- The filter bags require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Cartridge Filter

Description:

- Cartridge filters provide a high degree of pollutant removal by utilizing a number of individual cartridges as part of a larger filtering unit. They are often used as a secondary or higher (polishing) level of treatment after a significant amount of sediment and other pollutants are removed. Units come with various cartridge configurations (for use in series with bag filters) or with a larger single cartridge filtration unit (with multiple filters within).

Appropriate Applications:

- Effective for the removal of sediment (sand, silt, and some clays) and metals, as well as the reduction of BOD, turbidity, and hydrocarbons. Hydrocarbons can effectively be removed with special resin cartridges.

- Filters can be used to provide secondary treatment to water treated via settling or basic filtration.

Implementation:

- The filters require delivery to the site and initial set up. The vendor can provide assistance.

Maintenance:

- The cartridges require replacement when the pressure differential equals or exceeds the manufacturer's recommendation.

Costs

- Sediment control costs vary considerably depending on the dewatering and sediment treatment system that is selected. Pressurized filters tend to be more expensive than gravity settling but are often more effective. Simple tanks are generally rented on a long-term basis (one or more months) and can range from $460 per month for a 1,000-gallon tank to $3,400 per month for a 10,000-gallon tank (adjusted for inflation, 2016 dollars, by Tetra Tech Inc.). Mobilization and demobilization costs vary considerably.

Inspection and Maintenance

- Inspect and verify that dewatering BMPs are in place and functioning prior to the commencement of activities requiring dewatering.

- Inspect dewatering BMPs daily while dewatering activities are being conducted.

- Inspect all equipment before use. Monitor dewatering operations to ensure they do not cause offsite discharge or erosion.
- Sample dewatering discharges as required by the General Permit.
- Unit-specific maintenance requirements are included with the description of each unit.
- Sediment removed during the maintenance of a dewatering device may be either spread onsite and stabilized or disposed of at a disposal site as approved by the owner.
- Sediment that is commingled with other pollutants should be disposed of in accordance with all applicable laws and regulations and as approved by the owner.

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.

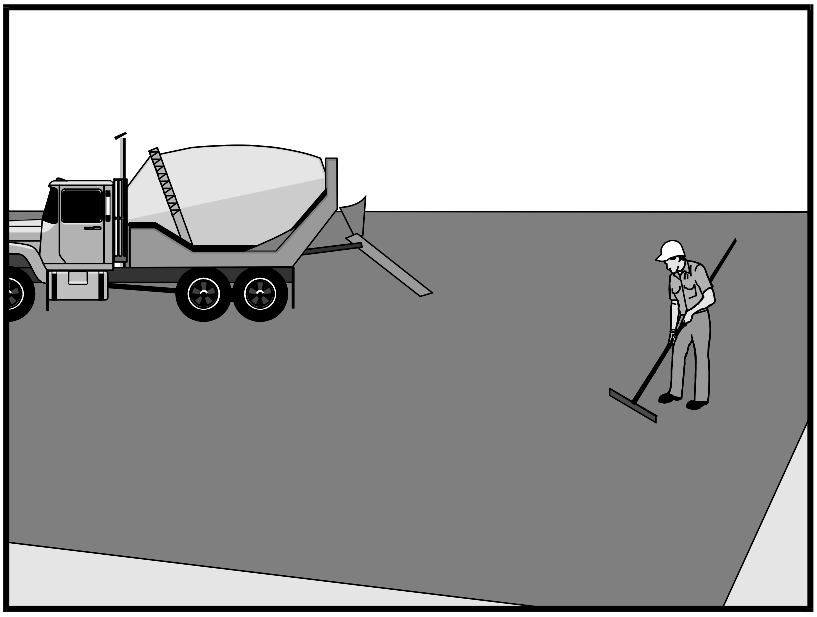
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003; Updated March 2004.

Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.

Labor Surcharge & Equipment Rental Rates, April 1, 2002 through March 31, 2003, California Department of Transportation (Caltrans).

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

Paving and Grinding Operations NS-3



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	☒

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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Description and Purpose

Prevent or reduce the discharge of pollutants from paving operations, using measures to prevent runon and runoff pollution, properly disposing of wastes, and training employees and subcontractors.

The General Permit incorporates Numeric Action Levels (NAL) for pH and turbidity (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 associated with paving and grinding operations, including mortar, concrete, and cement 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, which could lead to exceedances of the General Permit requirements.

Suitable Applications

These procedures are implemented where paving, surfacing, resurfacing, or sawcutting, may pollute stormwater runoff or discharge to the storm drain system or watercourses.

Limitations

- Paving opportunities may be limited during wet weather.

  Discharges of freshly paved surfaces may raise pH to environmentally harmful levels and trigger permit violations.

Implementation

General

- Avoid paving during the wet season when feasible.
- Reschedule paving and grinding activities if rain is forecasted.
- Train employees and sub-contractors in pollution prevention and reduction.
- Store materials away from drainage courses to prevent stormwater runon (see WM-1, Material Delivery and Storage).
- Protect drainage courses, particularly in areas with a grade, by employing BMPs to divert runoff or to trap and filter sediment.
- Stockpile material removed from roadways away from drain inlets, drainage ditches, and watercourses. These materials should be stored consistent with WM-3, Stockpile Management.
- Disposal of PCC (Portland cement concrete) and AC (asphalt concrete) waste should be in conformance with WM-8, Concrete Waste Management.

Saw Cutting, Grinding, and Pavement Removal

- Shovel or vacuum saw-cut slurry and remove from site. Cover or barricade storm drains during saw cutting to contain slurry.
- When paving involves AC, the following steps should be implemented to prevent the discharge of grinding residue, uncompacted or loose AC, tack coats, equipment cleaners, or unrelated paving materials:
  - AC grindings, pieces, or chunks used in embankments or shoulder backing should not be allowed to enter any storm drains or watercourses. Install inlet protection and perimeter controls until area is stabilized (i.e. cutting, grinding or other removal activities are complete and loose material has been properly removed and disposed of)or permanent controls are in place. Examples of temporary perimeter controls can be found in EC-9, Earth Dikes and Drainage Swales; SE-1, Silt Fence; SE-5, Fiber Rolls, or SE-13 Compost Socks and Berms
  - Collect and remove all broken asphalt and recycle when practical. Old or spilled asphalt should be recycled or disposed of properly.
- Do not allow saw-cut slurry to enter storm drains or watercourses. Residue from grinding operations should be picked up by a vacuum attachment to the grinding machine, or by sweeping, should not be allowed to flow across the pavement, and should not be left on the surface of the pavement. See also WM-8, Concrete Waste Management, and WM-10, Liquid Waste Management.
- Pavement removal activities should not be conducted in the rain.
- Collect removed pavement material by mechanical or manual methods. This material may be recycled for use as shoulder backing or base material.

- If removed pavement material cannot be recycled, transport the material back to an approved storage site.

Asphaltic Concrete Paving

- If paving involves asphaltic cement concrete, follow these steps:

  - Do not allow sand or gravel placed over new asphalt to wash into storm drains, streets, or creeks. Vacuum or sweep loose sand and gravel and properly dispose of this waste by referring to WM-5, Solid Waste Management.

  - Old asphalt should be disposed of properly. Collect and remove all broken asphalt from the site and recycle whenever possible.

Portland Cement Concrete Paving

- Do not wash sweepings from exposed aggregate concrete into a storm drain system. Collect waste materials by dry methods, such as sweeping or shoveling, and return to aggregate base stockpile or dispose of properly. Allow aggregate rinse to settle. Then, either allow rinse water to dry in a temporary pit as described in WM-8, Concrete Waste Management, or pump the water to the sanitary sewer if authorized by the local wastewater authority.

Sealing Operations

- During chip seal application and sweeping operations, petroleum or petroleum covered aggregate should not be allowed to enter any storm drain or water courses. Apply temporary perimeter controls until structure is stabilized (i.e. all sealing operations are complete and cured and loose materials have been properly removed and disposed).

- Inlet protection (SE-10, Storm Drain Inlet Protection) should be used during application of seal coat, tack coat, slurry seal, and fog seal.

- Seal coat, tack coat, slurry seal, or fog seal should not be applied if rainfall is predicted to occur during the application or curing period.

Paving Equipment

- Leaks and spills from paving equipment can contain toxic levels of heavy metals and oil and grease. Place drip pans or absorbent materials under paving equipment when not in use. Clean up spills with absorbent materials and dispose of in accordance with the applicable regulations. See NS-10, Vehicle and Equipment Maintenance, WM-4, Spill Prevention and Control, and WM-10, Liquid Waste Management.

- Substances used to coat asphalt transport trucks and asphalt spreading equipment should not contain soap and should be non-foaming and non-toxic.

- Paving equipment parked onsite should be parked over plastic to prevent soil contamination.

- Clean asphalt coated equipment offsite whenever possible. When cleaning dry, hardened asphalt from equipment, manage hardened asphalt debris as described in WM-5, Solid Waste Management. Any cleaning onsite should follow NS-8, Vehicle and Equipment Cleaning.

Thermoplastic Striping

- Thermoplastic striper and pre-heater equipment shutoff valves should be inspected to ensure that they are working properly to prevent leaking thermoplastic from entering drain inlets, the stormwater drainage system, or watercourses.
- Pre-heaters should be filled carefully to prevent splashing or spilling of hot thermoplastic. Leave six inches of space at the top of the pre-heater container when filling thermoplastic to allow room for material to move.
- Do not pre-heat, transfer, or load thermoplastic near drain inlets or watercourses.
- Clean truck beds daily of loose debris and melted thermoplastic. When possible, recycle thermoplastic material.

Raised/Recessed Pavement Marker Application and Removal

- Do not transfer or load bituminous material near drain inlets, the stormwater drainage system, or watercourses.
- Melting tanks should be loaded with care and not filled to beyond six inches from the top to leave room for splashing.
- When servicing or filling melting tanks, ensure all pressure is released before removing lids to avoid spills.
- On large-scale projects, use mechanical or manual methods to collect excess bituminous material from the roadway after removal of markers.

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 paving and grinding operations.
- 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.
- Sample stormwater runoff required by the General Permit.
- Keep ample supplies of drip pans or absorbent materials onsite.
- Inspect and maintain machinery regularly to minimize leaks and drips.

References

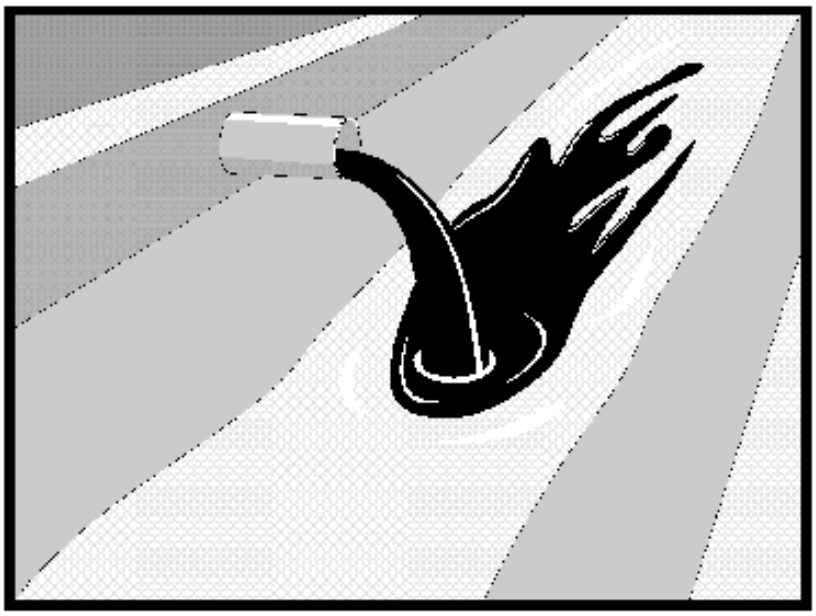
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Hot Mix Asphalt-Paving Handbook AC 150/5370-14, Appendix I, U.S. Army Corps of Engineers, July 1991.

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.

Illicit Connection / Discharge NS-6



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	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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Description and Purpose

Procedures and practices designed for construction contractors to recognize illicit connections or illegally dumped or discharged materials on a construction site and report incidents.

Suitable Applications

This best management practice (BMP) applies to all construction projects. Illicit connection/discharge and reporting is applicable anytime an illicit connection or discharge is discovered, or illegally dumped material is found on the construction site.

Limitations

Illicit connections and illegal discharges or dumping, for the purposes of this BMP, refer to discharges and dumping caused by parties other than the contractor. If pre-existing hazardous materials or wastes are known to exist onsite, they should be identified in the SWPPP and handled as set forth in the SWPPP.

Implementation

Planning

- Review the SWPPP. Pre-existing areas of contamination should be identified and documented in the SWPPP.
- Inspect site before beginning the job for evidence of illicit connections, illegal dumping or discharges. Document any pre-existing conditions and notify the owner.

- Inspect site regularly during project execution for evidence of illicit connections, illegal dumping or discharges.
- Observe site perimeter for evidence for potential of illicitly discharged or illegally dumped material, which may enter the job site.

Identification of Illicit Connections and Illegal Dumping or Discharges

- **General –** unlabeled and unidentifiable material should be treated as hazardous.
- **Solids** - Look for debris, or rubbish piles. Solid waste dumping often occurs on roadways with light traffic loads or in areas not easily visible from the traveled way.
- **Liquids** - signs of illegal liquid dumping or discharge can include:
  - Visible signs of staining or unusual colors to the pavement or surrounding adjacent soils
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Abnormal water flow during the dry weather season
- **Urban Areas** - Evidence of illicit connections or illegal discharges is typically detected at storm drain outfall locations or at manholes. Signs of an illicit connection or illegal discharge can include:
  - Abnormal water flow during the dry weather season
  - Unusual flows in sub drain systems used for dewatering
  - Pungent odors coming from the drainage systems
  - Discoloration or oily substances in the water or stains and residues detained within ditches, channels or drain boxes
  - Excessive sediment deposits, particularly adjacent to or near active offsite construction projects
- **Rural Areas** - Illicit connections or illegal discharges involving irrigation drainage ditches are detected by visual inspections. Signs of an illicit discharge can include:
  - Abnormal water flow during the non-irrigation season
  - Non-standard junction structures
  - Broken concrete or other disturbances at or near junction structures

Reporting

Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery. For illicit connections or discharges to the storm drain system, notify the local stormwater management agency. For illegal dumping, notify the local law enforcement agency.

Cleanup and Removal

The responsibility for cleanup and removal of illicit or illegal dumping or discharges will vary by location. Contact the local stormwater management agency for further information.

Costs

Costs to look for and report illicit connections and illegal discharges and dumping are low. The best way to avoid costs associated with illicit connections and illegal discharges and dumping is to keep the project perimeters secure to prevent access to the site, to observe the site for vehicles that should not be there, and to document any waste or hazardous materials that exist onsite before taking possession of the site.

