ATTACHMENT J:

POST-CONSTRUCTION STANDARD DETAILS, SPECIFICATIONS, AND GUIDANCE

The details in this Attachment J are for VTA facilities only. Where there are conflicts with City Standard details or other VTA details, ask VTA MS4 Program Manager and VTA Project Manager for direction

For VTA Facilities, designers should note that industry best practices for storm water design should be used. These include, but are not limited to, the following:

NOTES:

1. OVERFLOW DEVICE: INSTALL 5MM PERFORATED GRATE ON OVERFLOW TO COMPLY WITH TRASH CAPTURE REQUIREMENTS. ENSURE OVERFLOW ALLOWS FOR A MIN. OF 6" OF PONDING.
2. PERFORATION PIPE SHOULD HAVE PERFORATIONS SET AT 120 DEGREES AND PERFORATION SLOTS SHOULD BE POINTED DOWN. AT LEAST

2" OF DRAIN ROCK SHOULD COVER THE UNDERDRAIN. THE UNDERDRAIN SHOULD BE PLACED AT A MINIMUM 0 .5% SLOPE TO THE STORM DRAIN OR DISCHARGE POINT (UNLESS A FLATTER SLOPE IS ALLOWED BASED UPON SITE-SPECIFIC CONDITIONS).

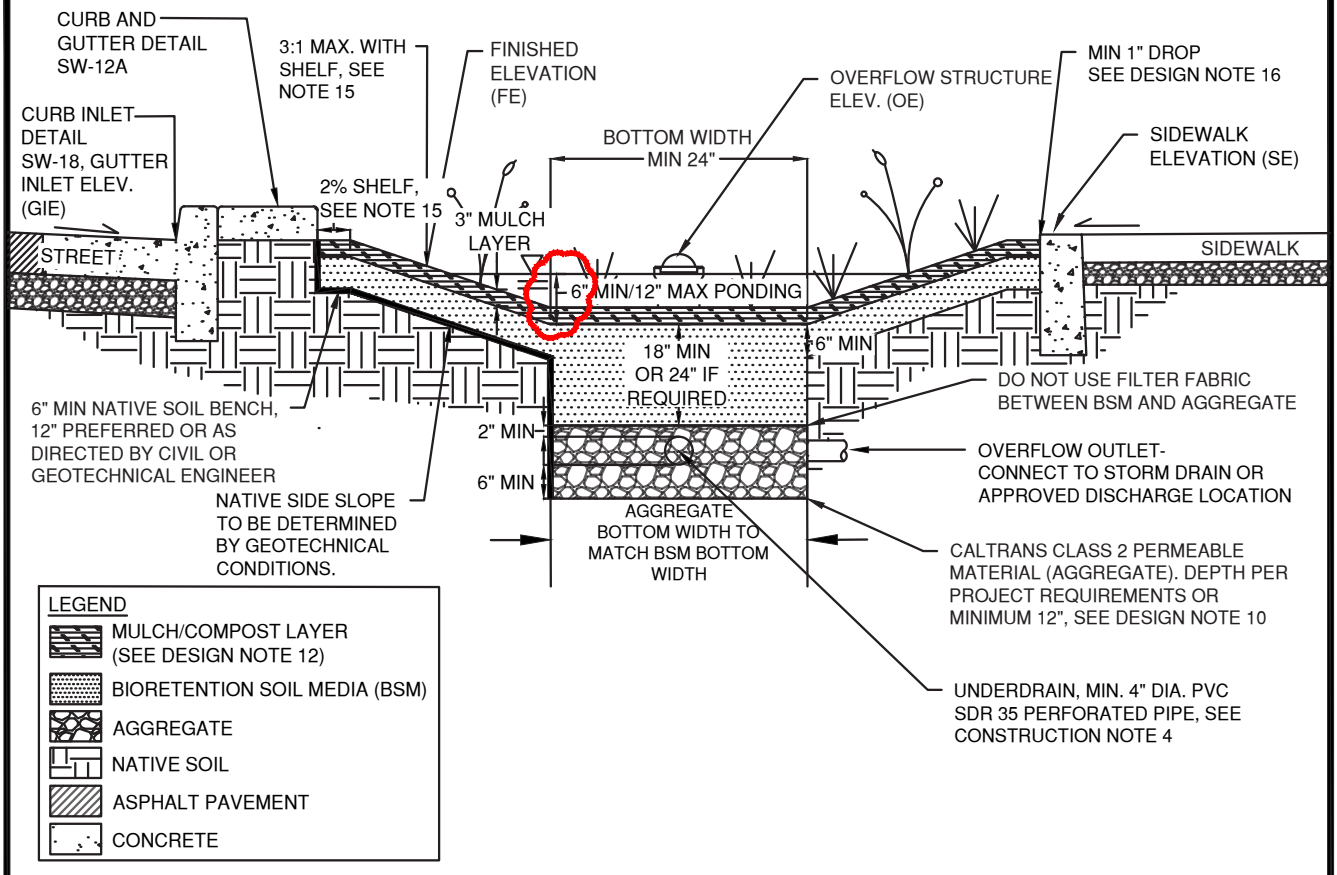
3. ENERGY DISSIPATER: INSTALL ROCK WITH FILTER FABRIC BENEATH IT (OR EQUIVALENT) AT ALL OPENINGS TO BIORETENTION BASINS. ROCK SHOULD EXTEND PAST OPENING AND DISSIPATE ENERGY SUFFICIENTLY THAT NO EROSION OCCURS IN BIORETENTION SOIL MEDIA.
4. ENSURE THAT VEHICLE STOP/CURB DOES NOT IMPEDE FLOW OF WATER THROUGH THE CURB CUT TO THE BASIN. IF BASIN HAS SURROUNDING CURB, THE DEPTH FROM THE TOP OF THE CURB TO THE MEDIA SHOULD NOT EXCEED HEIGHT OF OVERFLOW BY MORE THAN 2". IF EXCEEDANCE OCCURS, CONSIDER SAFETY MEASURES (I.E . RAILING)
5. SIZING: 4% OF TRIBUTARY DRAINAGE OR 4% OF IMPERVOUS AREAS MAY BE USED AS A GUIDELINE TO SIZE BIORETENTION BASINS
6. CONSIDER IRRIGATION: MINIMIZE OVERSPRAY ENTERING STORM DRAINAGE OVERFLOWS. CONSIDER USE OF DRIP SYSTEM.
7. CONSIDER GROUNDWATER/WATER TABLE IMPACTS EARLY IN DESIGN.
8. NOTE: BASINS THAT DO NOT POND WATER, AND/OR ALLOW "SHORT CIRCUITING" OF G:FLOW DIRECTLY TO THE UNDERDRAIN DUE TO EXCESSIVELY LONG/THIN DIMENSIONS ARE NOT ACCEPTABLE DESIGNS. BASIN DIMENSIONS MUST ALLOW FOR INTENDED PONDING. DESIGNERS MAY BE REQUIRED TO DEMONSTRATE THAT PONDING WILL OCCUR USING FLOW MODELING.
9. PLANTS: SEE VTA'S PLANTING GUIDELINES. DO NOT INSTALL TREES IN BASIN IF IMPERMEABLE LINER IS PRESENT.

ATTACHMENT J:

J1: LID STANDARD DETAILS (ADAPTED FROM CASQA)

TABLE OF CONTENTS: ATTACHMENT J

J1 LID STANDARD DETAILS:



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. PLACE BSM IN 6" LIFTS. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
8. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

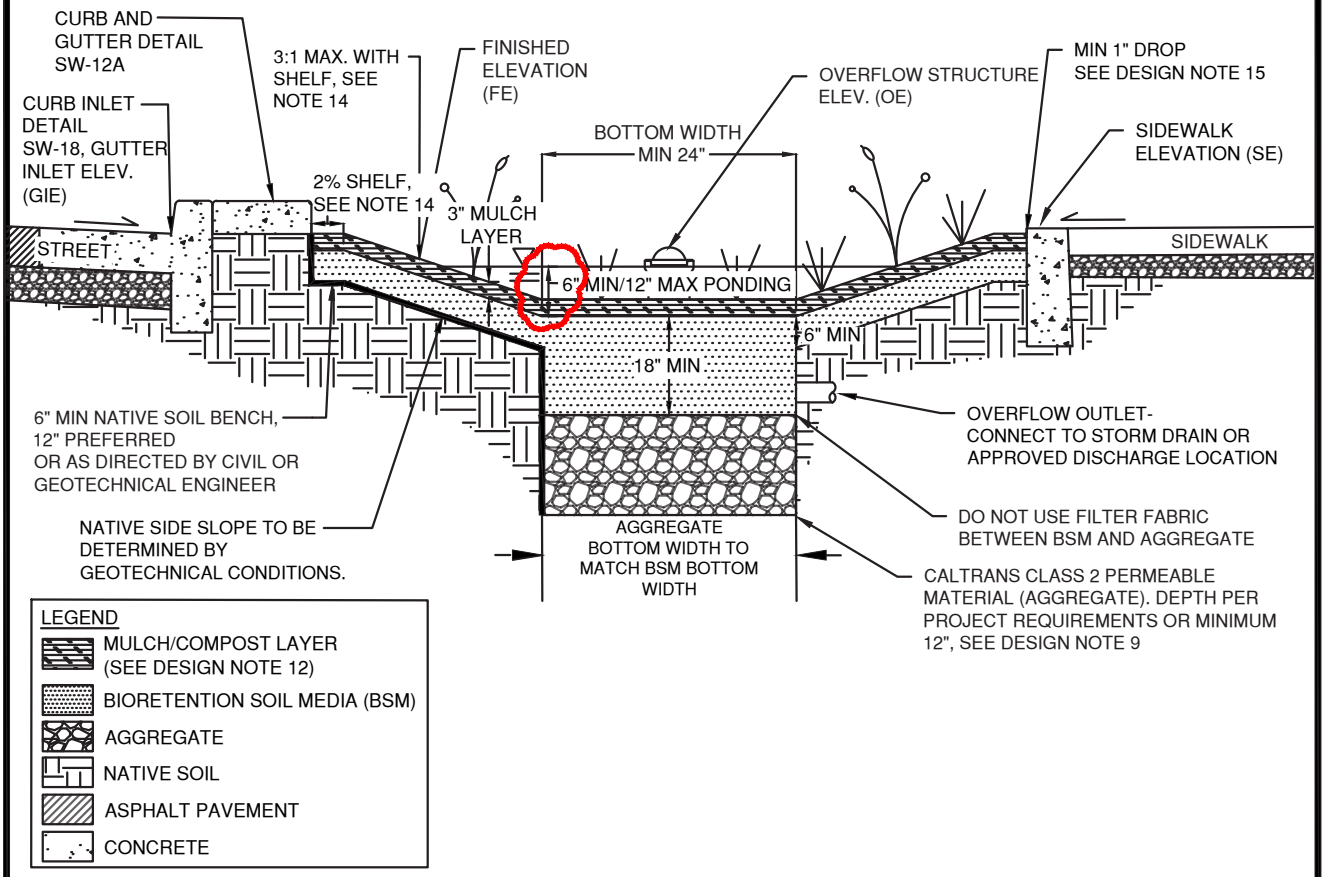
	APPROVED BY:	STREET SLOPE-SIDED BIORETENTION WITH PARKING, WITH UNDERDRAIN	STANDARD PLAN NO. SW-1
DEVELOPED UNDER PROP. 84 GRANT	VERSION: 08/31/2017	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
8. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
9. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
10. DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO.4) OPEN-GRADED AGGREGATE.
11. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
14. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
15. NATIVE SIDE SLOPE 4:1 (H:V) PREFERRED, 3:1 WITH SHELF. 6" MINIMUM SHELF WITH 2% SLOPE TOWARDS FACILITY ADJACENT TO PEDESTRIAN USE OR CURB UNLESS 4:1 SLOPE PROVIDED.
16. INCLUDE AT LEAST 1" DROP FROM CURB ABOVE MULCH LAYER.
17. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET SLOPE-SIDED BIORETENTION WITH PARKING, WITH UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-1 SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. PLACE BSM IN 6" LIFTS. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