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 the site regularly to check for any illegal dumping or discharge.
- Prohibit employees and subcontractors from disposing of non-job-related debris or materials at the construction site.
- Notify the owner of any illicit connections and illegal dumping or discharge incidents at the time of discovery.

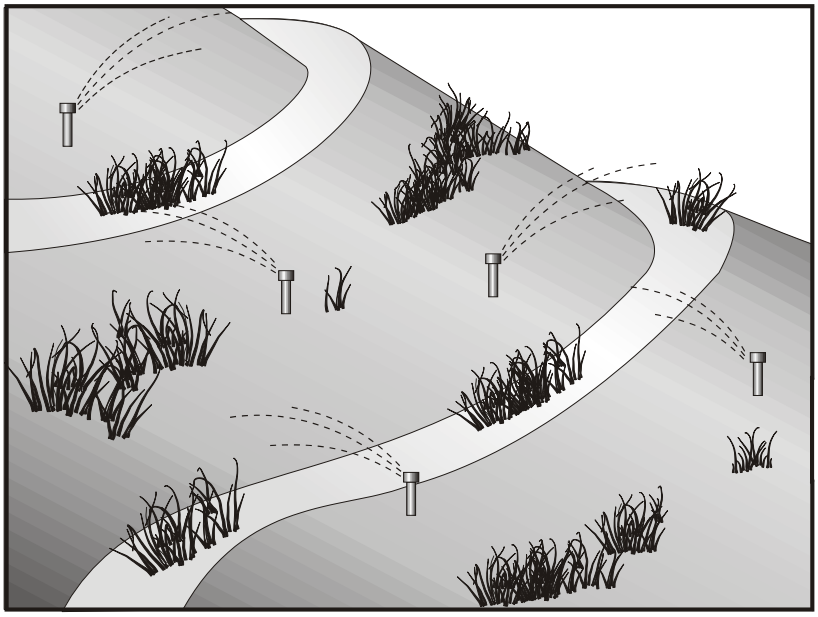
References

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 Practices, EPA 832-R-92005; USEPA, April 1992.

Potable Water/Irrigation NS-7



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Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

Description and Purpose

Potable Water/Irrigation consists of practices and procedures to manage the discharge of potential pollutants generated during discharges from irrigation water lines, landscape irrigation, lawn or garden watering, planned and unplanned discharges from potable water sources, water line flushing, and hydrant flushing.

Suitable Applications

Implement this BMP whenever potable water or irrigation water discharges occur at or enter a construction site.

Limitations

None identified.

Implementation

- Direct water from offsite sources around or through a construction site, where feasible, in a way that minimizes contact with the construction site.
- Discharges from water line flushing should be reused for landscaping purposes where feasible.
- Shut off the water source to broken lines, sprinklers, or valves as soon as possible to prevent excess water flow.
- Protect downstream stormwater drainage systems and watercourses from water pumped or bailed from trenches excavated to repair water lines.

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- Inspect irrigated areas within the construction limits for excess watering. Adjust watering times and schedules to ensure that the appropriate amount of water is being used and to minimize runoff. Consider factors such as soil structure, grade, time of year, and type of plant material in determining the proper amounts of water for a specific area.

Costs

Cost to manage potable water and irrigation are low and generally considered to be a normal part of related activities.

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.

- Repair broken water lines as soon as possible.

- Inspect irrigated areas regularly for signs of erosion and/or discharge.

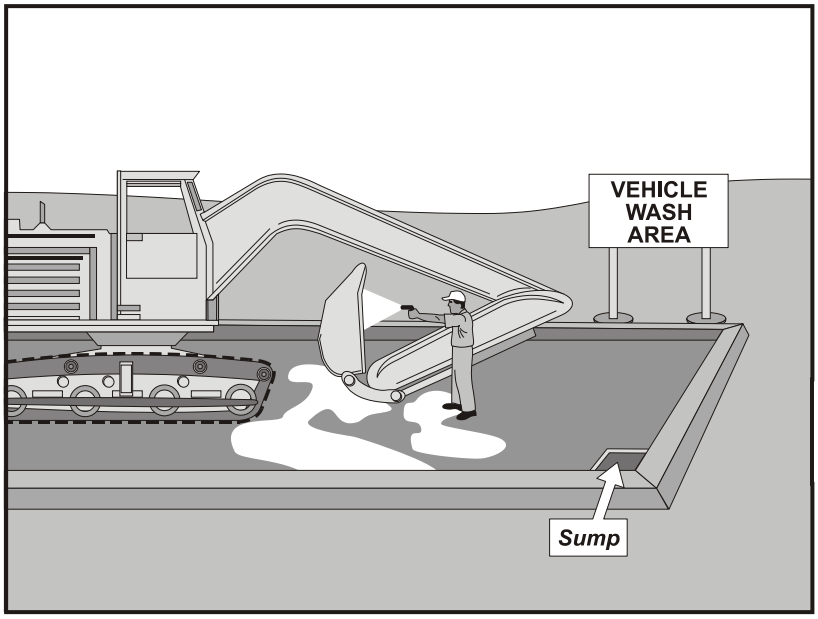
References

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 Practices, EPA 832-R-92005; USEPA, April 1992.

Vehicle and Equipment Cleaning NS-8



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	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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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:

- 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 runon 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

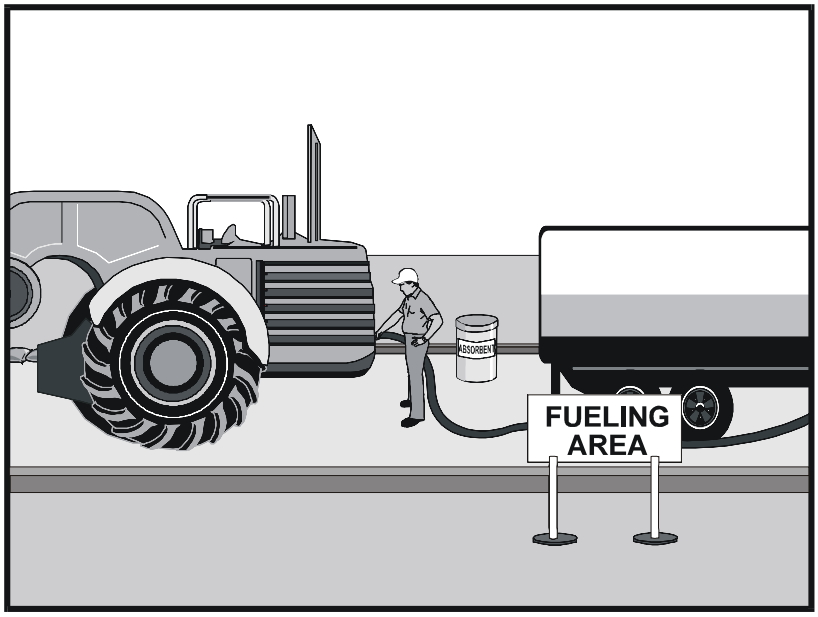
- Inspect and verify that activity-based BMPs are in place prior to the commencement of associated activities. While activities associated with the BMP are under way, inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at 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.

Vehicle and Equipment Fueling NS-9



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	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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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 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 runon 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 runon, 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

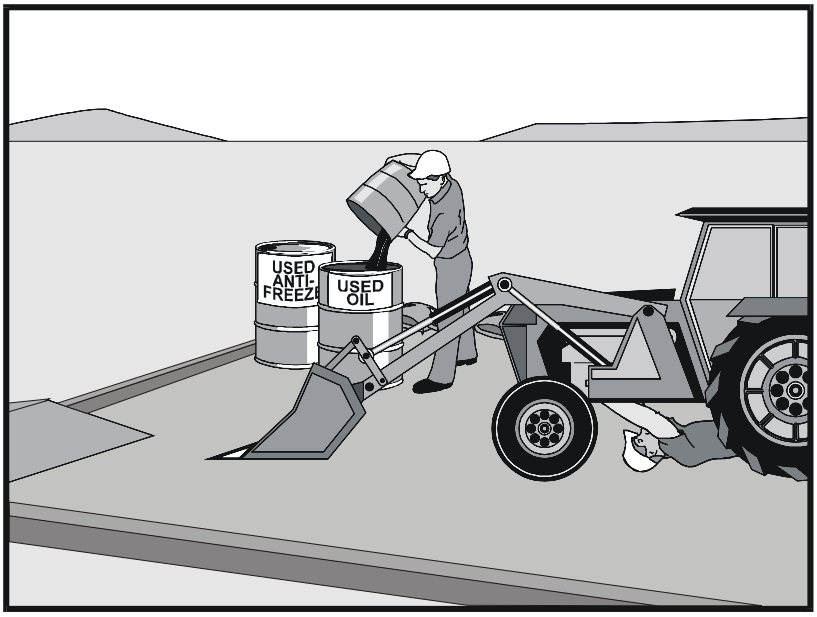
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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



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	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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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 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 runon and 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.

- 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.

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.

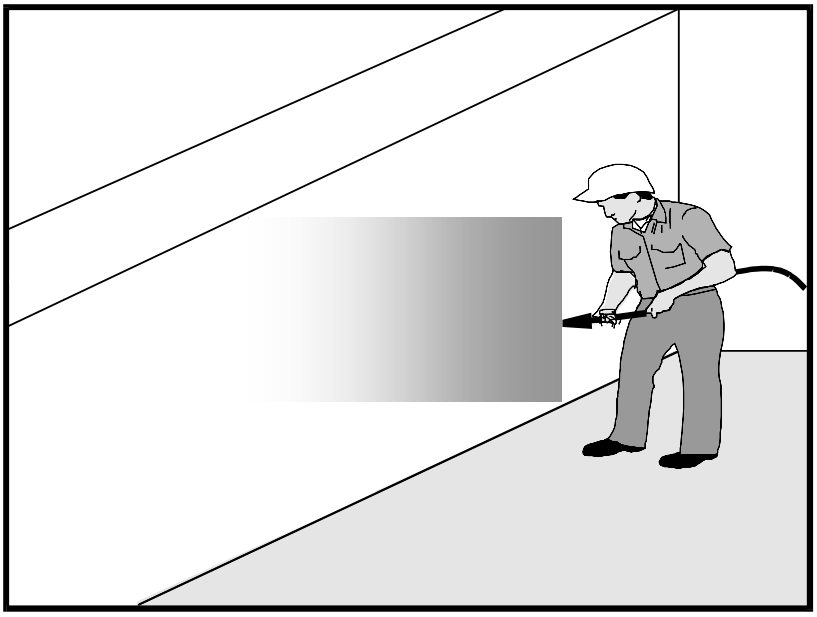
References

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



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	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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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 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.

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

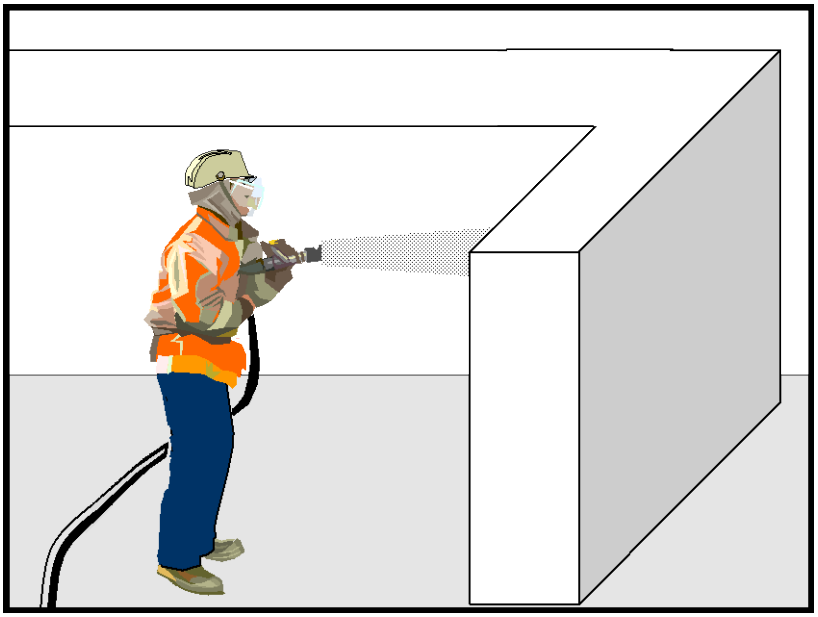
Blue Print for a Clean Bay-Construction-Related Industries: Best Management Practices for Stormwater Pollution Prevention; Santa Clara Valley Non-Point Source Pollution Control Program, 1992.

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.

Concrete Finishing NS-13



Categories

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SE	Sediment Control	
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Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	☑

Potential Alternatives

None

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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 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.

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.

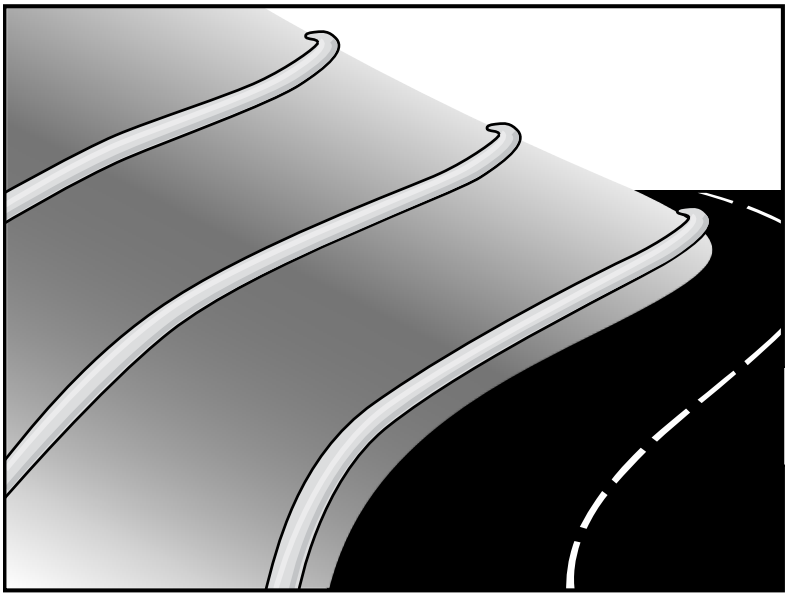
References

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.

Fiber Rolls SE-5



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	

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Description and Purpose

A fiber roll (also known as wattles or logs) consists of straw, coir, curled wood fiber, or other biodegradable materials bound into a tight tubular roll wrapped by plastic netting, which can be photodegradable, or natural fiber, such as jute, cotton, or sisal. 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.

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

SE-1 Silt Fence

SE-6 Gravel Bag Berm

SE-8 Sandbag Barrier

SE-12 Manufactured Linear Sediment Controls

SE-14 Biofilter Bags

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- At operational storm drains as a form of inlet protection.
- Around temporary stockpiles.