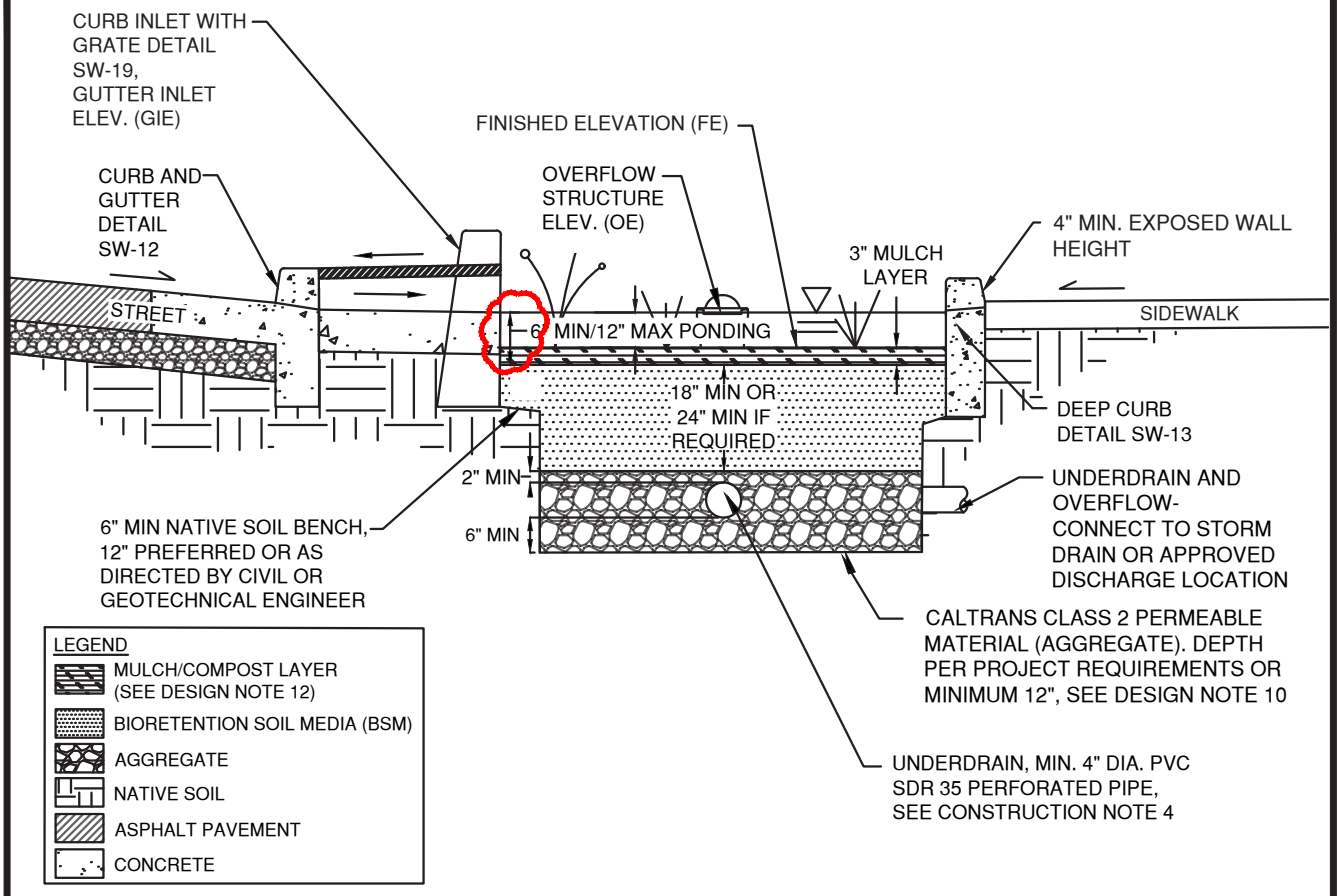
LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET SLOPE-SIDED BIORETENTION, WITH PARKING, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-1A SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
9. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
10. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
14. NATIVE SIDE SLOPE 4:1 (H:V) PREFERRED, 3:1 WITH SHELF. 6" MINIMUM SHELF WITH 2% SLOPE TOWARDS FACILITY ADJACENT TO PEDESTRIAN USE OR CURB UNLESS 4:1 SLOPE PROVIDED.
15. INCLUDE AT LEAST 1" DROP FROM CURB ABOVE MULCH LAYER.
16. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET SLOPE-SIDED BIORETENTION, WITH PARKING, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-1A SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
8. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

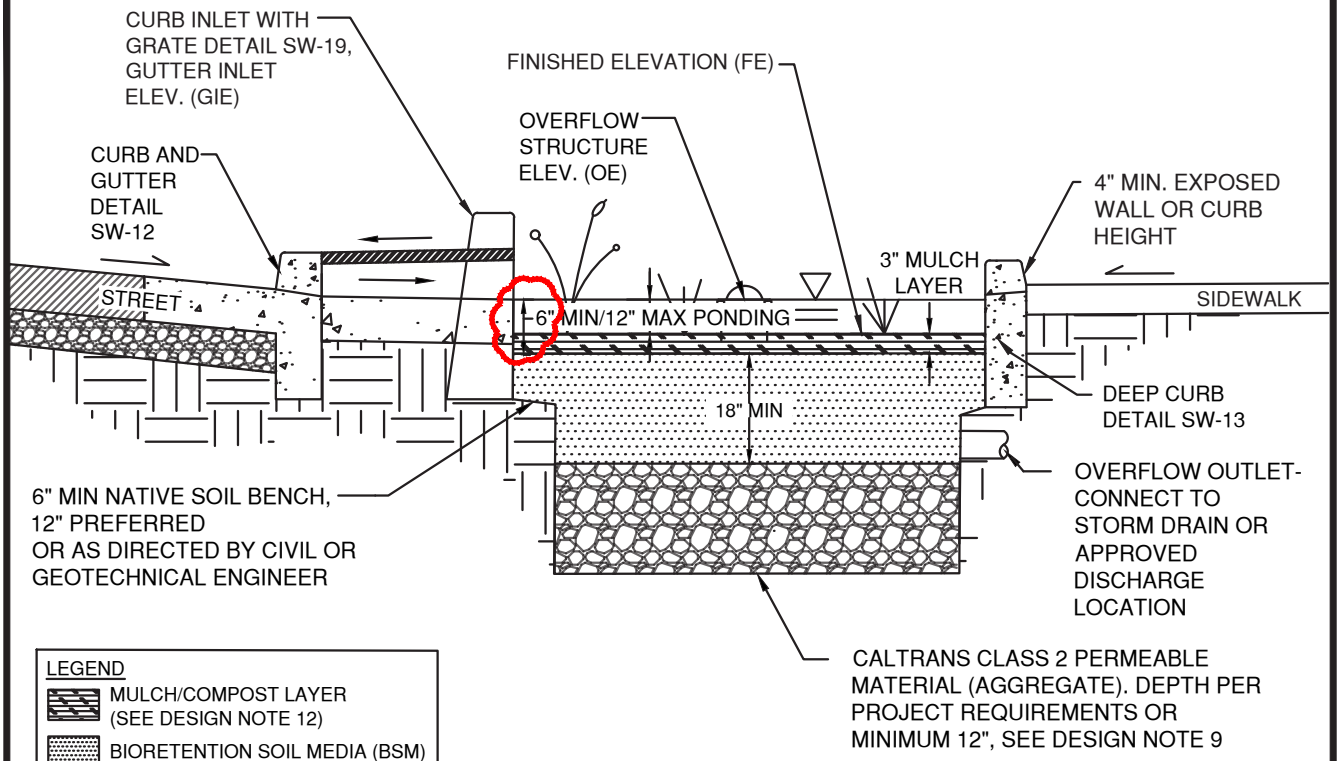
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION PLANTER BOX, WITH PARKING, WITH UNDERDRAIN	STANDARD PLAN NO. SW-2
		USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTIONFACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
8. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
9. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
10. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
11. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
14. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
15. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION PLANTER BOX, WITH PARKING, WITH UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-2 SHEET 2 OF 2



LEGEND

- MULCH/COMPOST LAYER (SEE DESIGN NOTE 12)
- BIORETENTION SOIL MEDIA (BSM)
- AGGREGATE
- NATIVE SOIL
- ASPHALT PAVEMENT
- CONCRETE

CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

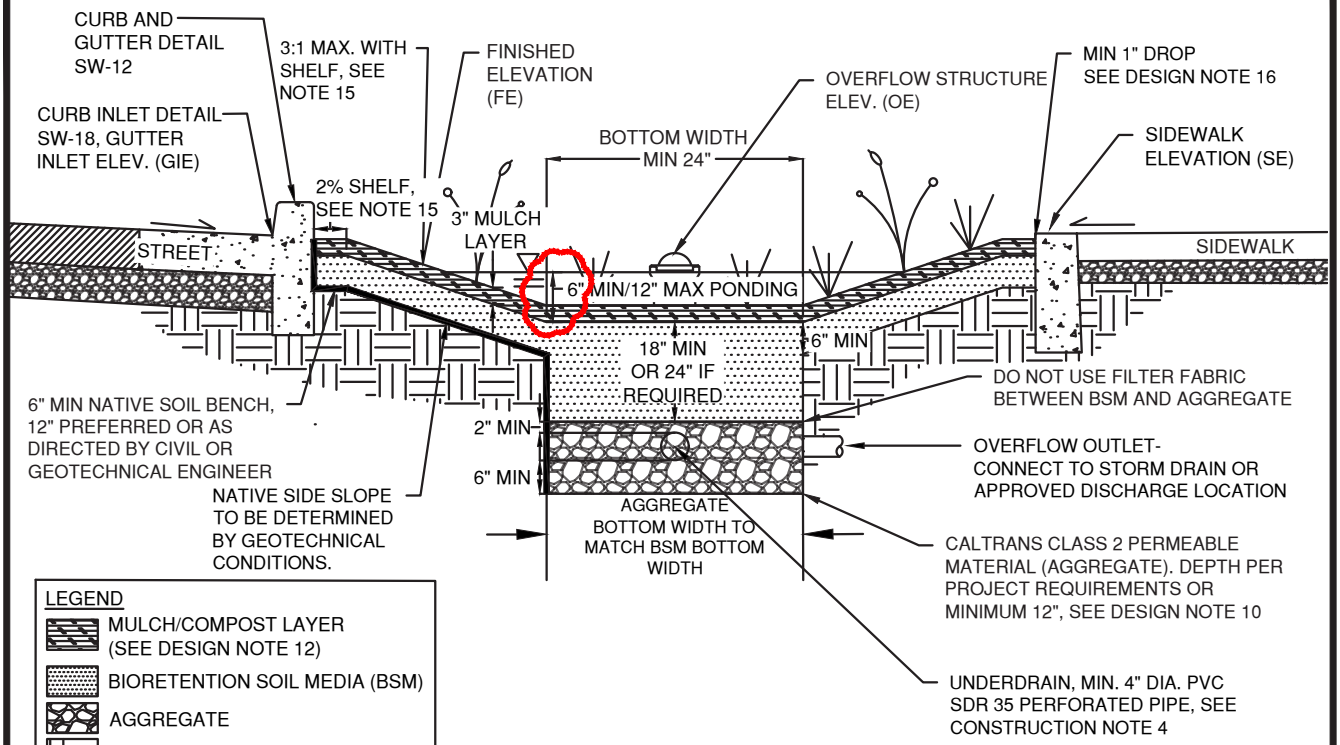
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION PLANTER BOX, WITH PARKING, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-2A SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
9. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
10. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
14. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION PLANTER BOX, WITH PARKING, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-2A SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. PLACE BSM IN 6" LIFTS. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
8. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

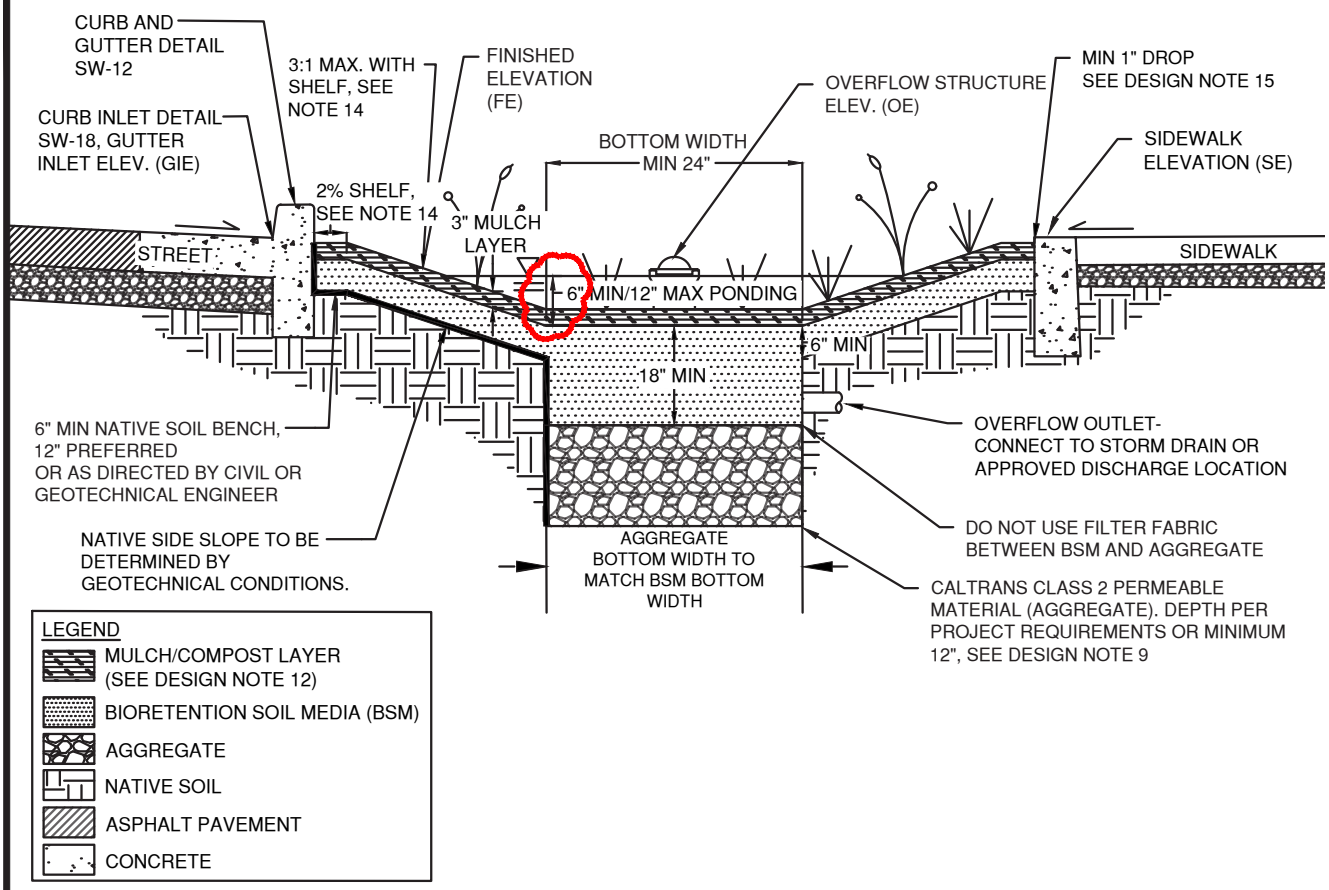
	APPROVED BY:	STREET SLOPE-SIDED BIORETENTION, NO PARKING, WITH UNDERDRAIN	STANDARD PLAN NO. SW-3
DEVELOPED UNDER PROP. 84 GRANT	VERSION: 08/31/2017	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
8. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
9. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
10. DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO.4) OPEN-GRADED AGGREGATE.
11. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
14. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
15. NATIVE SIDE SLOPE 4:1 (H:V) PREFERRED, 3:1 WITH SHELF. 6" MINIMUM SHELF WITH 2% SLOPE TOWARDS FACILITY ADJACENT TO PEDESTRIAN USE OR CURB UNLESS 4:1 SLOPE PROVIDED.
16. INCLUDE AT LEAST 1" DROP FROM CURB ABOVE MULCH LAYER.
17. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET SLOPE-SIDED BIORETENTION, NO PARKING, WITH UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-3 SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. PLACE BSM IN 6" LIFTS. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

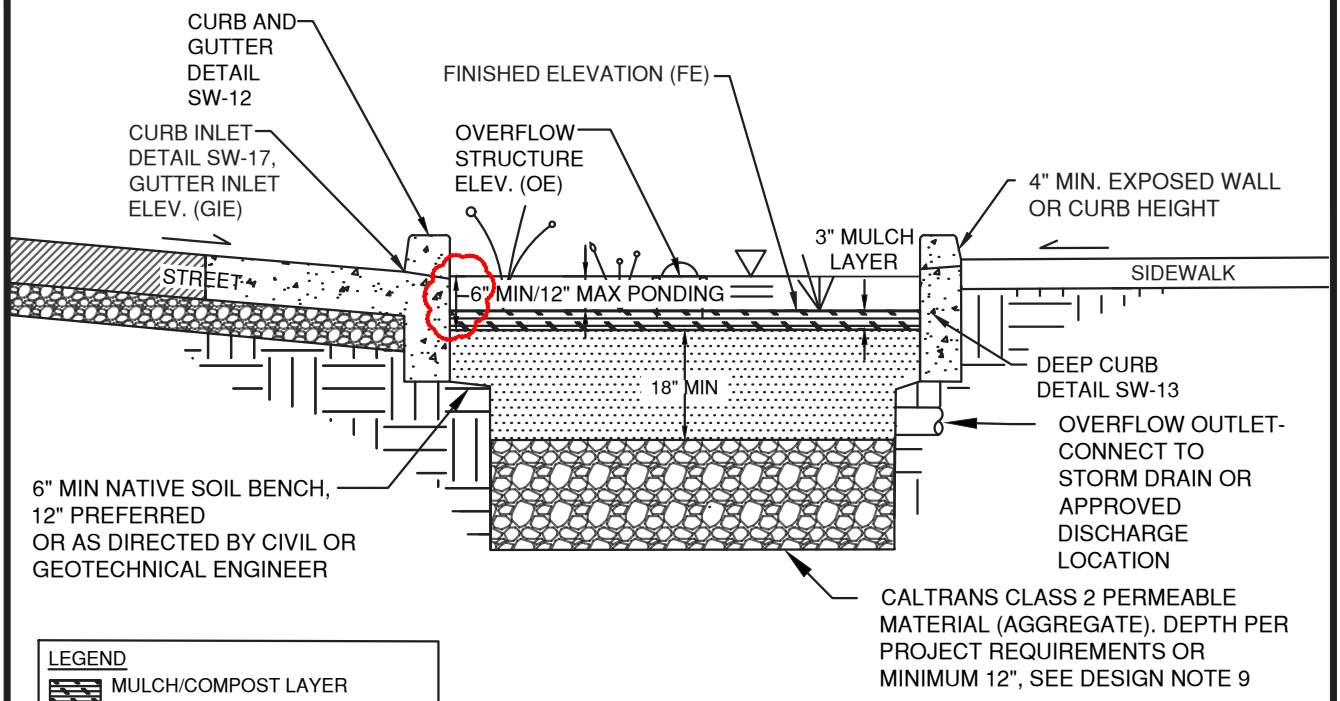
	APPROVED BY:	STREET SLOPE-SIDED BIORETENTION, NO PARKING, NO UNDERDRAIN	STANDARD PLAN NO. SW-3A
DEVELOPED UNDER PROP. 84 GRANT	VERSION: 08/31/2017	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
9. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
10. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
14. NATIVE SIDE SLOPE 4:1 (H:V) PREFERRED, 3:1 WITH SHELF. 6" MINIMUM SHELF WITH 2% SLOPE TOWARDS FACILITY ADJACENT TO PEDESTRIAN USE OR CURB UNLESS 4:1 SLOPE PROVIDED.
15. INCLUDE AT LEAST 1" DROP FROM CURB ABOVE MULCH LAYER.
16. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET SLOPE-SIDED BIORETENTION, NO PARKING, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-3A SHEET 2 OF 2