Limitations

- Fiber rolls should be used in conjunction with erosion control, such as hydroseed, RECPs, etc.
- Only biodegradable fiber rolls containing no plastic can remain on a site applying for a Notice of Termination due to plastic pollution and wildlife concerns (State Water Board, 2016). Fiber rolls containing plastic that are used on a site must be disposed of for final stabilization.
- Fiber rolls are not effective unless trenched in and staked. If not properly staked and trenched in, fiber rolls will not work as intended and could be transported by high flows.
- Not intended for use in high flow situations (i.e., for concentrated flows).
- Difficult to move once saturated.
- Fiber rolls have a 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 and roll material.

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, curled wood fiber, or coir bound into a tight tubular roll by netting or natural fiber (see *Limitations* above regarding plastic netting).
- Typical fiber rolls vary in diameter from 6 in. to 20 in. Larger diameter rolls are available as well. The larger the roll, the higher the sediment retention capacity.
- Typical fiber rolls lengths are 4, 10, 20 and 25 ft., although other lengths are likely available.

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 ¼ 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). Fiber rolls encased with plastic netting or containing any plastic material will need to be removed from the site for final stabilization. Fiber rolls used in a permanent application are to be encased with a non-plastic material and are left in place. Removal of a fiber roll used in a permanent application can result in greater disturbance; therefore, during the BMP planning phase, the areas where fiber rolls will be used on final slopes, only fiber rolls wrapped in non-plastic material should be selected.

- 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 straw fiber rolls range from $26 - $38 per 25-ft. roll[1] and curled wood fiber rolls range from $30 - $40 per roll[2].

Material costs for PAM impregnated fiber rolls range between $9.00-$12.00 per linear foot, based upon vendor research[1] .

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.

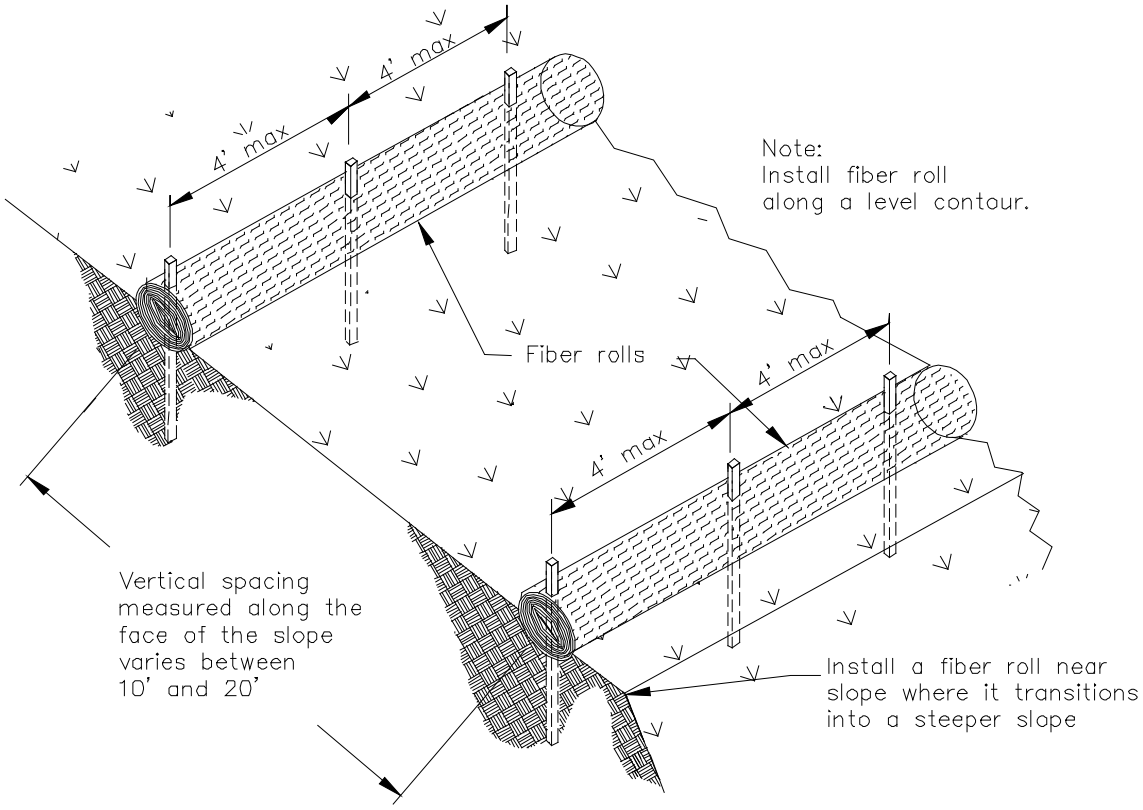
References

General Construction – Frequently Asked Questions, Storm Water Program website, State Water Resources Control Board, 2009 updated in 2016. Available online at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/gen_const_faq.shtml.

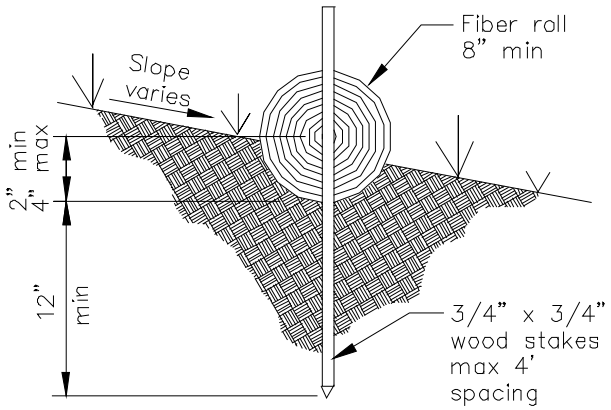
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

Erosion and Sediment Control Manual, Oregon Department of Environmental Quality, February 2005.

[1] Adjusted for inflation (2016 dollars) by Tetra Tech, Inc.
[2] Costs estimated based on vendor query by Tetra Tech, Inc. 2016.

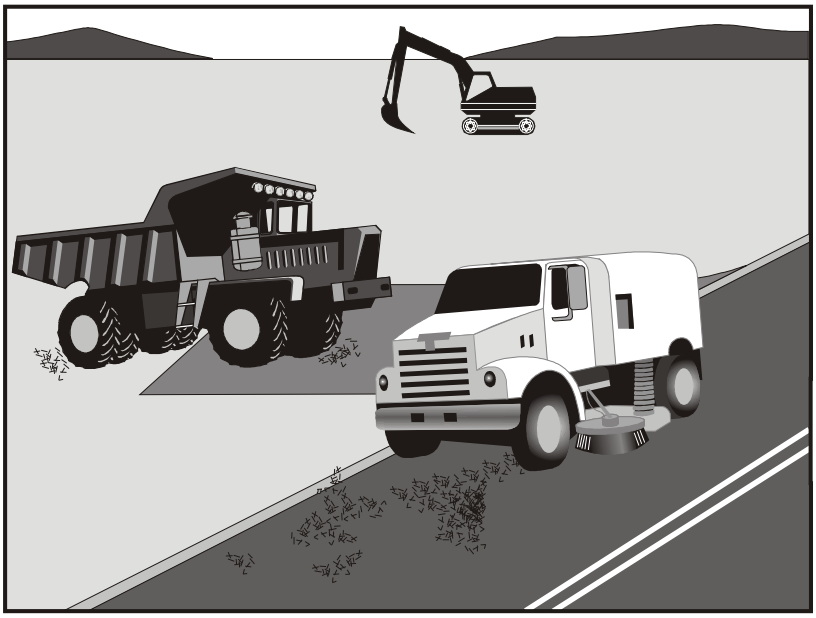


TYPICAL FIBER ROLL INSTALLATION
N.T.S.



ENTRENCHMENT DETAIL
N.T.S.

Street Sweeping and Vacuuming SE-7



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	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☑
Metals	
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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).
- Sweeping may be less effective for fine particle soils (i.e., clay).

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.

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- 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.
- 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 $ 650/day to $2,500/day[1], 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

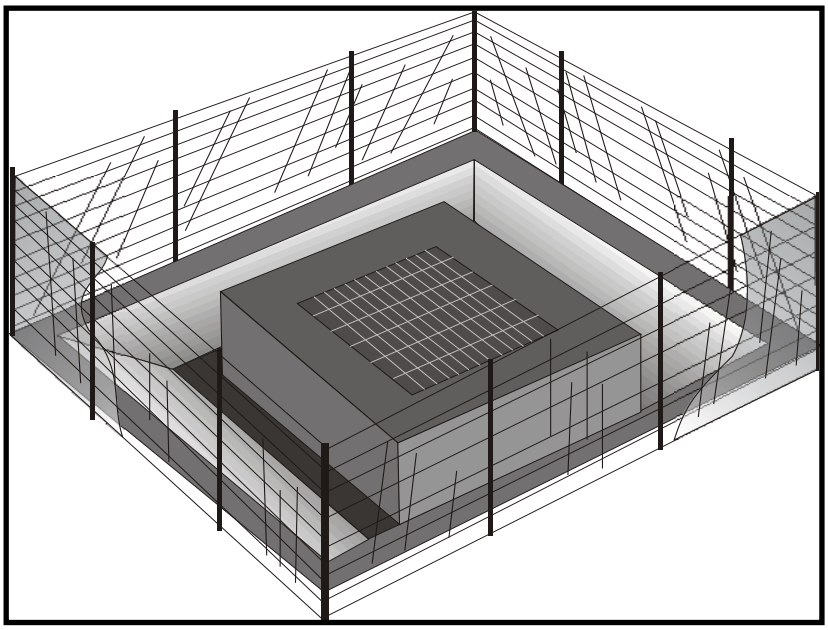
- Inspect BMPs in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- When actively in 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.

[1] Based on contractor query conducted by Tetra Tech, Inc. November 2016.

Storm Drain Inlet Protection SE-10



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	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	☒
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

SE-13 Compost Socks and Berms

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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.
- 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.
- Seven 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.

- Compost Socks: Allow filtered run-off to pass through the compost while retaining sediment and potentially other pollutants (SE-13). Appropriate for flows under 1.0 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^3/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.

- ***DI Protection Type 7 – Compost Socks*** – A compost sock can be assembled on site by filling a mesh sock (e.g., with a pneumatic blower). Compost socks do not require special trenching compared to other sediment control methods (e.g., silt fence). Compost socks should conform to specification detailed in SE-13, Compost Socks and Berms.

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.
- See SE-13 for Compost Sock cost information.

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.

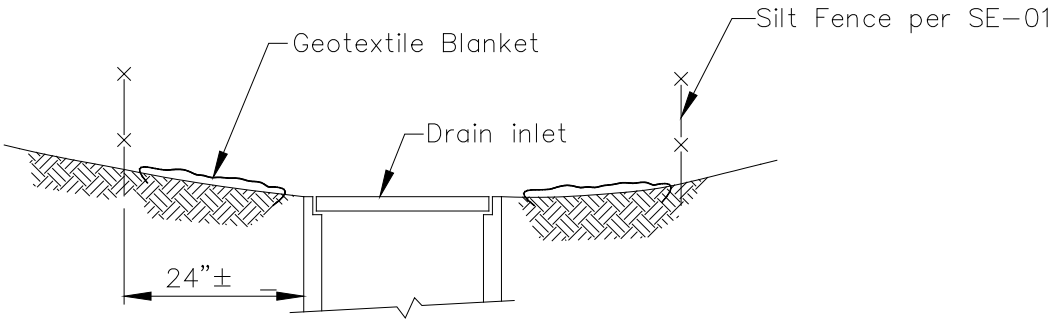
- Sediment that accumulates in the BMP should be periodically removed in order to maintain BMP effectiveness. Sediment should be removed when the sediment accumulation reaches one-third of the barrier height.
- Inspect and maintain temporary geotextile insert devices according to manufacturer's specifications.
- 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

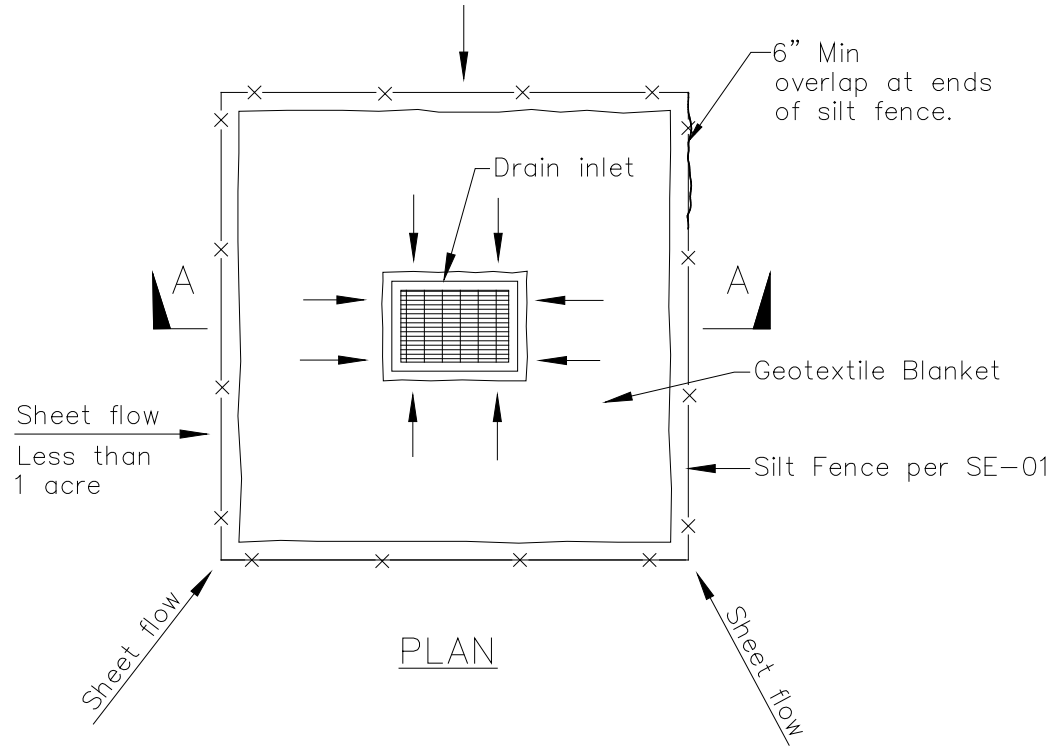
Stormwater Quality Handbooks - Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), March 2003.

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.



SECTION A–A

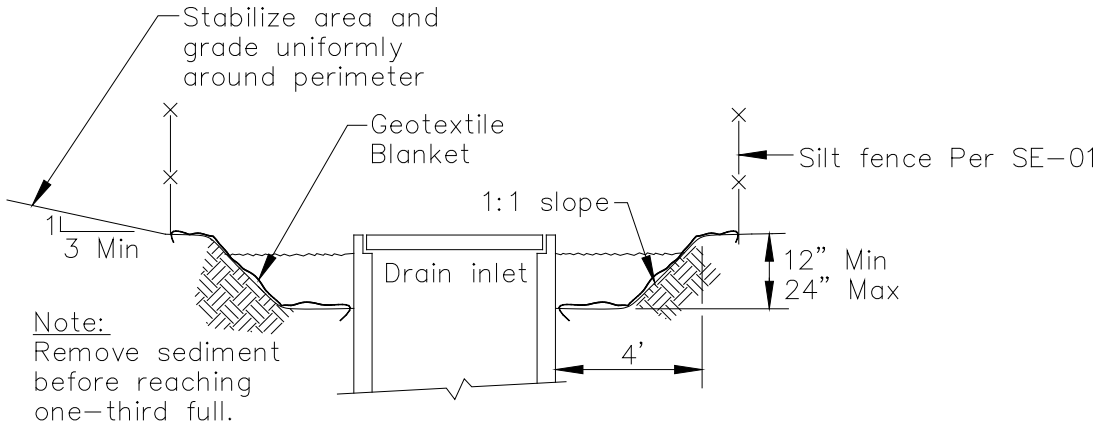


PLAN

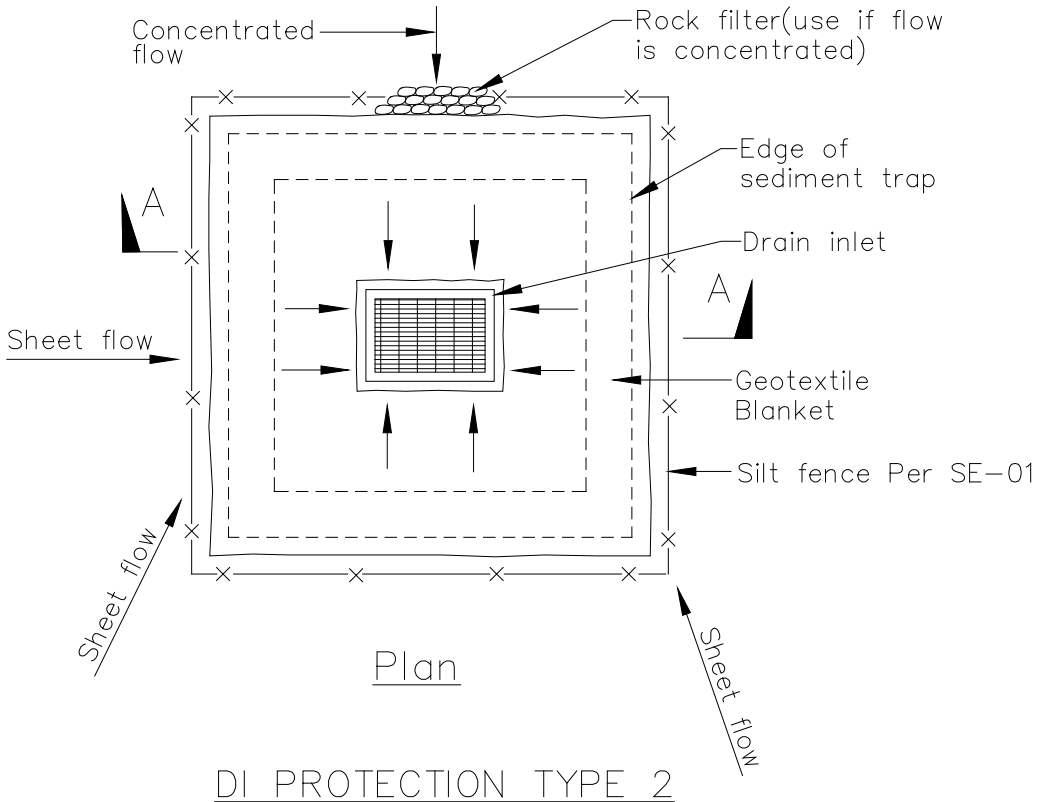
DI PROTECTION TYPE 1
NOT TO SCALE

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.



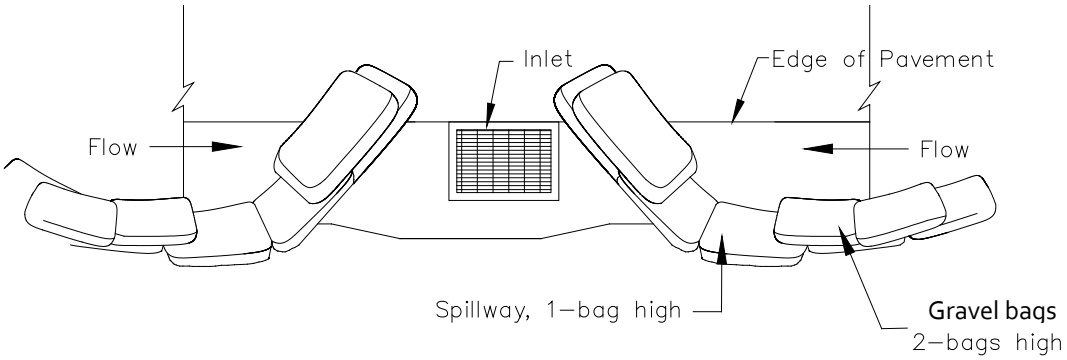
Section A–A



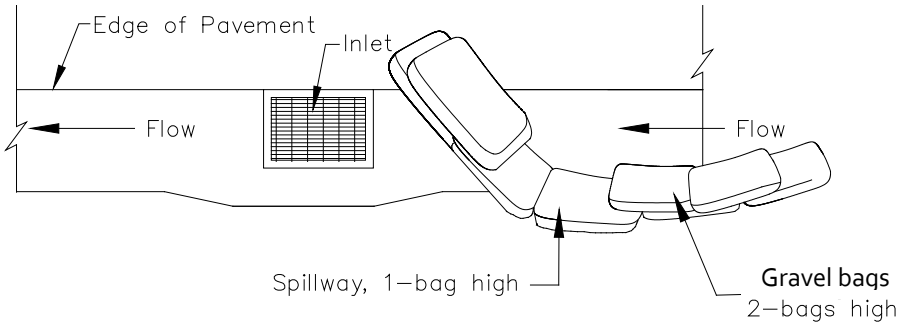
Plan

DI PROTECTION TYPE 2
NOT TO SCALE

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

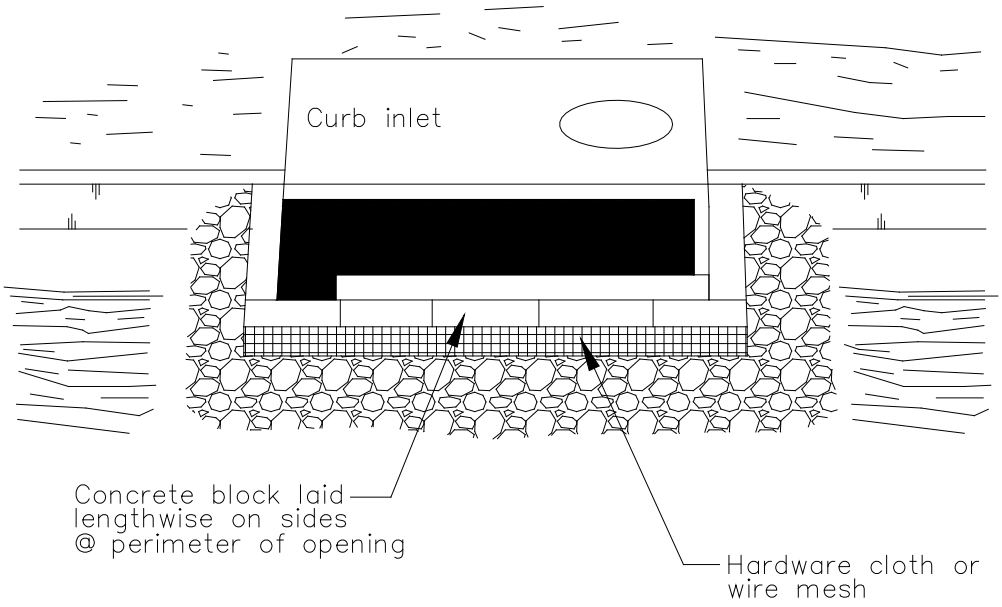


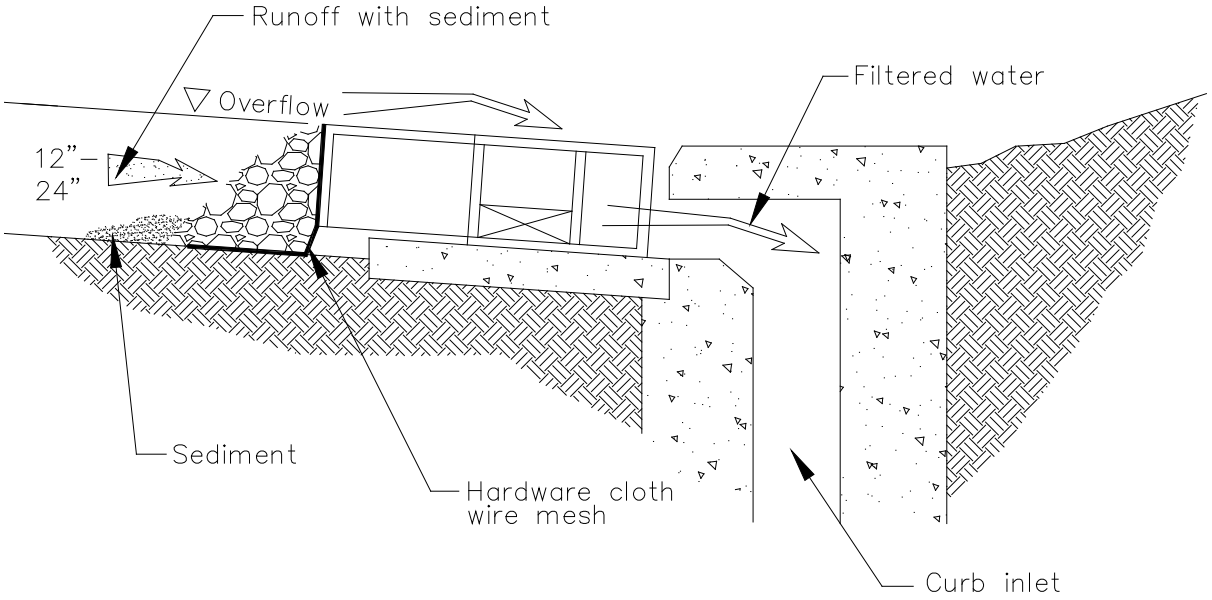
TYPICAL PROTECTION FOR INLET ON GRADE

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.
6. Protection can be effective even if it is not immediately adjacent to the inlet provided that the inlet is protected from potential sources of pollution.

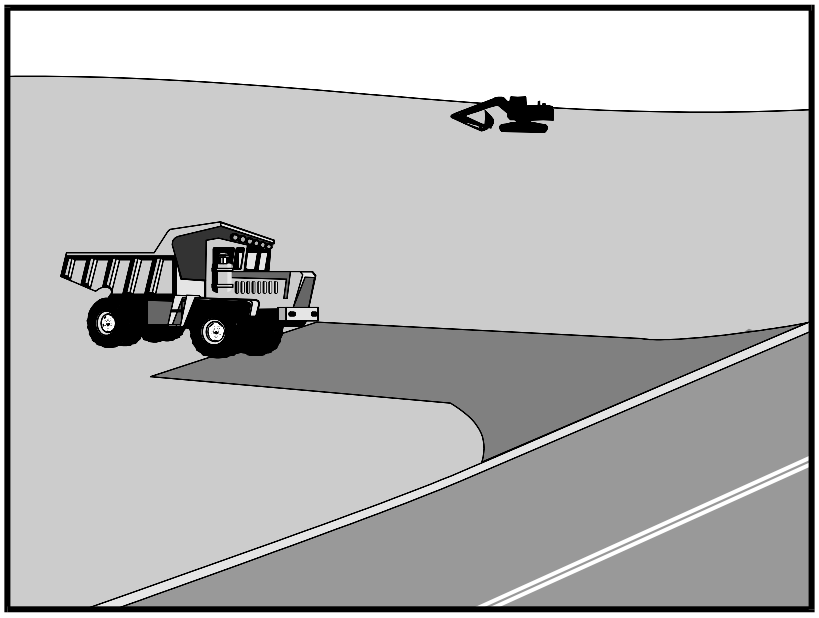
DI PROTECTION TYPE 3
NOT TO SCALE





DI PROTECTION – TYPE 4
NOT TO SCALE

Stabilized Construction Entrance / Exit TC-1



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	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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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.

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.

- 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 $1,500 to $6,100 each, averaging $3,100 per entrance. Costs will increase with addition of washing rack and sediment trap. With wash rack, costs range from $1,500 - $7,700 each, averaging $4,600 per entrance (All costs adjusted for inflation, 2016 dollars, by Tetra Tech Inc.

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, 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.

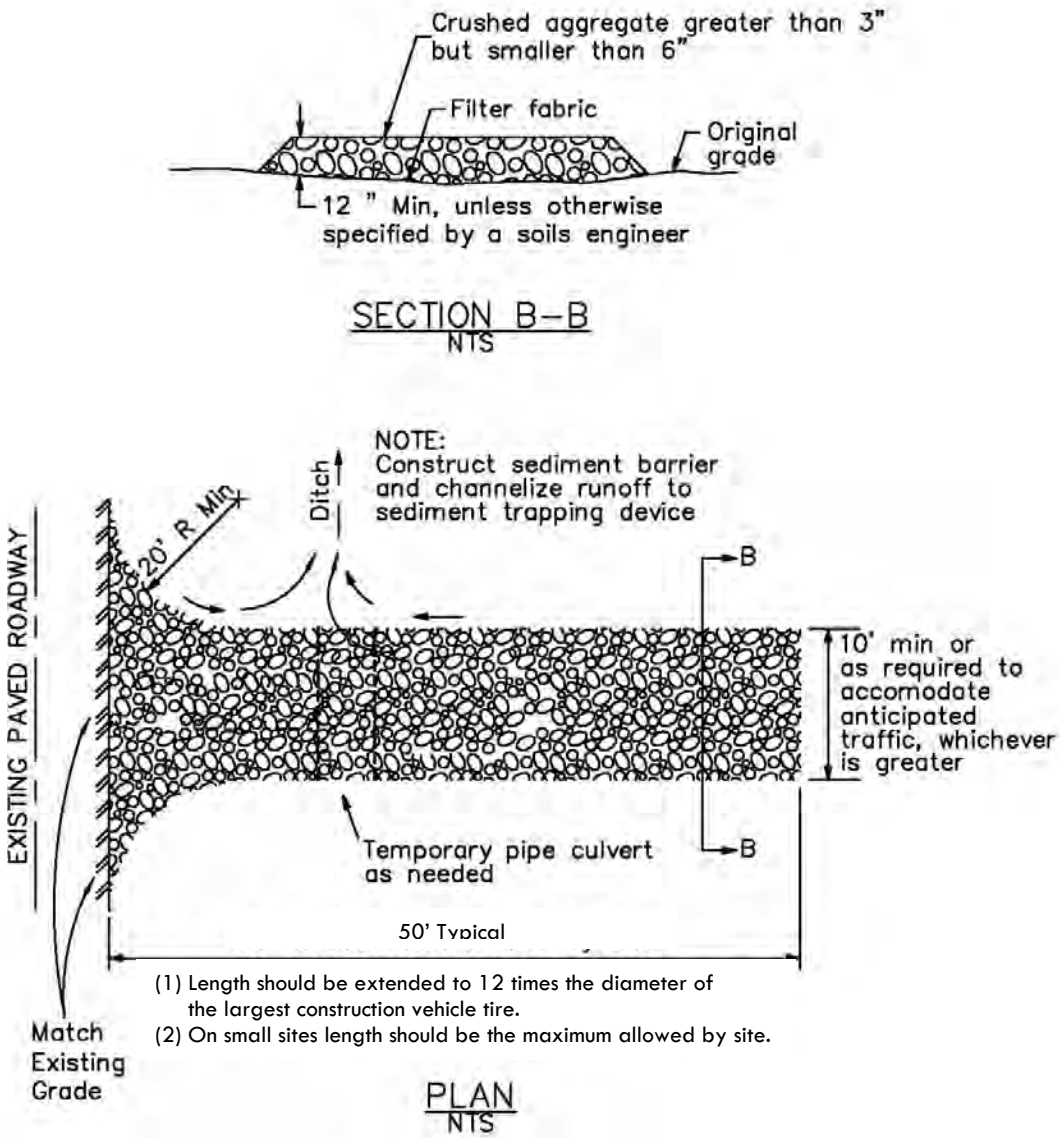
Stormwater Management of the Puget Sound Basin, Technical Manual, Publication #91-75, Washington State Department of Ecology, February 1992.