LEGEND

- MULCH/COMPOST LAYER (SEE DESIGN NOTE 12)
- BIORETENTION SOIL MEDIA (BSM)
- AGGREGATE
- NATIVE SOIL
- ASPHALT PAVEMENT
- CONCRETE

CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

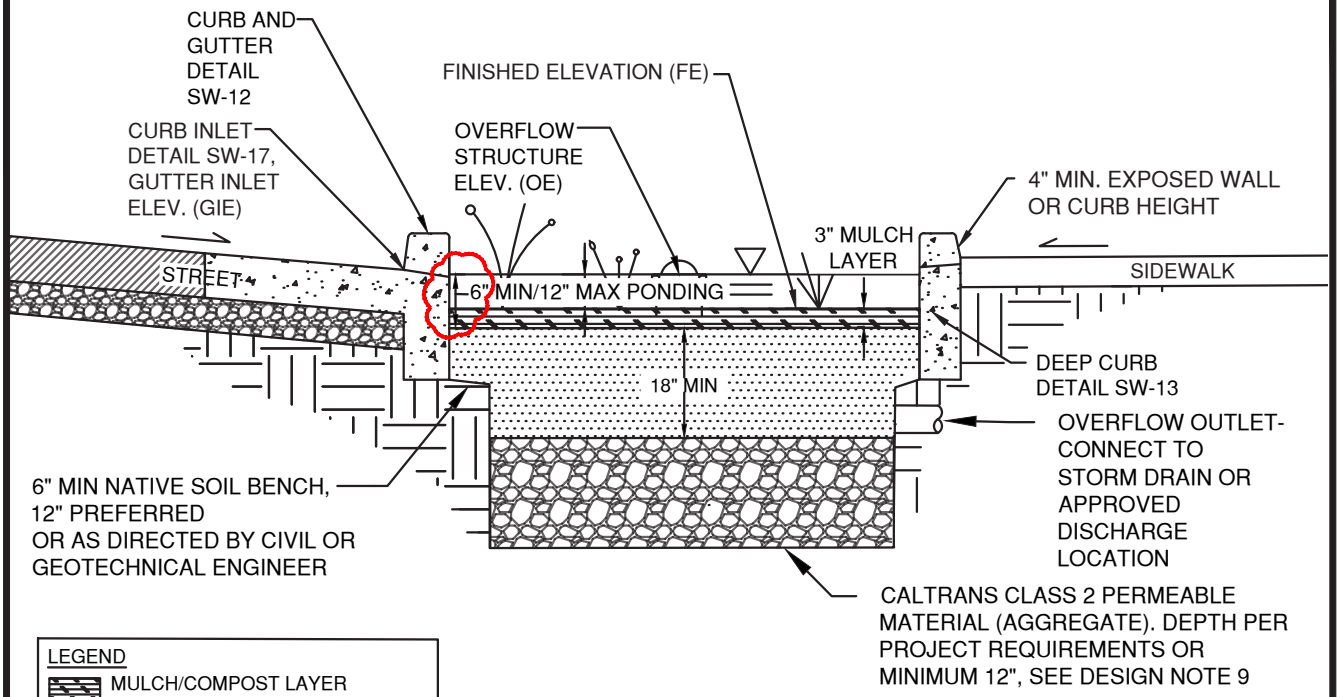
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION PLANTER BOX, NO PARKING, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-4A SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTIONFACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
8. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
9. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
10. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
11. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
14. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
15. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION PLANTER BOX, NO PARKING, WITH UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-4 SHEET 2 OF 2



LEGEND

- MULCH/COMPOST LAYER (SEE DESIGN NOTE 12)
- BIORETENTION SOIL MEDIA (BSM)
- AGGREGATE
- NATIVE SOIL
- ASPHALT PAVEMENT
- CONCRETE

CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

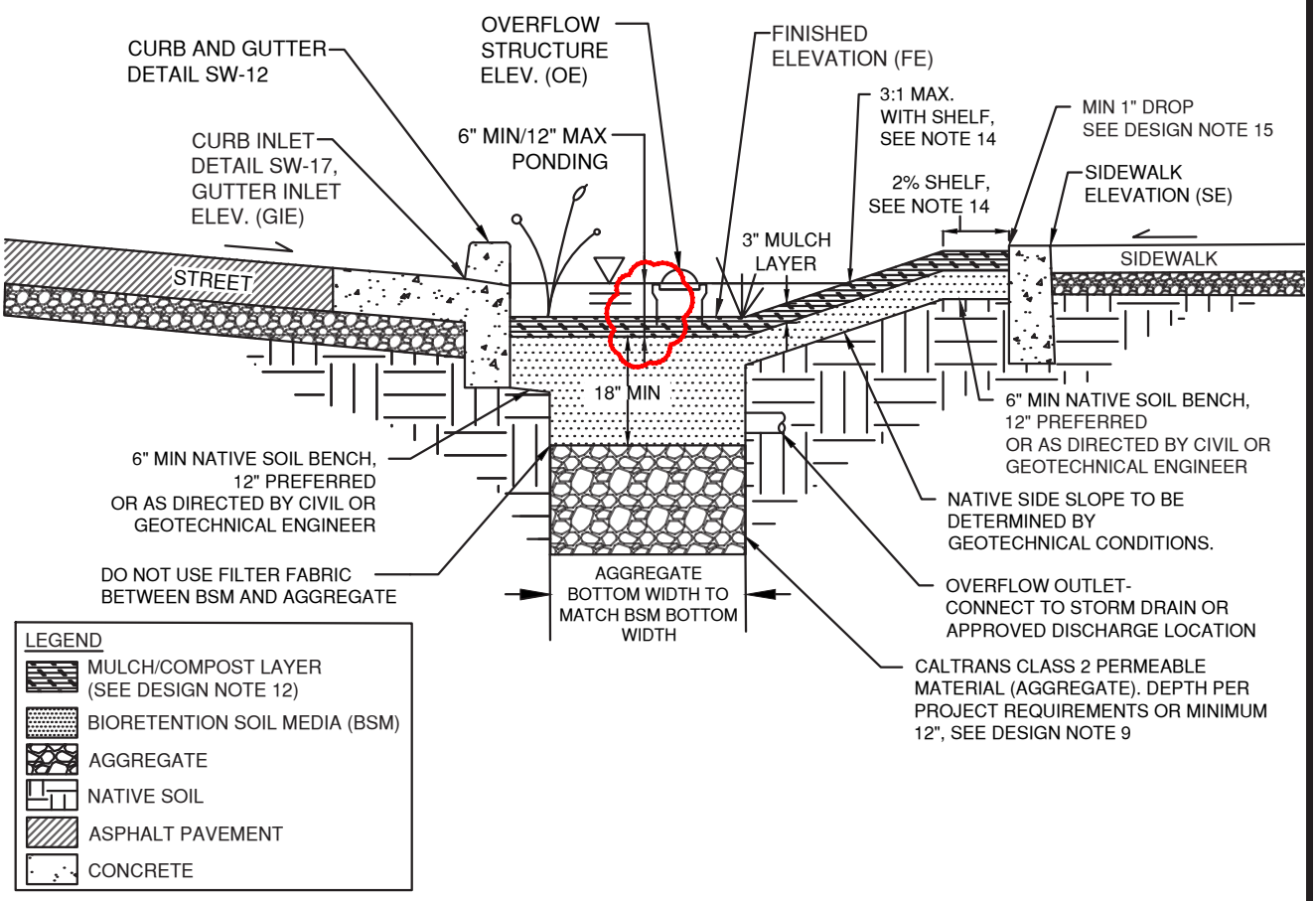
	APPROVED BY:	STREET BIORETENTION PLANTER BOX, NO PARKING, NO UNDERDRAIN	STANDARD PLAN NO. SW-4A
DEVELOPED UNDER PROP. 84 GRANT	VERSION: 08/31/2017	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
9. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
10. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
14. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION PLANTER BOX, NO PARKING, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-4A SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. PLACE BSM IN 6" LIFTS. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

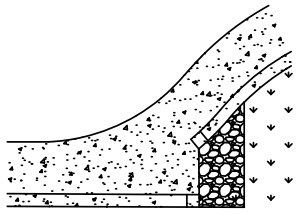
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION BULB OUT, NO PARKING, NO UNDERDRAIN, SINGLE SLOPE USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-5 SHEET 1 OF 2

DESIGN NOTES

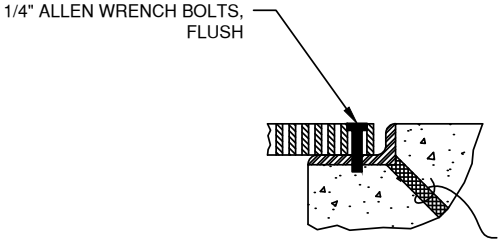
1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
9. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
10. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
14. NATIVE SIDE SLOPE 4:1 (H:V) PREFERRED, 3:1 WITH SHELF. 6" MINIMUM SHELF WITH 2% SLOPE TOWARDS FACILITY ADJACENT TO PEDESTRIAN USE OR CURB UNLESS 4:1 SLOPE PROVIDED.
15. INCLUDE AT LEAST 1" DROP FROM CURB ABOVE MULCH LAYER.
16. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

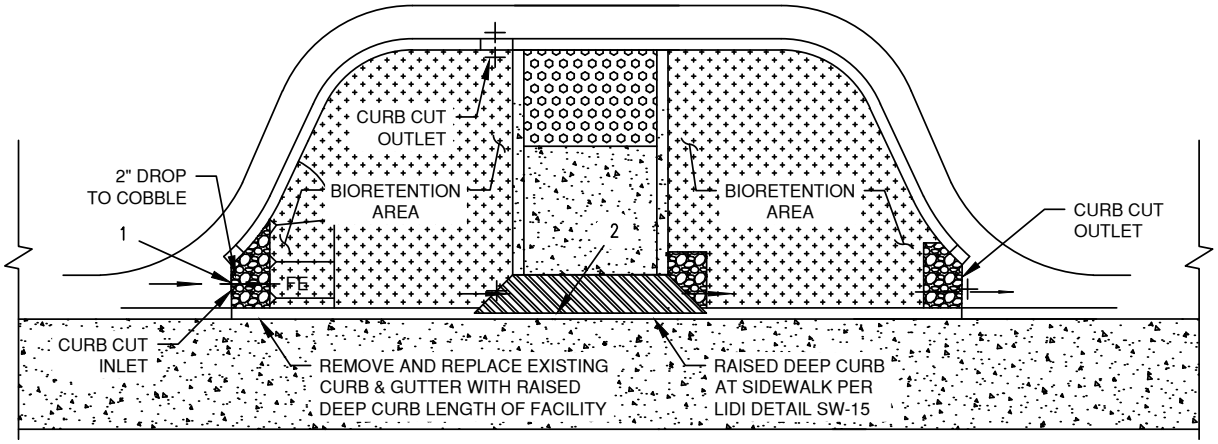
CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION BULB OUT, NO PARKING, NO UNDERDRAIN, SINGLE SLOPE USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-5 SHEET 2 OF 2



CURB CUT INLET 1



GRATE & FRAME 2



CONSTRUCTION NOTES:

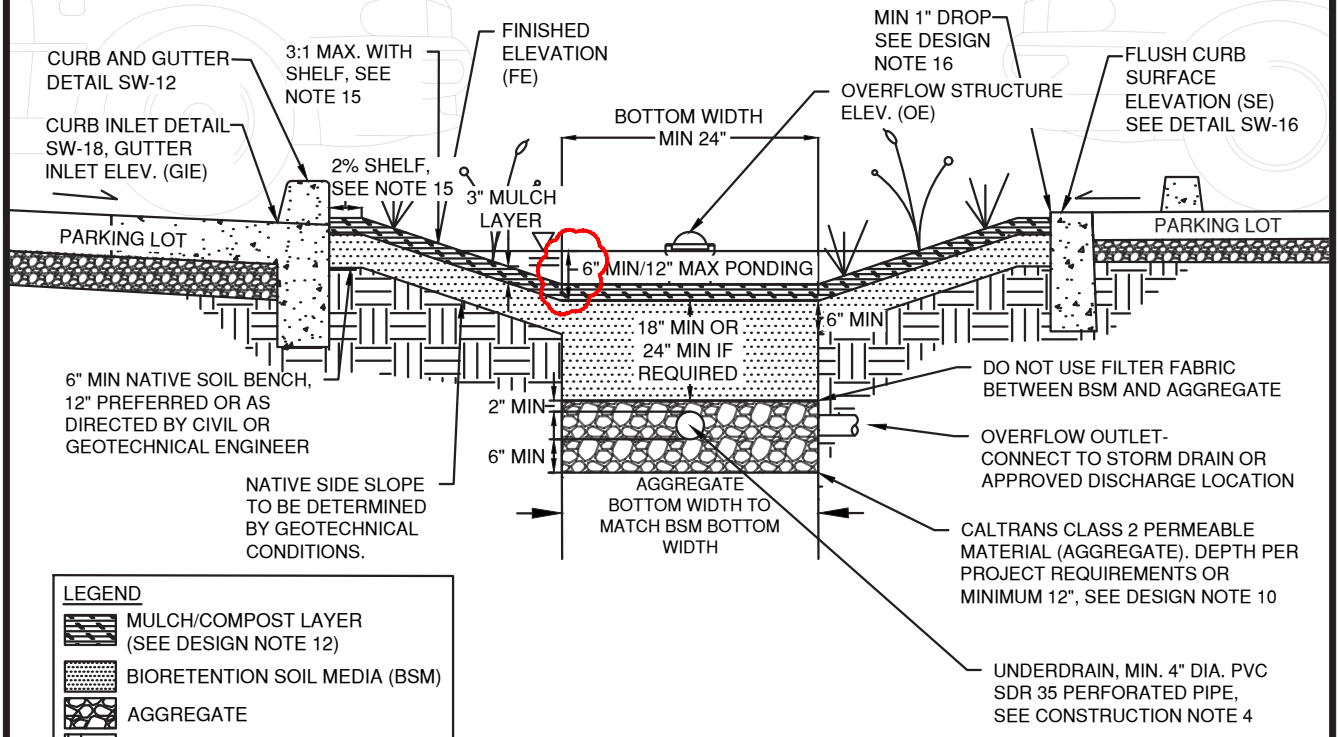
1. INSTALL GRAVEL BAGS AT CURB CUTS TO BLOCK FLOW FROM ENTERING BIORETENTION AREA. CITY TO REMOVE GRAVEL BAGS AT A TIME FOLLOWING CONSTRUCTION COMPLETION.

DESIGN NOTE:

1. THIS STANDARD DETAIL ASSUMES GRADUAL LONGITUDINAL AND CROSS SLOPES OF THE ROADWAY. STEEPER SLOPES IN EITHER DIRECTION WILL IMPACT CONVEYANCE AND ELEVATION DIFFERENCES BETWEEN THE FACILITY AND ADJACENT ROADWAY, CURB, AND SIDEWALK SURFACES. RETROFIT PROJECTS WILL FACE GREATER CONSTRAINTS THAN NEW CONSTRUCTION. SITE SPECIFIC DESIGN IS CRITICAL TO AVOID GRADE CONFLICTS AND MAXIMIZING PONDING AREA. GRADING PLANS THAT PROVIDE SPOT ELEVATIONS ACROSS THE ENTIRE FACILITY AND ALONG ADJACENT SURFACES ARE NECESSARY.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	STREET BIORETENTION BULB OUT, MID BLOCK CROSSING USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-5.1 SHEET 1 OF 1



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. PLACE BSM IN 6" LIFTS. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
8. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

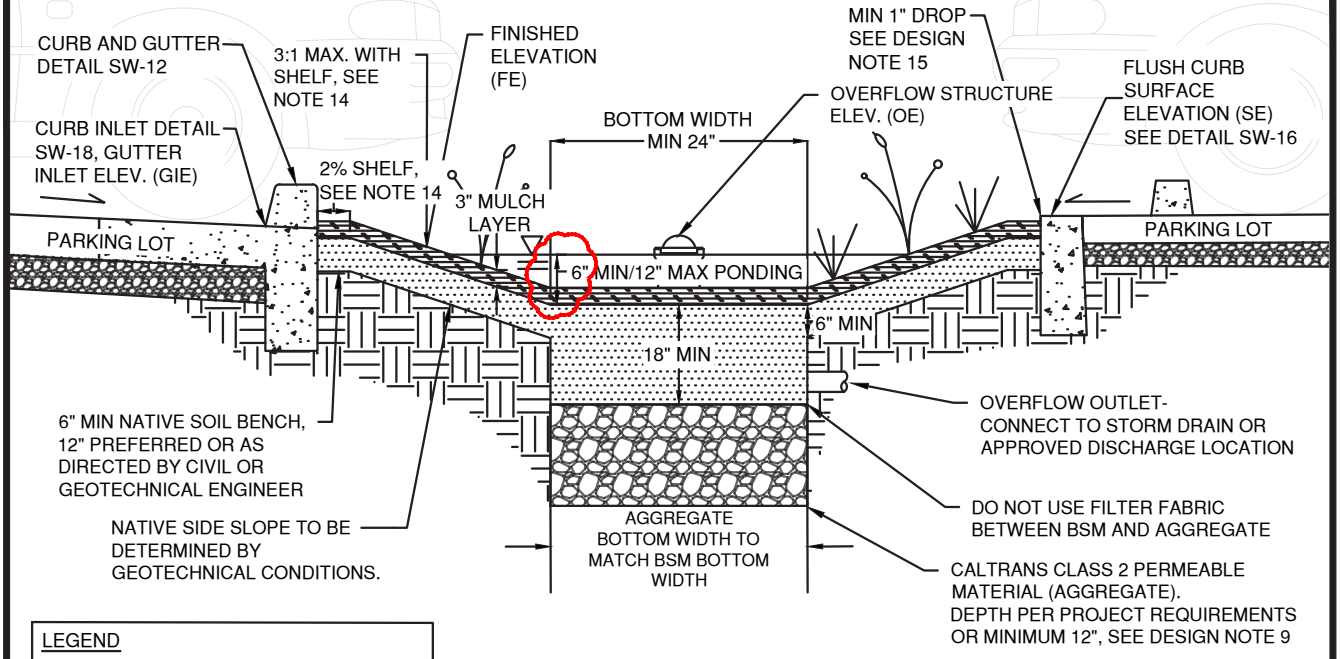
LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PARKING LOT SLOPE-SIDED BIORETENTION, WITH UNDERDRAIN	STANDARD PLAN NO. SW-6
		USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
8. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
9. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
10. DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO.4) OPEN-GRADED AGGREGATE.
11. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
14. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
15. NATIVE SIDE SLOPE 4:1 (H:V) PREFERRED, 3:1 WITH BENCH. 6" MINIMUM SHELF WITH 2% SLOPE TOWARDS FACILITY ADJACENT TO PEDESTRIAN USE OR CURB UNLESS 4:1 SLOPE PROVIDED.
16. INCLUDE AT LEAST 1" DROP FROM CURB ABOVE MULCH LAYER.
17. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PARKING LOT SLOPE-SIDED BIORETENTION, WITH UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-6 SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. PLACE BSM IN 6" LIFTS. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

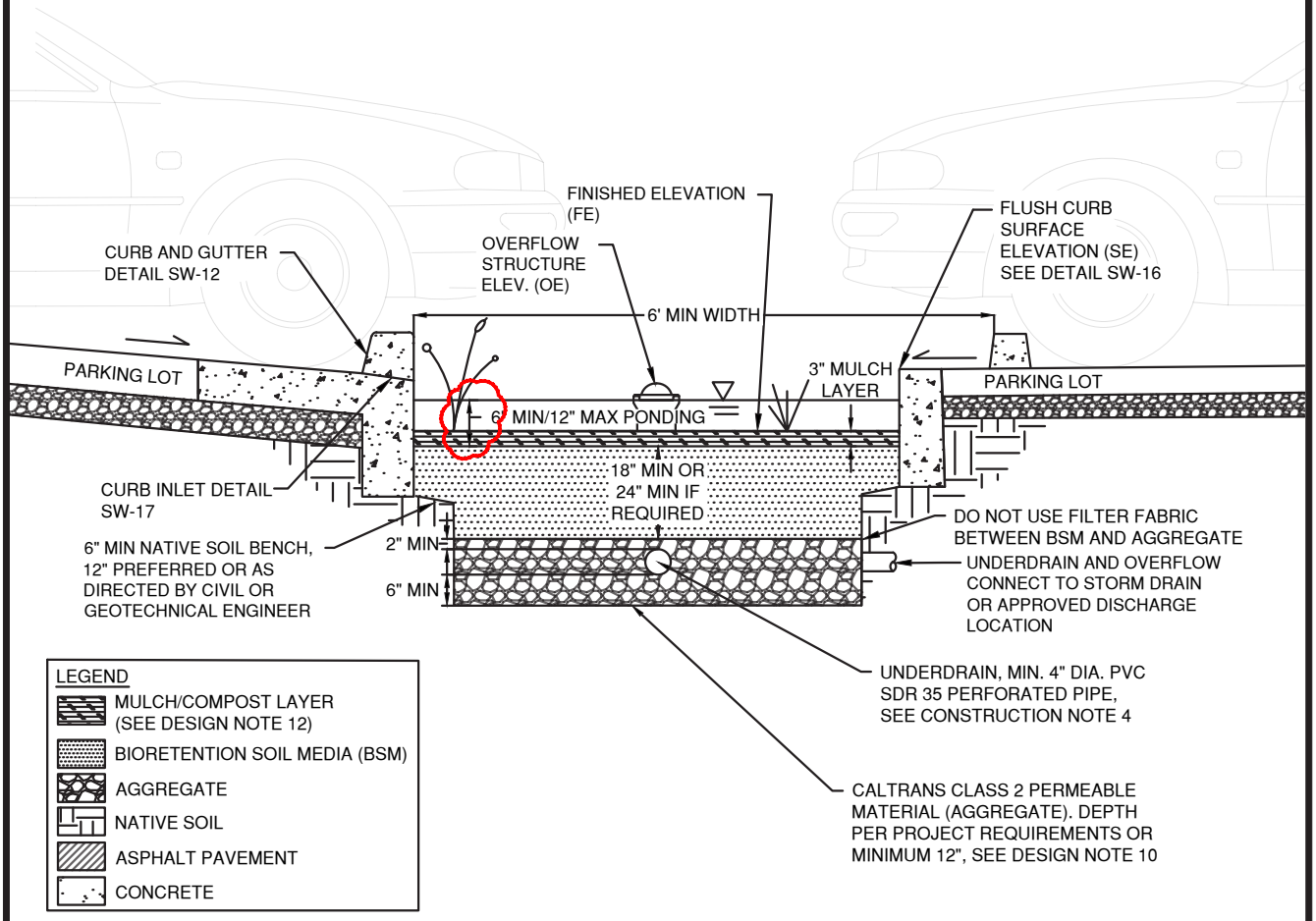
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PARKING LOT SLOPE-SIDED BIORETENTION, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-6A SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURE ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
9. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
10. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
14. NATIVE SIDE SLOPE 4:1 (H:V) PREFERRED, 3:1 WITH SHELF. 6" MINIMUM SHELF WITH 2% SLOPE TOWARDS FACILITY ADJACENT TO PEDESTRIAN USE OR CURB UNLESS 4:1 SLOPE PROVIDED.
15. INCLUDE AT LEAST 1" DROP FROM CURB ABOVE MULCH LAYER.
16. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PARKING LOT SLOPE-SIDED BIORETENTION, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-6A SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
8. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