Virginia Erosion and Sedimentation Control Handbook, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, 1991.

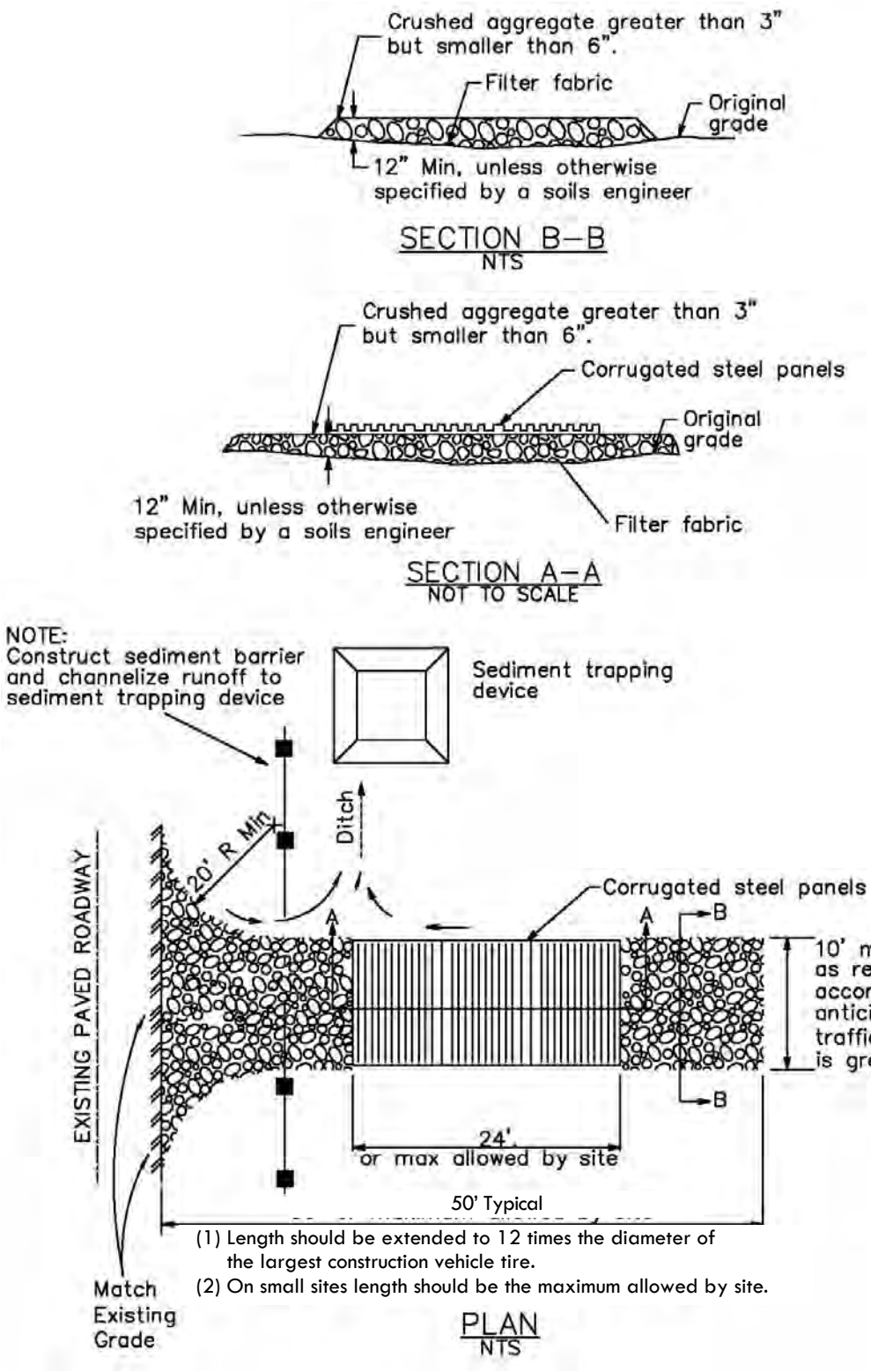
Guidance Specifying Management Measures for Nonpoint Pollution in Coastal Waters, EPA 840-B-9-002, USEPA, Office of Water, Washington, DC, 1993.

Water Quality Management Plan for the Lake Tahoe Region, Volume II, Handbook of Management Practices, Tahoe Regional Planning Agency, November 1988.

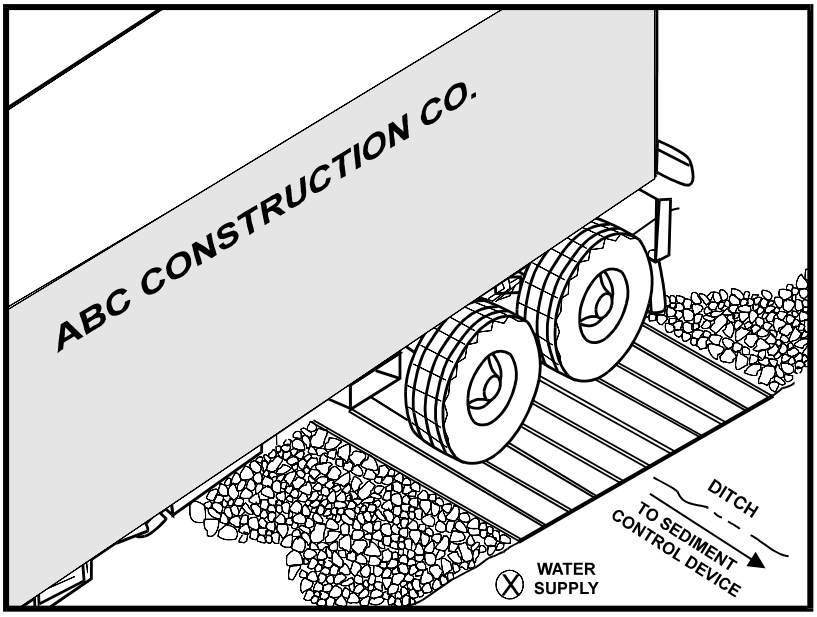
Stabilized Construction Entrance / Exit TC-1



Stabilized Construction Entrance / Exit TC-1



Entrance/Outlet Tire Wash TC-3



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	

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

TC-1 Stabilized Construction Entrance/Exit

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Description and Purpose

A tire wash is an area located at stabilized construction access points to remove sediment from tires and under carriages and to prevent sediment from being transported onto public roadways.

Suitable Applications

Tire washes may be used on construction sites where dirt and mud tracking onto public roads by construction vehicles may occur.

Limitations

- The tire wash requires a supply of wash water.
- A turnout or doublewide exit is required to avoid having entering vehicles drive through the wash area.
- Do not use where wet tire trucks leaving the site leave the road dangerously slick.

Implementation

- Incorporate with a stabilized construction entrance/exit. See TC-1, Stabilized Construction Entrance/Exit.
- Construct on level ground when possible, on a pad of coarse aggregate greater than 3 in. but smaller than 6 in. A geotextile fabric should be placed below the aggregate.
- Wash rack should be designed and constructed/manufactured for anticipated traffic loads.

- Provide a drainage ditch that will convey the runoff from the wash area to a sediment trapping device. The drainage ditch should be of sufficient grade, width, and depth to carry the wash runoff.
- Use hoses with automatic shutoff nozzles to prevent hoses from being left on.
- Require that all employees, subcontractors, and others that leave the site with mud caked tires and undercarriages to use the wash facility.
- Implement SC-7, Street Sweeping and Vacuuming, as needed.

Costs

Costs are low for installation of wash rack.

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.
- Remove accumulated sediment in wash rack and/or sediment trap to maintain system performance.
- Inspect routinely for damage and repair as needed.

References

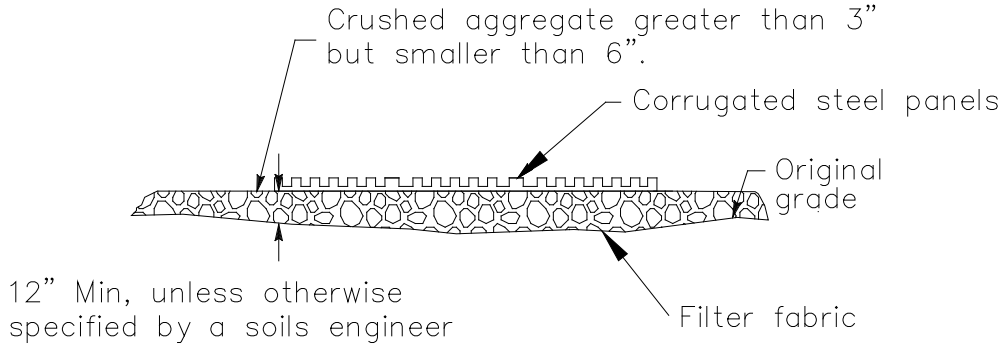
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

Coastal Nonpoint Pollution Control Program; Program Development and Approval Guidance, Working Group, Working Paper; USEPA, April 1992.

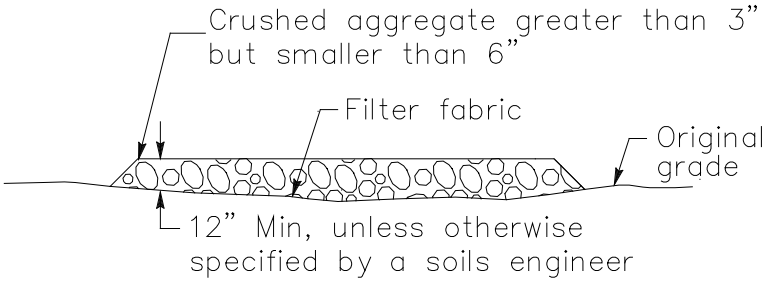
Manual of Standards of Erosion and Sediment Control Measures, Association of Bay Area Governments, May 1995.

Stormwater Quality Handbooks Construction Site Best Management Practices (BMPs) Manual, State of California Department of Transportation (Caltrans), November 2000.

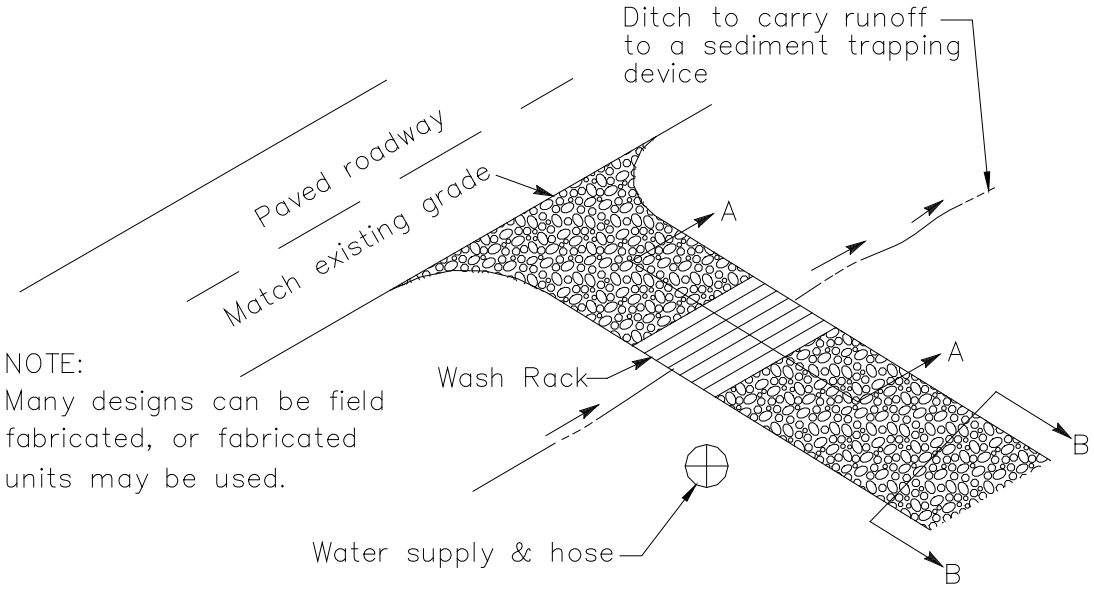
Stormwater Management for Construction Activities, Developing Pollution Prevention Plans and Best Management Practices, EPA 832-R-92005; USEPA, April 1992.



SECTION A–A
NOT TO SCALE

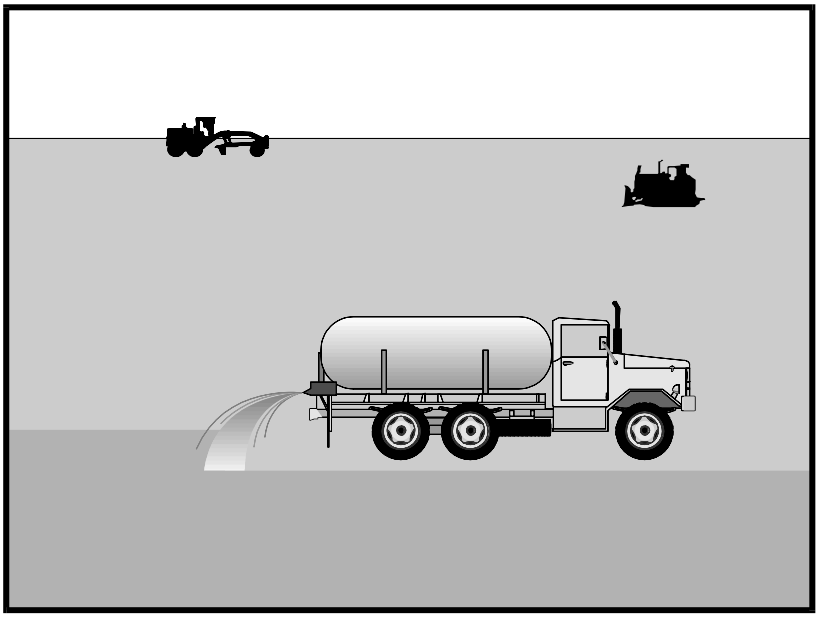


SECTION B–B
NTS



TYPICAL TIRE WASH
NOT TO SCALE

Wind Erosion Control WE-1



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	

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

EC-5 Soil Binders

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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:

- 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, vinyl, 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.

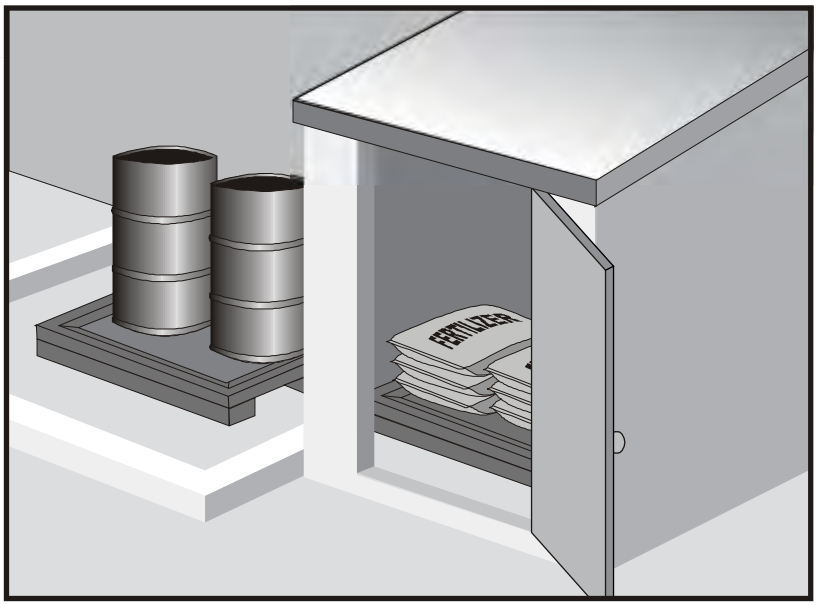
California Air Pollution Control Laws, California Air Resources Board, updated annually.

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 (PM10), 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.

Material Delivery and Storage WM-1



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	☑

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	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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- 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

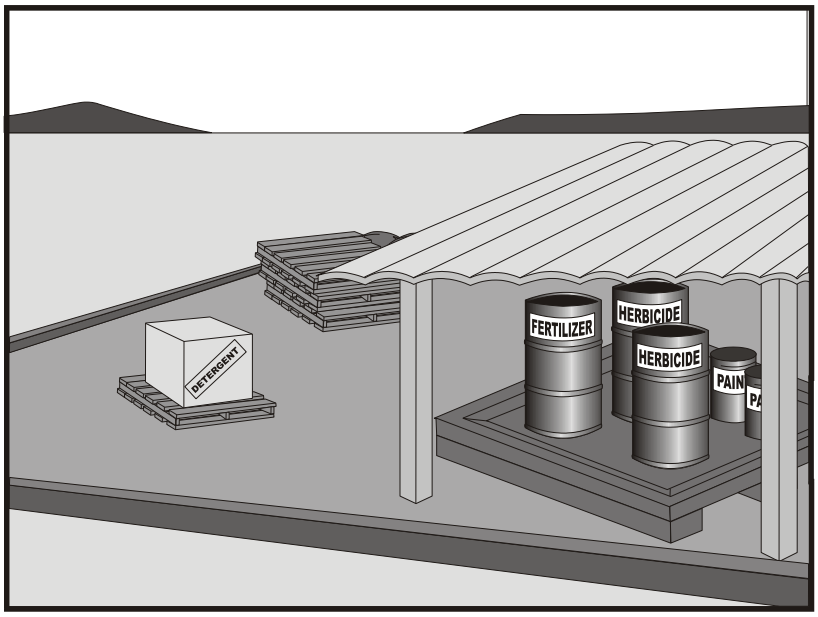
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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.

Material Use WM-2



Categories

EC	Erosion Control	
SE	Sediment Control	
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WE	Wind Erosion Control	
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WM	Waste Management and Materials Pollution Control	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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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

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.

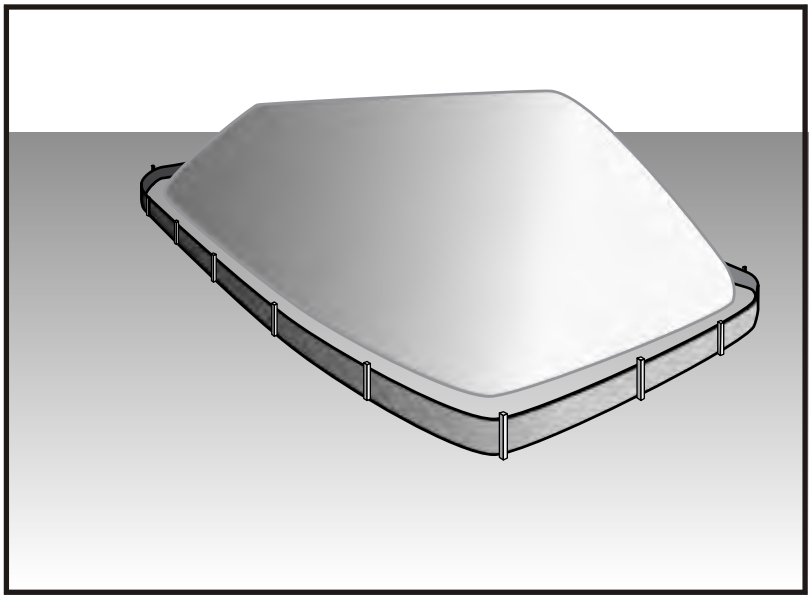
Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance, Working Group Working Paper; USEPA, April 1992.

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



Treat 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	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

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 and photodegradable plastics should be avoided.

Implementation

Protection of stockpiles is a year-round requirement. To properly manage stockpiles:

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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- On larger sites, a minimum of 50 ft separation from concentrated flows of stormwater, drainage courses, and inlets is recommended.
- After 14 days of inactivity, a stockpile is non-active and requires further protection described below. All stockpiles are required to be protected as non-active stockpiles 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

A stockpile is considered non-active if it either is not used for 14 days or if it is scheduled not to be used for 14 days or more. Stockpiles need to be protected immediately if they are not scheduled to be used within 14 days. Non-active stockpiles of the identified materials should be protected as follows:

Soil stockpiles

- Soil stockpiles should be covered or protected with soil stabilization measures and a temporary perimeter sediment barrier at all times.
- Temporary vegetation should be considered 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

- Stockpiles should be covered and protected with a temporary perimeter sediment barrier at all times.

Stockpiles of "cold mix"

- Cold mix stockpiles should be placed on and covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Stockpiles of fly ash, stucco, hydrated lime

- Stockpiles of materials that may raise the pH of runoff (i.e., basic materials) should be covered with plastic and surrounded by a berm.

Stockpiles/Storage of treated wood

- Treated wood should be covered with plastic sheeting or comparable material at all times and surrounded by a berm.

Protection of Active Stockpiles

A stockpile is active when it is being used or is scheduled to be used within 14 days of the previous use. 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.)

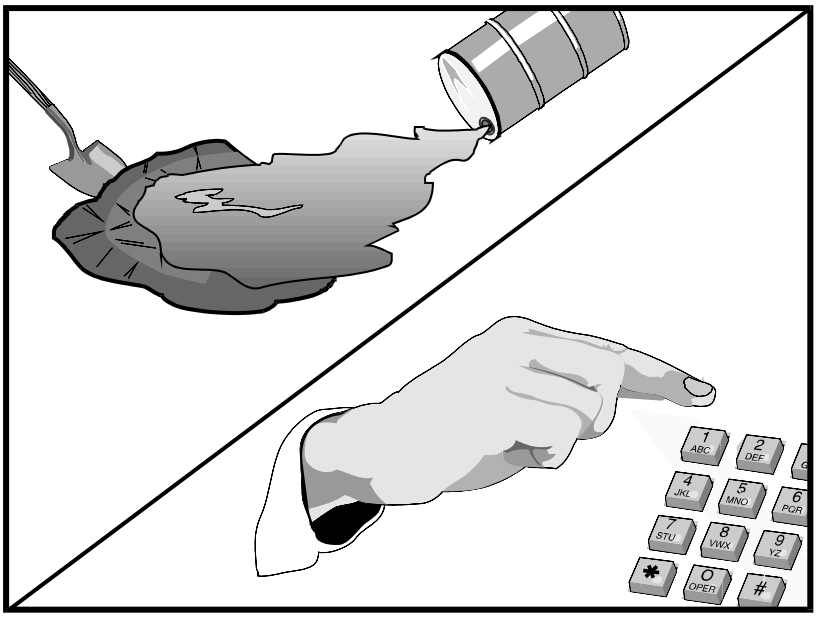
Inspection and Maintenance

- 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.

Spill Prevention and Control WM-4



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	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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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

- 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 runon 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 spill's 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 runon 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 runon 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.

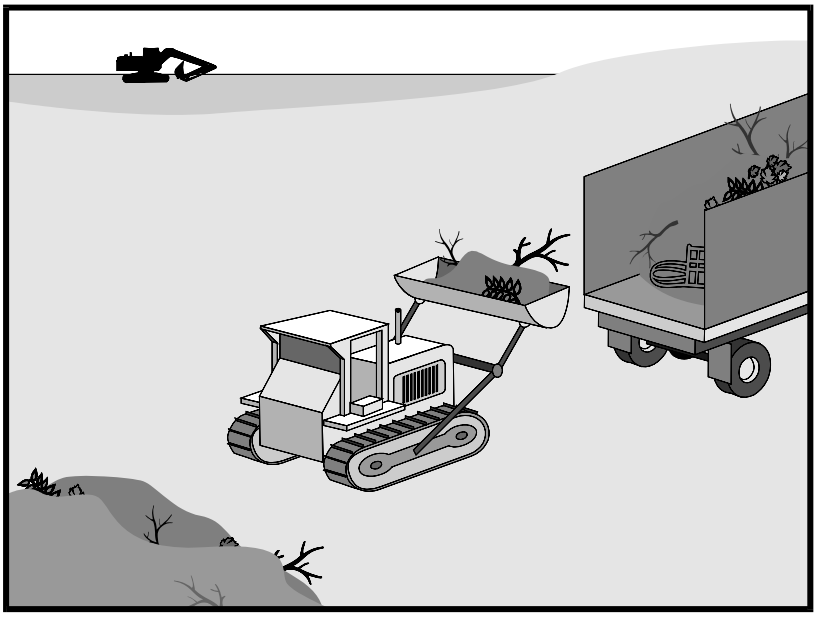
References

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



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	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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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, 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 runon 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.

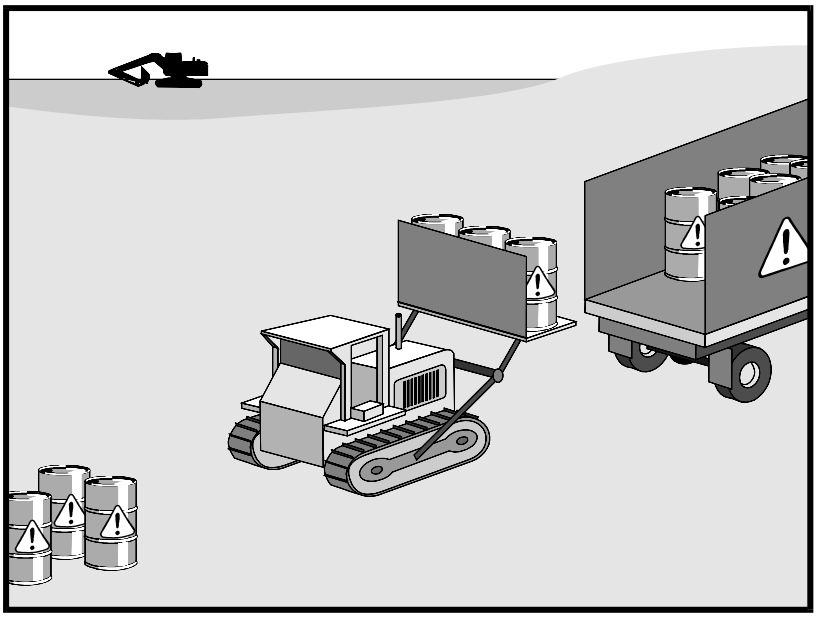
References

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.

Hazardous Waste Management WM-6



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	☑

Legend:

☑ **Primary Objective**

☒ **Secondary Objective**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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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
- Asphalt Products
- Concrete Curing Compounds
- Pesticides
- Palliatives
- Acids
- Septic Wastes
- Paints
- Stains
- Solvents
- Wood Preservatives
- 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

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 aerially 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

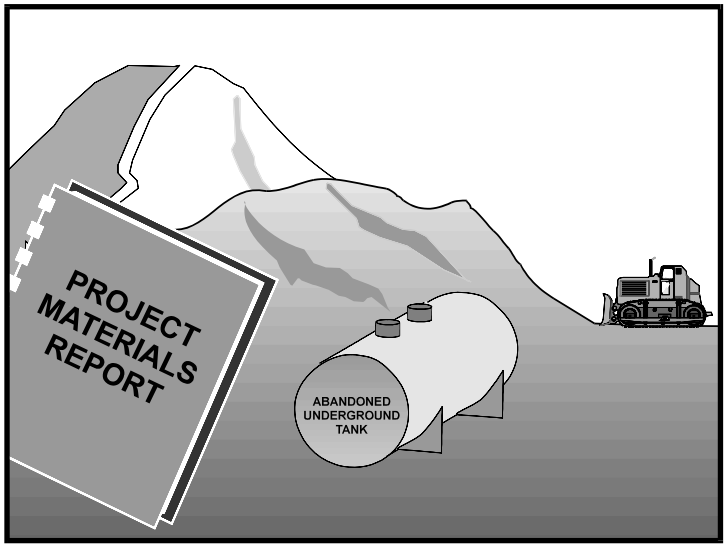
Blueprint for a Clean Bay: Best Management Practices to Prevent Stormwater Pollution from Construction Related Activities; Santa Clara Valley Nonpoint Source Pollution Control Program, 1995.