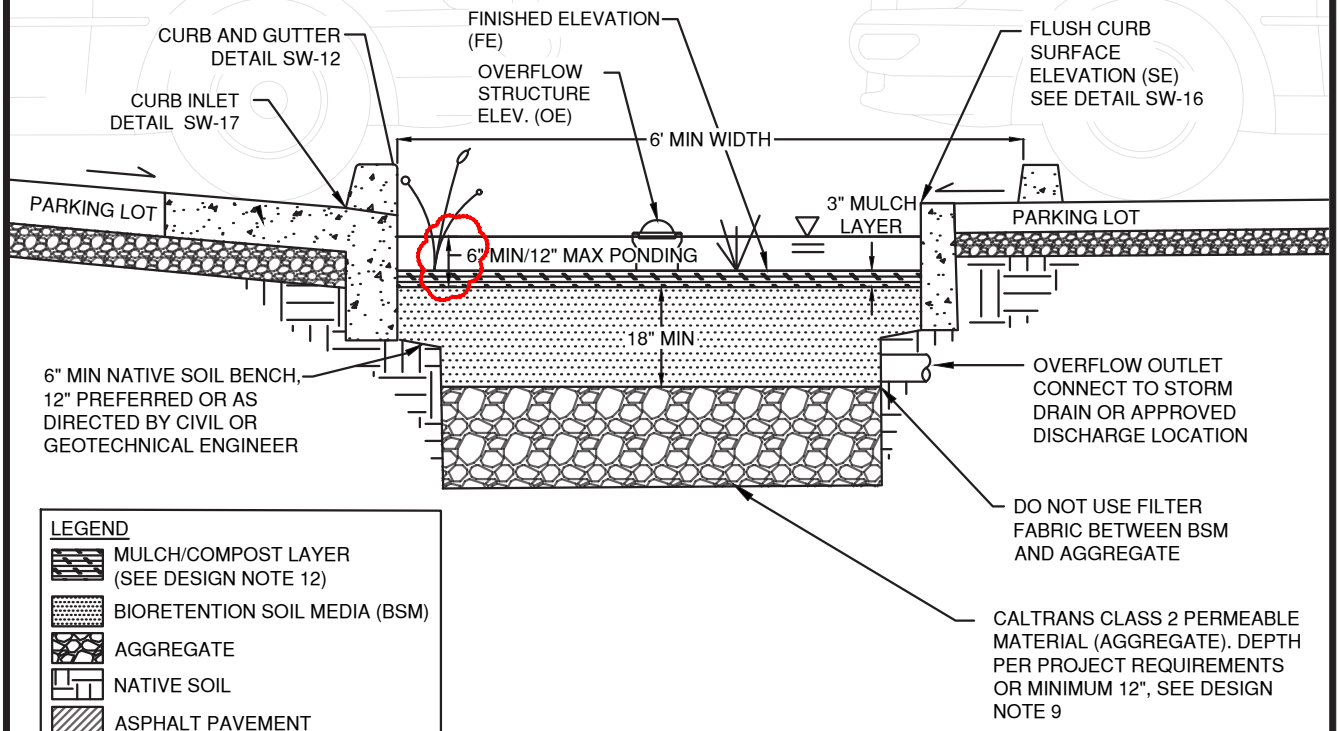
LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PARKING LOT BIORETENTION PLANTER BOX, WITH UNDERDRAIN	STANDARD PLAN NO. SW-7
		USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
8. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
9. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
10. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
11. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
14. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
15. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PARKING LOT BIORETENTION PLANTER BOX, WITH UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-7 SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND SOIL.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIORETENTION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

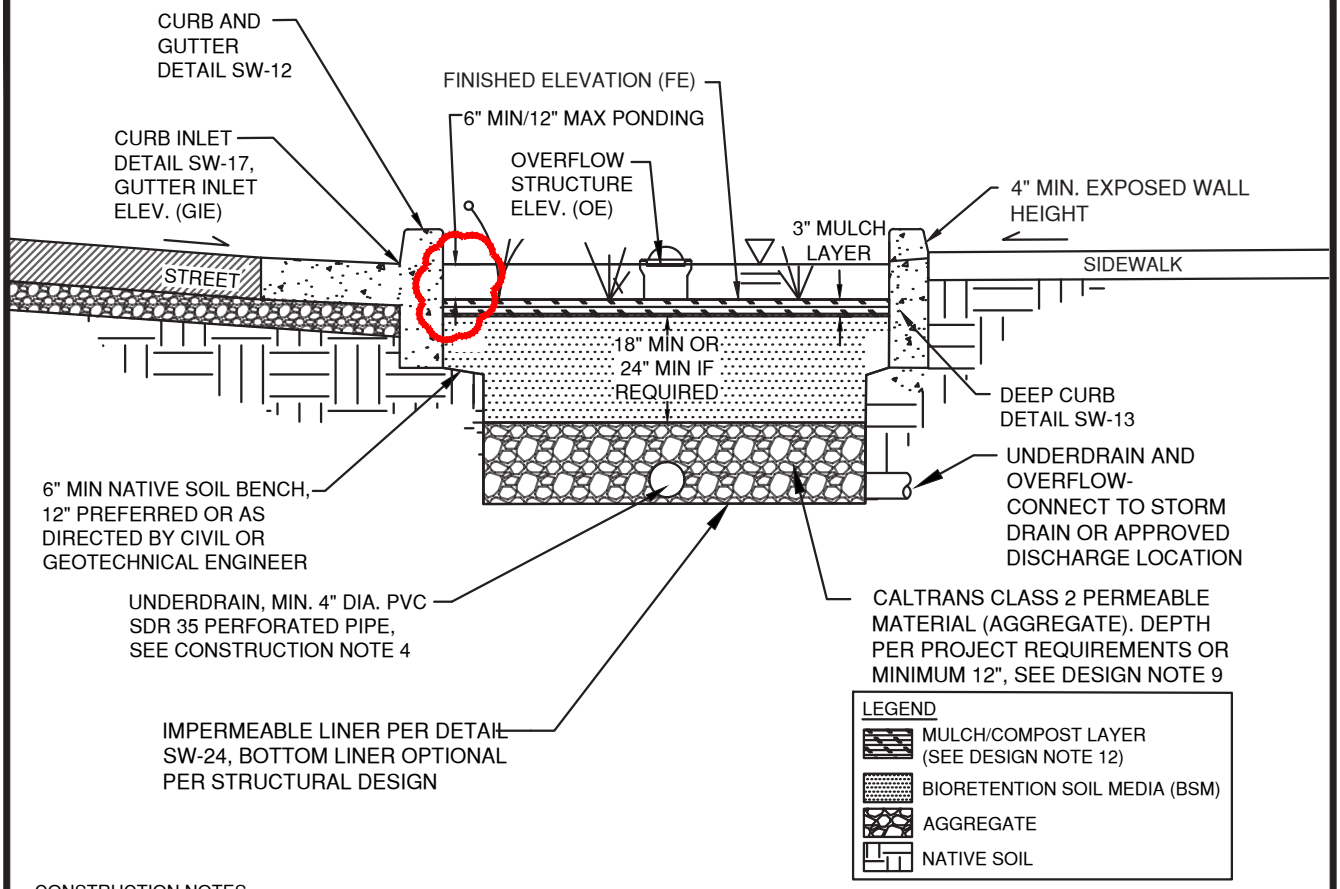
	APPROVED BY:	PARKING LOT BIORETENTION PLANTER BOX, NO UNDERDRAIN	STANDARD PLAN NO. SW-7A
DEVELOPED UNDER PROP. 84 GRANT	VERSION: 08/31/2017	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 2

DESIGN NOTES

1. BIORETENTION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE, OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIORETENTION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. A VERTICAL LINER MAY BE USED FOR BIORETENTION FACILITIES TO PREVENT LATERAL FLOW AND TO SEPARATE THE NATIVE SOIL FROM THE BSM AND THE AGGREGATE, HOWEVER A HORIZONTAL LINER SHALL NOT BE USED.
6. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
7. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
9. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
10. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
14. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PARKING LOT BIORETENTION PLANTER BOX, NO UNDERDRAIN USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-7A SHEET 2 OF 2



CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIOFILTRATION AREA FOR AGGREGATE AND BSM.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, BSM, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
5. DO NOT WORK WITHIN BIOFILTRATION AREA DURING RAIN OR UNDER WET CONDITIONS.
6. KEEP HEAVY MACHINERY OUTSIDE BIOFILTRATION AREA LIMITS.
7. STORMWATER SHOULD BE DIRECTED AWAY FROM BIOFILTRATION UNTIL CONSTRUCTION IS COMPLETE AND DRAINAGE AREA VEGETATION IS STABILIZED.