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.

Contaminated Soil Management WM-7



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	☑

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	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑

Potential Alternatives

None

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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

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.

Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity, 430/9-73-007, USEPA, 1973.

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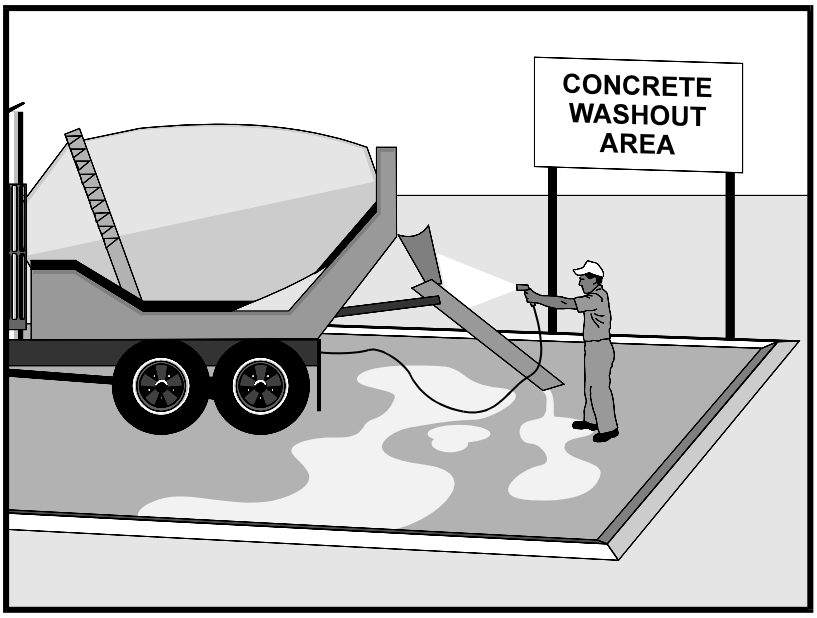
Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.

Concrete Waste Management WM-8



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	☑

Legend:
☑ **Primary Category**
☒ **Secondary Category**

Targeted Constituents

Sediment	☑
Nutrients	
Trash	
Metals	☑
Bacteria	
Oil and Grease	
Organics	

Potential Alternatives

None

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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 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.
- 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.
  - Washouts shall be implemented in a manner that prevents leaching to underlying soils. Washout containers must be water tight and washouts on or in the ground must be lined with a suitable impervious liner, typically a plastic type material.
- 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-0ff 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.

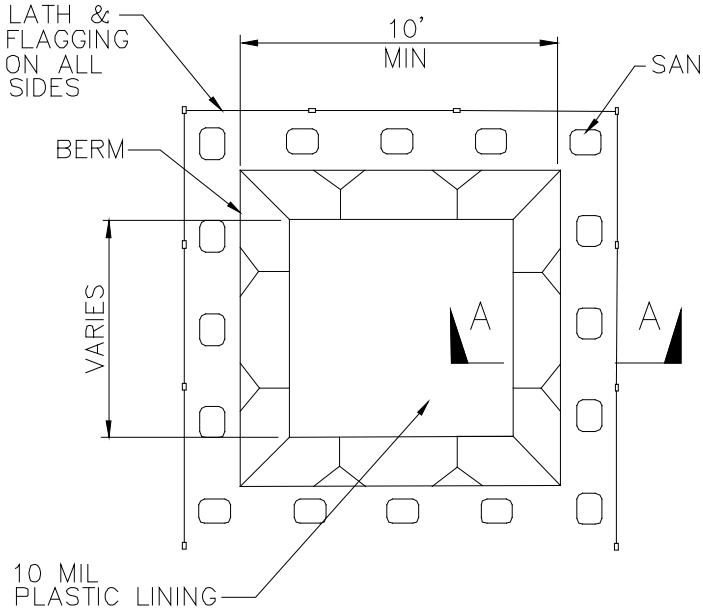
- Inspect washout facilities for damage (e.g. torn liner, evidence of leaks, signage, etc.). Repair all identified damage.

References

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, Updated March 2003.

Stormwater Management for Construction Activities; Developing Pollution Prevention Plans and Best Management Practice, EPA 832-R-92005; USEPA, April 1992.



PLAN
NOT TO SCALE
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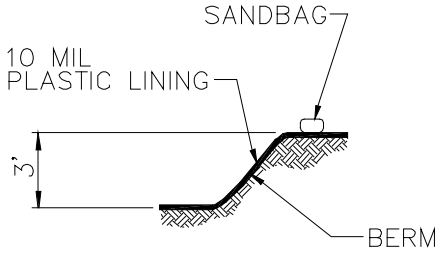
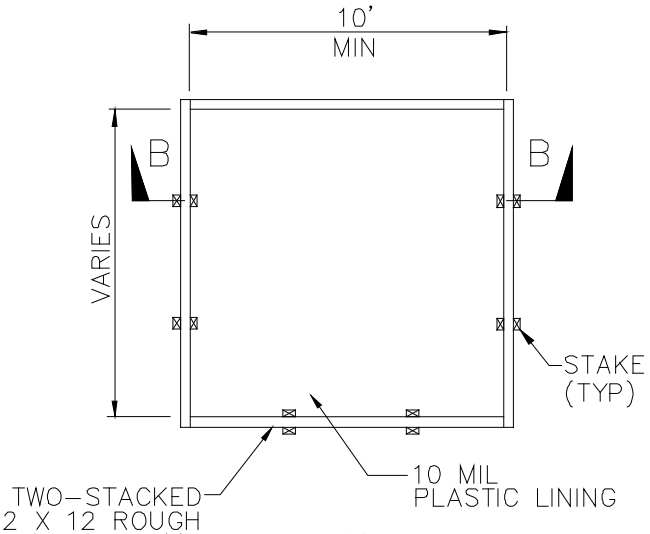
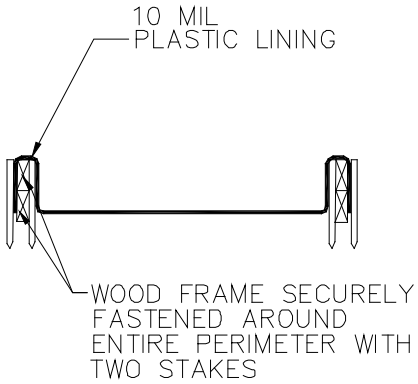


SECTION A–A
NOT TO SCALE



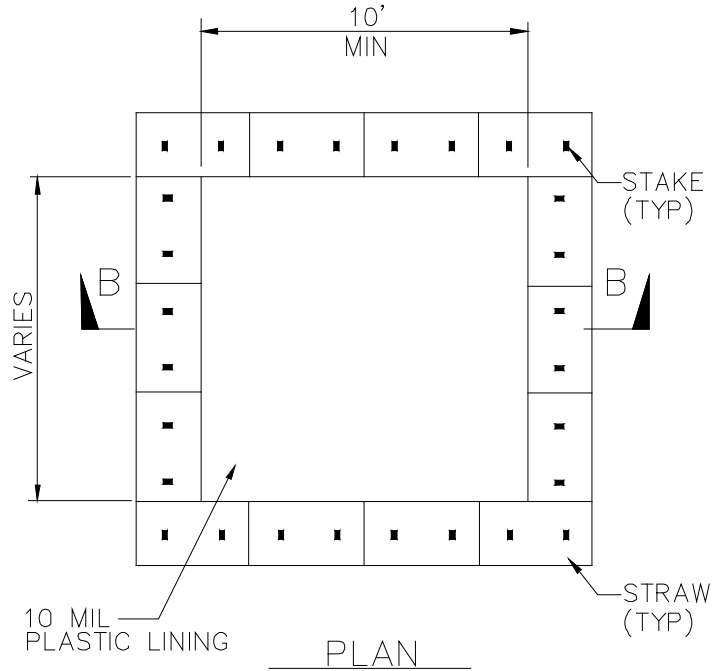
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"



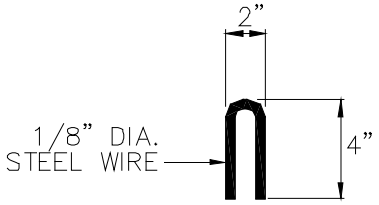
SECTION B–B
NOT TO SCALE

NOTES

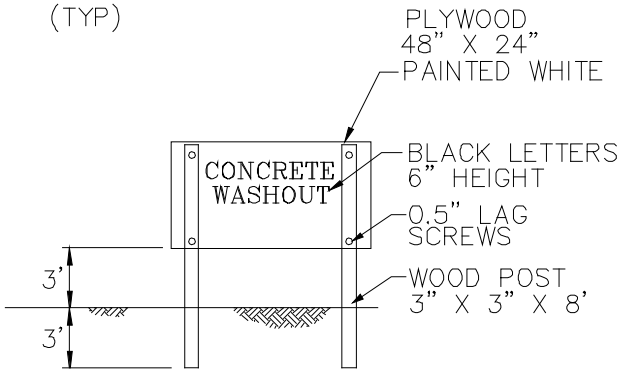
1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.



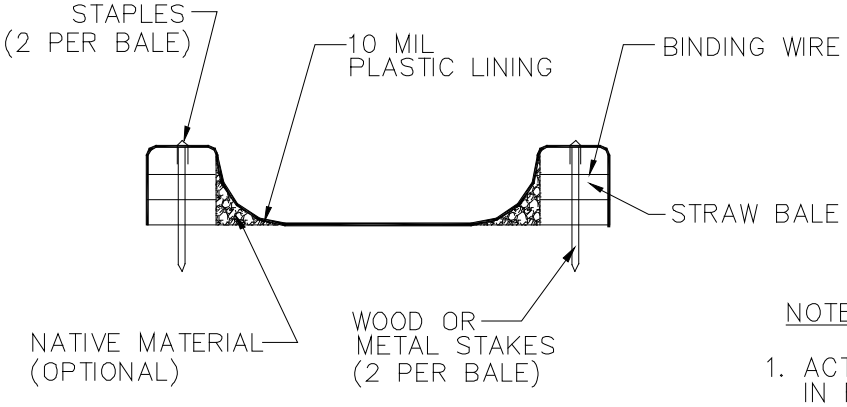
PLAN
NOT TO SCALE
TYPE "ABOVE GRADE"
WITH STRAW BALES



STAPLE DETAIL



CONCRETE WASHOUT
SIGN DETAIL
(OR EQUIVALENT)

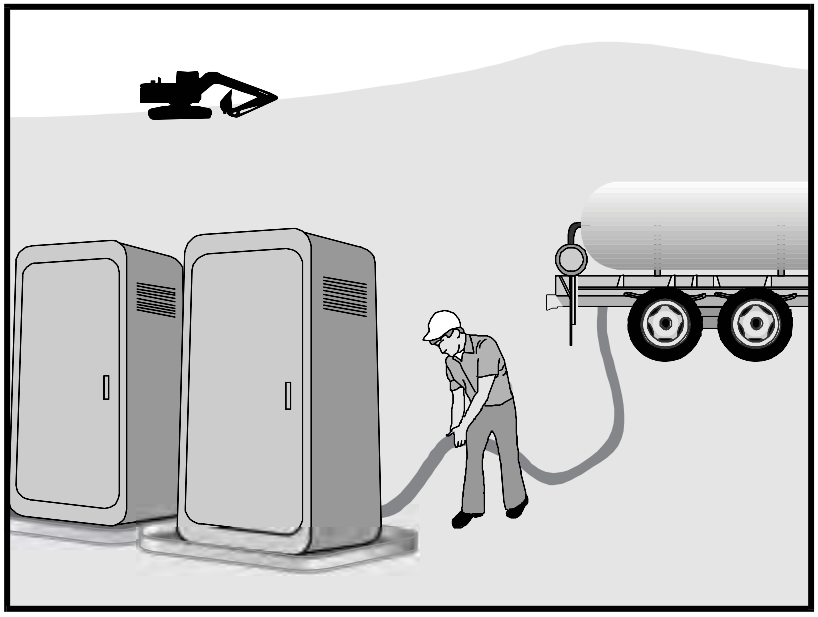


SECTION B–B
NOT TO SCALE

NOTES

1. ACTUAL LAYOUT DETERMINED IN FIELD.
2. THE CONCRETE WASHOUT SIGN SHALL BE INSTALLED WITHIN 30 FT. OF THE TEMPORARY CONCRETE WASHOUT FACILITY.

Sanitary/Septic Waste Management WM-9



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	☑

Legend:

☑ **Primary Category**

☒ **Secondary Category**

Targeted Constituents

Sediment	
Nutrients	☑
Trash	☑
Metals	
Bacteria	☑
Oil and Grease	
Organics	☑

Potential Alternatives

None

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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.

- 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.

Inspection and Maintenance

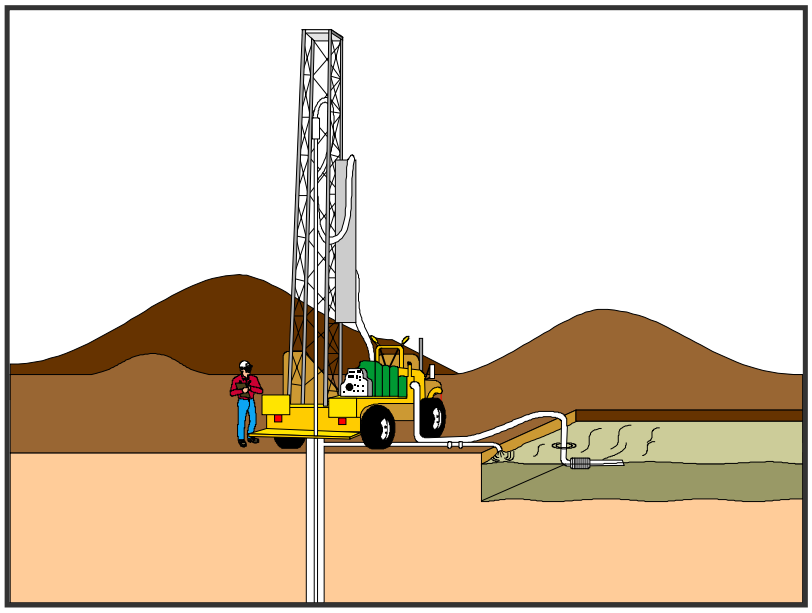
- BMPs must be inspected in accordance with General Permit requirements for the associated project type and risk level. It is recommended that at a minimum, BMPs be inspected weekly, prior to forecasted rain events, daily during extended rain events, and after the conclusion of rain events.
- Arrange 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.

Liquid Waste Management WM-10



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	☑

Legend:
☑ **Primary Objective**
☒ **Secondary Objective**

Targeted Constituents	
Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	
Oil and Grease	☑
Organics	

Potential Alternatives

None

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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 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.

Appendix H: BMP Inspection Form

BMP INSPECTION REPORT

Date and Time of Inspection:	Date Report Written:

Inspection Type: (Circle one)	Weekly *Complete Parts I,II,III and VII*	Pre-Qualifying Precipitation Event (QPE) *Complete Parts I,II,III,IV and VII*	During QPE *Complete Parts I, II, III, V, and VII*	Post-QPE *Complete Parts I,II,III,VI and VII*	*Inactive Project Complete Parts I,II,III and VII*

Part I. General Information

Site Information

Construction Site Name:	
Construction stage and completed activities:	Approximate area of site that is exposed:

Photos Taken: (Circle one)	Yes	No	Photo Reference IDs:

Weather

Estimate storm beginning: (date and time)	Estimate storm duration: (hours)
Estimate time since last storm: (days or hours)	Rain gauge reading and location: (in)

Is a "Qualifying Precipitation Event" predicted or did one occur (i.e., any weather pattern with a 50% chance of 0.5" or more within a 24-hr period when 0.5" has been forecast and continues on subsequent 24-hour periods when 0.25" of precipitation or more is forecast)? (Y/N)
If yes, summarize forecast:

Exception Documentation (explanation required if inspection could not be conducted). Visual inspections are not required outside of business hours or during dangerous weather conditions such as electrical storms, flooding, and high winds above 40 miles per hour.

Inspector Information

Inspector Name:	Inspector Title:
Inspector Certification:	Date:

Part II. BMP Observations. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level 1 Sites	Adequately designed, implemented and effective (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Construction Materials			
Inventory of products (excluding materials designed to be outdoors)			
Stockpiled construction materials not actively in use are covered and bermed			
All chemicals are stored in watertight containers with appropriate secondary containment, or in a completely enclosed storage shed			
Construction materials are minimally exposed to precipitation			
BMPs preventing the off-site tracking of materials are implemented and properly effective			
Good Housekeeping for Waste Management			
Wash/rinse water and materials are prevented from being disposed into the storm drain system			
Portable toilets are contained to prevent discharges of waste			
Sanitation facilities are clean and with no apparent for leaks and spills			
Equipment is in place to cover waste disposal containers at the end of business day and during rain events			
Discharges from waste disposal containers are prevented from discharging to the storm drain system / receiving water			
Stockpiled waste material is securely protected from wind and rain if not actively in use			
Procedures are in place for addressing hazardous and non-hazardous spills			
Appropriate spill response personnel are assigned and trained			
Equipment and materials for cleanup of spills is available onsite			
Washout areas (e.g., concrete) are contained appropriately to prevent discharge or infiltration into the underlying soil			
Good Housekeeping for Vehicle Storage and Maintenance			
Measures are in place to prevent oil, grease, or fuel from leaking into the ground, storm drains, or surface waters			
All equipment or vehicles are fueled, maintained, and stored in a designated area with appropriate BMPs			
Vehicle and equipment leaks are cleaned immediately and disposed of properly			

Part II. BMP Observations Continued. Describe deficiencies in Part III.			
Minimum BMPs for Risk Level 1 Sites	Adequately designed, implemented and effective (yes, no, N/A)	Action Required (yes/no)	Action Implemented (Date)
Good Housekeeping for Landscape Materials			
Stockpiled landscape materials such as mulches and topsoil are contained and covered when not actively in use			
Erodible landscape material has not been applied 2 days before a forecasted rain event or during an event			
Erodible landscape materials are applied at quantities and rates in accordance with manufacturer recommendations			
Bagged erodible landscape materials are stored on pallets and covered			
Good Housekeeping for Air Deposition of Site Materials			
Good housekeeping measures are implemented onsite to control the air deposition of site materials and from site operations			
Non-Stormwater Management			
Non-Stormwater discharges are properly controlled			
Vehicles are washed in a manner to prevent non-stormwater discharges to surface waters or drainage systems			
Streets are cleaned in a manner to prevent unauthorized non-stormwater discharges to surface waters or drainage systems.			
Erosion Controls			
Wind erosion controls are effectively implemented			
Effective soil cover is provided for disturbed areas inactive (i.e., not scheduled to be disturbed for 14 days) as well as finished slopes, open space, utility backfill, and completed lots			
The use of plastic materials is limited in cases when a more sustainable, environmentally friendly alternative exists.			
Sediment Controls			
Perimeter controls are established and effective at controlling erosion and sediment discharges from the site			
Entrances and exits are stabilized to control erosion and sediment discharges from the site			
Sediment basins are properly maintained			
Inspect immediate access roads prior to forecasted precipitation			
Linear sediment control along toe of slope, face of slope an at grade breaks (Risk Level 2 & 3 Only)			
Limit construction activity to and from site to entrances and exits that employ effective controls to prevent offsite tracking (Risk Level 2 & 3 Only)			

Ensure all storm, drain inlets and perimeter controls, runoff control BMPs and pollutants controls at entrances and exits are maintained and protected from activities the reduce their effectiveness (Risk Level 2 & 3 Only)			
Run-On and Run-Off Controls			
Run-on to the site is effectively managed and directed away from all disturbed areas.			
Other			
Are the project SWPPP and BMP plan up to date, available onsite and being properly implemented?			
Is the posting of the project's unique WDID number, waiver identification number, and site and project contact information publicly accessible?			

Part III. Descriptions of BMP Deficiencies

Deficiency	**Repairs Implemented:** **Note -** Repairs must begin within 72 hours of identification and, complete repairs as soon as possible.	
	Start Date	**Action**
1.		
2.		
3.		
4.		

Part IV. Additional Pre-QPE Observations. Note the presence or absence of floating and suspended materials, sheen, discoloration, turbidity, odors, and source(s) of pollutants(s).

	Yes, No, N/A
Do stormwater storage and containment areas have adequate freeboard? If no, complete Part III.	
Are drainage areas free of spills, leaks, or uncontrolled pollutant sources? If no, complete Part VII and describe below.	
Notes:	
Are stormwater storage and containment areas free of leaks? If no, complete Parts III and/or VII and describe below.	
Notes:	

Part V. Additional During-QPE Observations. If BMPs cannot be inspected during inclement weather, list the results of visual inspections at all relevant outfalls, discharge points, and downstream locations. Note odors or visible sheen on the surface of discharges. Complete Part VII (Corrective Actions) as needed.	
Outfall, Discharge Point, or Other Downstream Location	
Location	Description
Location	Description
Location	Description
Location	Description

Part VI. Additional Post-QPE Observations. Visually observe (inspect) stormwater discharges at all discharge locations within 96 hours after each qualifying precipitation event, and observe (inspect) the discharge of stored or contained stormwater that is derived from and discharged subsequent to a qualifying precipitation event producing precipitation of ½ inch or more at the time of discharge. Complete Part VII (Corrective Actions) as needed.	
Discharge Location, Storage or Containment Area	**Visual Observation**

Part VII. Additional Corrective Actions Required. Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Note if SWPPP change is required.	
Required Actions	**Implementation Date**

Appendix I: Training Forms

Contractor Personnel Training Log

Stormwater Management Training Log and Documentation

Project Name: Ventura HS Track and Field Replacement and Bleacher Upgrades

WDID Number: _____

Stormwater Management Topic: (check as appropriate)

☐ Good Housekeeping BMPs ☐ Erosion Control BMPs

☐ Sediment Control BMPs ☐ Tracking Control

☐ Non-Stormwater Management BMPs ☐ Waste Management & Pollution Control BMPs

☐ BMP Implementation Activities ☐ Advanced BMPs

☐ Identification of QSPs and QSP Delegates

Training Objective: _____

Date: _____ Instructor:_____

Training Length (hours): _____

Attendee Roster (Attach additional forms if necessary)

Name	Company	Phone

QSP Delegate Training Log

Stormwater Management Training Log and Documentation

Project Name: Ventura HS Track and Field Replacement and Bleacher Upgrades

WDID Number: _____

QSP Delegate Name _____

Delegated Responsibilities:

☐ Stormwater Visual Inspections

☐ Sampling

☐ BMP Inspections

☐ BMP Maintenance and Repair

Foundational Training

Topic	Date Completed	QSP Trainer
☐ Roles and Responsibilities		
☐ Forecast Information		
☐ Documentation and Reporting Procedures		

Site-Specific Training

Topic	Date Completed	QSP Trainer
☐ Visual Inspections		
☐ Sample Collection Procedures		
☐ Sample Reporting Procedures		
☐ BMP Implementation		

As needed, attach proof of external training (e.g., course completion certificates, credentials for the QSP Delegate).

Appendix J: Responsible Parties

Identification of QSP and QSP Delegates

Project Name: Ventura HS Track and Field Replacement and Bleacher Upgrades

WDID Number:

The following are QSPs and QSP Delegates associated with this project

Name of Personnel[1]	QSP Number, or state “Delegate”	Company	Date

(1) If additional QSPs or QSP Delegates are required on the job site add additional lines

Appendix K: Contractors and Subcontractors

Contractor Name:	
Title:	
Contractor Company:	
Address	
Phone Number:	
Phone Number (24/7)	

Appendix L: Calculations

Site Pervious and Impervious Calculations

Total Site Area	=	4.82 Acres	(A)

Existing Site Conditions (prior to construction)

Impervious Site Area [1]	=	(XX.XX BUILDING / ROOF)	(B)
Impervious Site Area Runoff Coefficient [2, 4]	=	0.95	(C)
Pervious Site Area [3]	=	Acres	(D)
Pervious Site Area Runoff Coefficient [4]	=	0.40	(E)
Existing Site Area Runoff Coefficient $\frac{(B \times C) + (D \times E)}{(A)}$	=	0.	(F)

Proposed Site Conditions (after construction)

Impervious Site Area [1]	=	Acres	(G)
Impervious Site Area Runoff Coefficient [2, 4]	=	0.95	(H)
Pervious Site Area [3]	=	Acres	(I)
Pervious Site Area Runoff Coefficient [4]	=	0.40	(J)
Proposed Site Area Runoff Coefficient $\frac{(G \times H) + (I \times J)}{(A)}$	=	0.	(K)

1. Includes paved areas, areas covered by buildings, and other impervious surfaces.
2. Use 0.95 unless lower or higher runoff coefficient can be verified.
3. Includes areas of vegetation, most unpaved or uncovered soil surfaces, and other pervious areas.
4. Refer to local Hydrology Manual for typical C values.

Appendix M: Weather Reports

The discharger must obtain the precipitation forecast information from the National Weather Service Forecast Office (http://forecast.weather.gov). A printed copy with the date and time of printing should be retained in this Appendix.

Appendix N: Monitoring Records

Place completed BMP Inspection Forms, photographic documentation, Effluent Sampling, Receiving Water, and Dewatering Field Logs, Monitoring Exceptions, and NAL Exceedance Reports in this appendix.

Appendix O: Example Storm Event Monitoring Forms

Rain Gauge Log Sheet				
Construction Site Name:				
WDID #:				
Date (mm/dd/yy)	Time (24-hr)	Initials	Rainfall Depth (Inches)	Notes:

Risk Level 1 ***Visual Inspection Field Log Sheet***					
Date and Time of Inspection:				Report Date:	
Inspection Type:	☐ Weekly	☐ Pre Qualifying Precipitation Event (QPE)	☐ During QPE	☐ Post QPE	☐ Dewatering Discharge
Site Information					
Construction Site Name:					
Construction stage and completed activities:				Approximate area of exposed site:	
Weather and Observations					
Date Rain Predicted to Occur:			Predicted % chance of precipitation (PoP): Predicted quantity of precipitation (QPF):		
Estimate storm beginning: _____ (date and time)	Estimate storm duration:_____ (hours)		Estimate time since last storm: _____ (days or hours)	Rain gauge reading:_____ (inches)	
Observations: If yes identify location					
Odors	Yes ☐	No ☐			
Floating material	Yes ☐	No ☐			
Suspended Material	Yes ☐	No ☐			
Sheen	Yes ☐	No ☐			
Discolorations	Yes ☐	No ☐			
Turbidity	Yes ☐	No ☐			
Site Inspections					
Outfalls or BMPs Evaluated			**Deficiencies Noted**		
(add additional sheets or attached detailed BMP Inspection Checklists)					
Photos Taken:	Yes ☐	No ☐	Photo Reference IDs:		
Corrective Actions Identified (note if SWPPP change is needed)					
Inspector Information					
Inspector Name:			Inspector Title:		
Signature:				Date:	

Risk Level 1 ***Effluent Sampling Field Log Sheets***			
Construction Site Name:		Date:	Time Start:
Sampler:			
Sampling Event Type:	☐ Stormwater	☐ Dewatering Discharge	☐ Non-visible pollutant
Field Meter Calibration			
pH Meter ID No./Desc.: Calibration Date/Time:		Turbidity Meter ID No./Desc.: Calibration Date/Time:	

Field pH and Turbidity Measurements			
Discharge Location Description	pH	Turbidity	Time

Grab Samples Collected		
Discharge Location Description	Sample Type	Time

Additional Sampling Notes:
Time End:

NAL Exceedance Evaluation Summary Report	Page __ of __
Project Name	
Project WDID	
Project Location	
Date of Exceedance	
Type of Exceedance	**NAL ☐ pH ☐ Turbidity** **☐ Other (specify) _____**
Measurement or Analytical Method	**☐ Field meter** **(Sensitivity: _____)** **☐ Lab method (specify) _____** **(Minimum Level: ___)** **(MDL: _____)**
Calculated Daily Average	**☐ pH _____ pH units** **☐ Turbidity _____ NTU**
Rain Gauge Measurement	**_____ inches**
Visual Observations on Day of Exceedance	

NAL Exceedance Evaluation Summary Report	Page __ of __
Description of BMPs in Place at Time of Event	
Initial Assessment of Cause	
Corrective Actions Taken (deployed after exceedance)	
Additional Corrective Actions Proposed	
Report Completed By	_____ **(Print Name, Title)**
Signature	_____

CHAIN-OF-CUSTODY **DATE:** **Lab ID:**

DESTINATION LAB: ATTN: **ADDRESS:** **Office Phone:** **Cell Phone:**							REQUESTED ANALYSIS				Notes:
SAMPLED BY:											
Contact:											
Project Name											
Client Sample ID	**Sample Date**	**Sample Time**	**Sample Matrix**	**Container #**	**Container Type**	**Container Pres.**					

SENDER COMMENTS:	**RELINQUISHED BY**	
	Signature:	
	Print:	
	Company:	
	Date:	TIME:
LABORATORY COMMENTS:	**RECEIVED BY**	
	Signature:	
	Print:	
	Company:	
	Date:	TIME:

Appendix P: Field Meter Instructions

Appendix Q: Supplemental Information

Appendix R: Active Treatment System and Passive Treatment Plans

This project will not require the use of an active treatment system (unless otherwise determined by the Regional Water Quality Board) and will not be implementing a passive treatment system.

Appendix S: Construction General Permit

Copies of the Construction Stormwater General Permit may be downloaded from the State Water Board website at:

http://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.shtml.