NOTE: **VTA CHANGED THE DEPTH OF PONDING TO REFLECT CASQA'S RECOMMENDATIONS FOUND IN THE DOCUMENT, "TECHNICAL MEMORANDUM #1 BIORETENTION DETAILS AND STANDARDS REVIEW."**

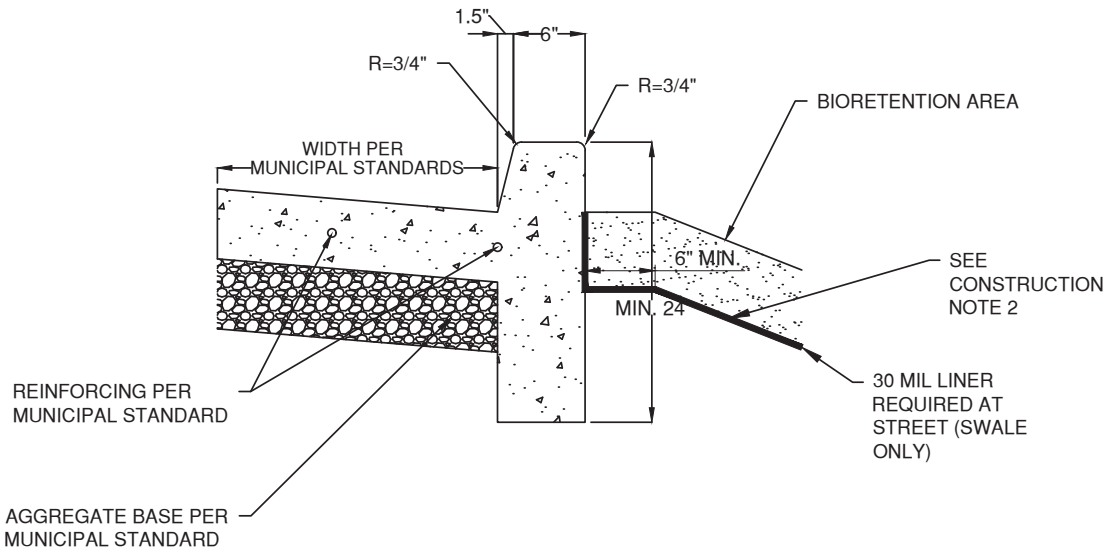
LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	BIOFILTRATION PLANTER BOX, NO PARKING USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-9 SHEET 1 OF 2

DESIGN NOTES

1. BIOFILTRATION FACILITY DESIGN SHOULD OPTIMIZE THE FLAT BOTTOM DIMENSIONS (I.E., WIDTH, LENGTH) TO MAXIMIZE THE FUNCTIONAL AREA OF THE FACILITY.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM (DETAIL SW-22, SW-23). ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS AND OVERFLOW STRUCTURES ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL SW-18.
4. DUE TO SITE VARIABILITY, TO ENSURE THE LONG-TERM STRUCTURAL STABILITY OF THE BIOFILTRATION FACILITY AND ANY ADJACENT INFRASTRUCTURE CONSULT WITH A GEOTECHNICAL ENGINEER.
5. DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE.
6. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
7. PROVIDE A CLEAN-OUT/OBSERVATION PORT IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS SW-20, SW-21)
9. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO. 4) OPEN-GRADED AGGREGATE.
10. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
13. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS.
14. AVOID DECORATIVE USE OF COBBLE THAT CAN INTERFERE WITH WITH INFILTRATION.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY:	BIOFILTRATION PLANTER BOX, NO PARKING	STANDARD PLAN NO. SW-9
	VERSION: 08/31/2017	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 2 OF 2



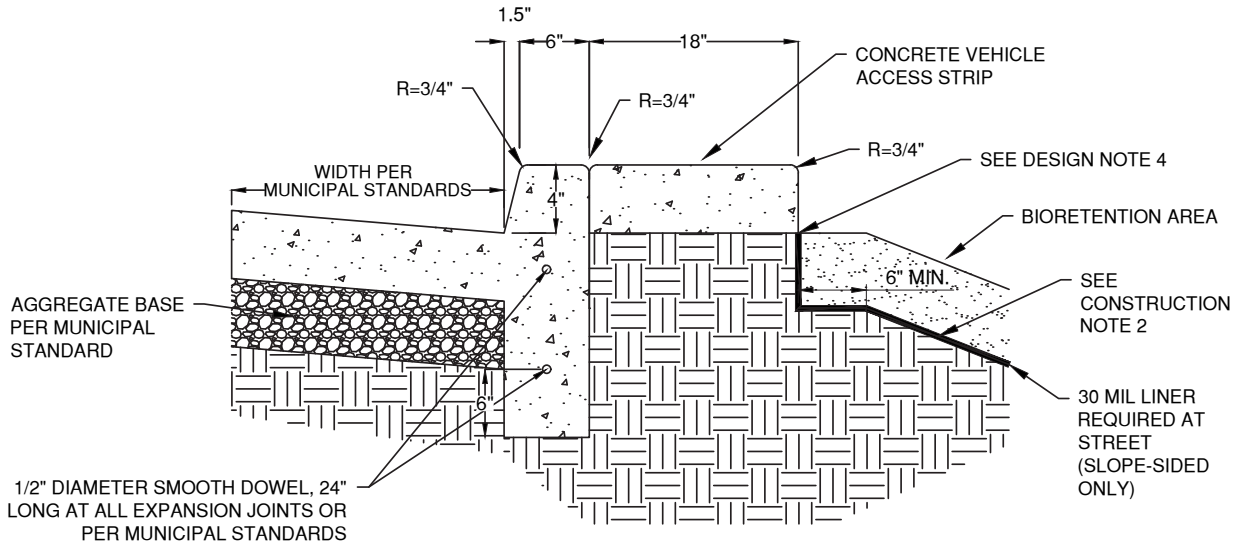
DESIGN NOTES

1. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER PLANTER WALL SPANS. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.
2. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, GUTTER, AND WALL DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS SUBJECT TO APPROVAL BY CITY ENGINEER.
3. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.
4. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.
2. LAYBACK SLOPE AS FLAT AS POSSIBLE UNTIL TOP WIDTH PRODUCES 1:1 SLOPE & 24" BOTTOM WIDTH. AS PLANTER GETS WIDER MAINTAIN 1:1 SLOPE AND INCREASE BOTTOM WIDTH WIDER THAN 24". ALTERNATIVE TRENCH WALL CONFIGURATIONS MAY BE PROPOSED BY THE PROJECT GEOTECHNICAL ENGINEER (I.E. VERTICAL SHORING, REINFORCED TRENCH SIDEWALL) THAT DO NOT REQUIRE SIDEWALK SUPPORT FROM THE LIGHTLY COMPACTED BSM.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	CURB AND GUTTER USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-12 SHEET 1 OF 1



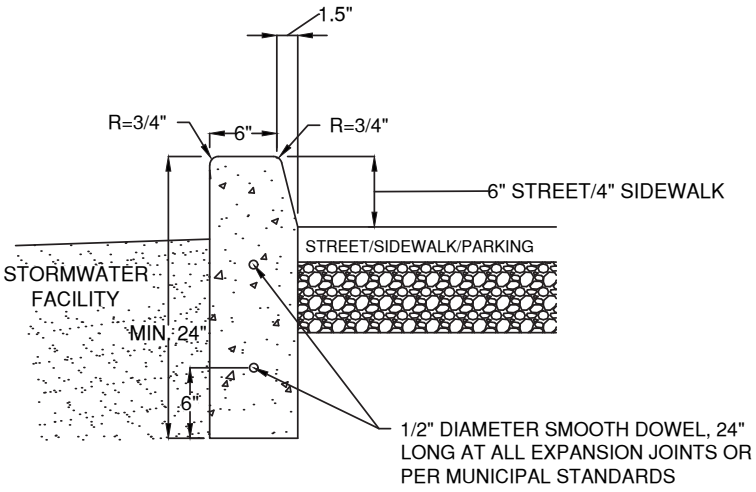
DESIGN NOTES

1. SPECIAL CONCRETE AND EXPANSION JOINS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.
2. PROVIDE OPENINGS IN CURB (12" WIDE) TO ALLOW FOR SURFACE DRAINAGE TO BIORETENTION AREAS IF DEDICATED INLET NOT USED. SPACING TO BE DETERMINED BY PROJECT ENGINEER BASED ON DESIGN STORM TO MINIMIZE PONDING AGAINST CURB FOR MEDIAN ISLAND APPLICATION.
3. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.
4. SEE REFERENCE DETAIL SW-24 FOR ATTACHMENT OF IMPERVIOUS LINER.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.
2. LAYBACK SLOPE AS FLAT AS POSSIBLE UNTIL TOP WIDTH PRODUCES 1:1 SLOPE & 24" BOTTOM WIDTH. AS PLANTER GETS WIDER MAINTAIN 1:1 SLOPE AND INCREASE BOTTOM WIDTH WIDER THAN 24". ALTERNATIVE TRENCH WALL CONFIGURATIONS MAY BE PROPOSED BY THE PROJECT GEOTECHNICAL ENGINEER (I.E. VERTICAL SHORING, REINFORCED TRENCH SIDEWALL) THAT DO NOT REQUIRE SIDEWALK SUPPORT FROM THE LIGHTLY COMPACTED BSM.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	CURB AND GUTTER USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-12A SHEET 1 OF 1



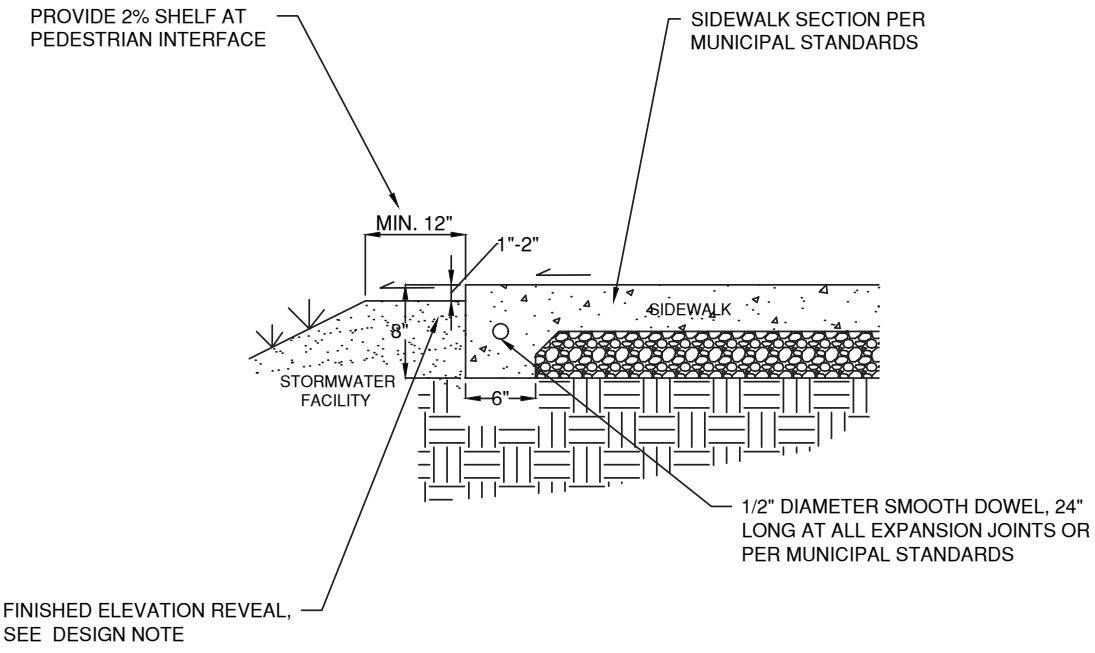
DESIGN NOTES

1. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER SWALE EDGE SPANS. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.
2. WHEN SIDEWALK DRAINS TO PLANTER, PROVIDE 4" - 6" WIDE NOTCH OPENINGS, 1" BELOW SIDEWALK, SLOPED TO FACILITY, PER BIORETENTION PLANTER DETAILS. SPACE OPENINGS TO CONVEY FLOWS. PROVIDE MINIMUM 2" COVER BETWEEN DRAINAGE NOTCH OPENING AND DOWELS.
3. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.
4. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.
2. LAYBACK SLOPE AS FLAT AS POSSIBLE UNTIL TOP WIDTH PRODUCES 1:1 SLOPE & 24" BOTTOM WIDTH. AS PLANTER GETS WIDER MAINTAIN 1:1 SLOPE AND INCREASE BOTTOM WIDTH WIDER THAN 24". ALTERNATIVE TRENCH WALL CONFIGURATIONS MAY BE PROPOSED BY THE PROJECT GEOTECHNICAL ENGINEER (I.E. VERTICAL SHORING, REINFORCED TRENCH SIDEWALL) THAT DO NOT REQUIRE SIDEWALK SUPPORT FROM THE LIGHTLY COMPACTED BSM.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	DEEP CURB USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-13 SHEET 1 OF 1



DESIGN NOTES

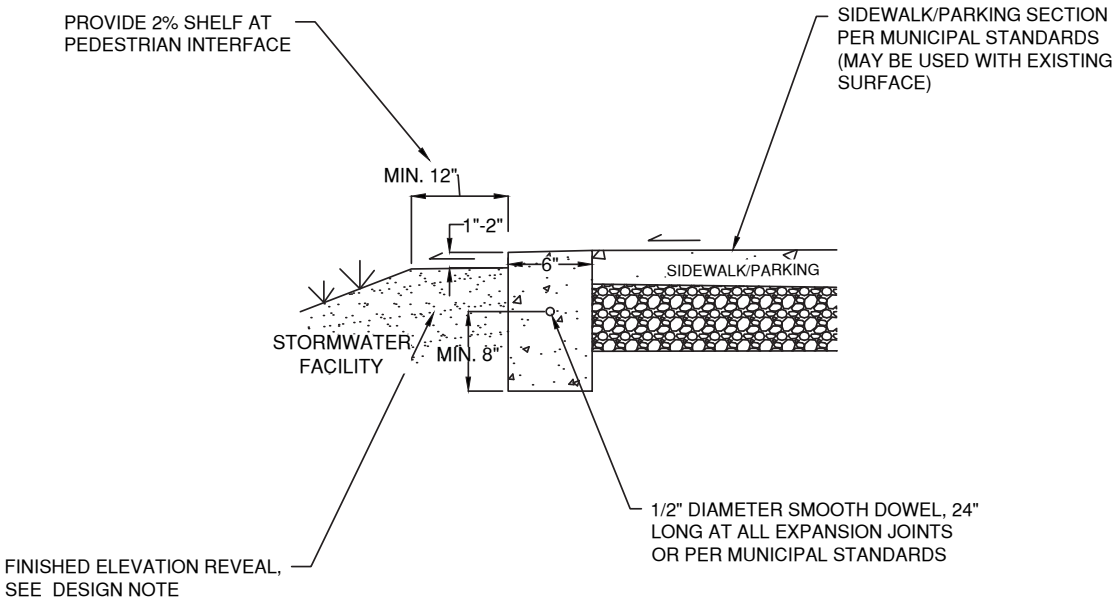
1. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER FACILITY EDGE SPANS. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.
2. FINISHED ELEVATION REVEAL - WHERE SIDEWALK CONVEYS SHEET FLOW TO FACILITY, A 1"-2" REVEAL SHOULD BE MAINTAINED BETWEEN SIDEWALK AND FACILITY FINISHED GRADE TO AVOID MULCH OR PLANT BUILDUP FROM BLOCKING FLOWS.
3. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	THICKENED EDGE SIDEWALK USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-14 SHEET 1 OF 1



DESIGN NOTES

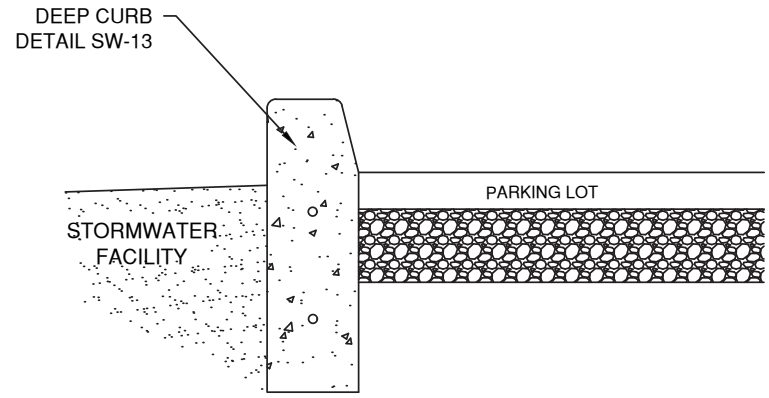
1. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER FACILITY EDGE SPANS. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.
2. EDGE CONDITION WILL VARY FOR PROJECTS. CURB DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS SUBJECT TO APPROVAL BY CITY ENGINEER.
3. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.
4. FINISHED ELEVATION REVEAL AT SIDEWALK - WHERE SIDEWALK CONVEYS SHEET FLOW TO FACILITY, A 1"-2" REVEAL SHOULD BE MAINTAINED BETWEEN SIDEWALK AND FACILITY FINISHED GRADE TO AVOID MULCH OR PLANT BUILDUP FROM BLOCKING FLOWS AND REDUCE DROP AT PEDESTRIAN INTERFACE.

CONSTRUCTION NOTES

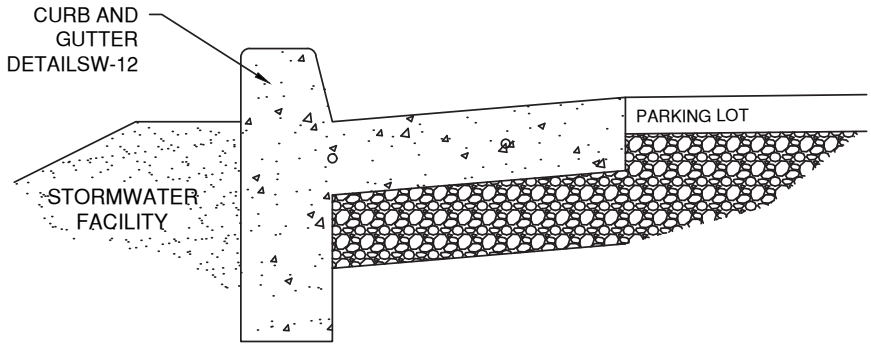
1. FINISH ALL EXPOSED CONCRETE SURFACES.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

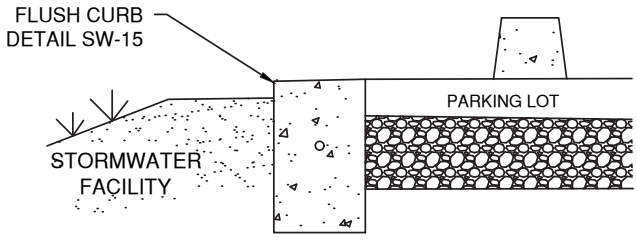
CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	FLUSH CURB AT SIDEWALK USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-15 SHEET 1 OF 1



DEEP CURB



CURB AND GUTTER

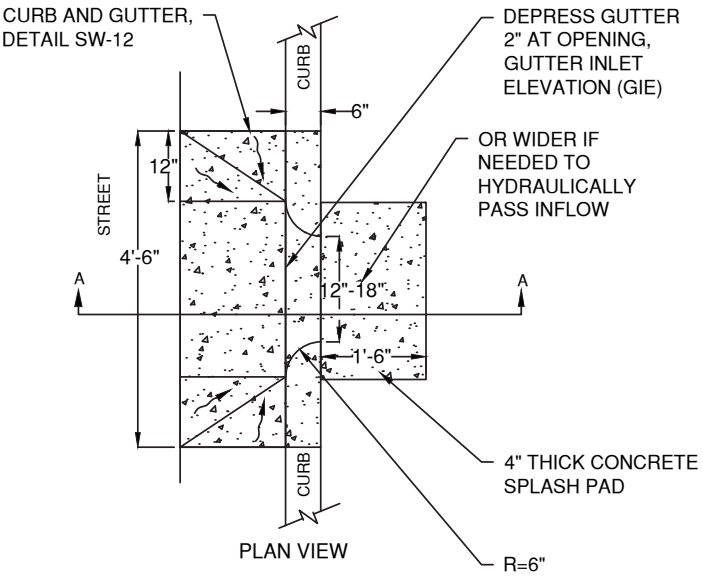


FLUSH EDGE/WHEEL STOPS

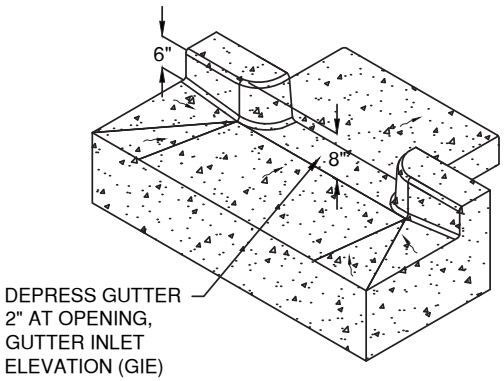
DESIGN NOTES

1. WHEEL STOPS MAY BE USED ON NON-FLUSH DESIGNS TO KEEP CARS FROM OVERHANGING BIORETENTION FACILITY.
2. VEHICLE OVERHANG CAN BE USED TO REDUCE IMPERVIOUS PAVEMENT AREA.
3. WHERE VEHICLE OVERHANG IS UTILIZED SELECT LOW GROWING PLANTS THAT WILL TOLERATE SHADING.

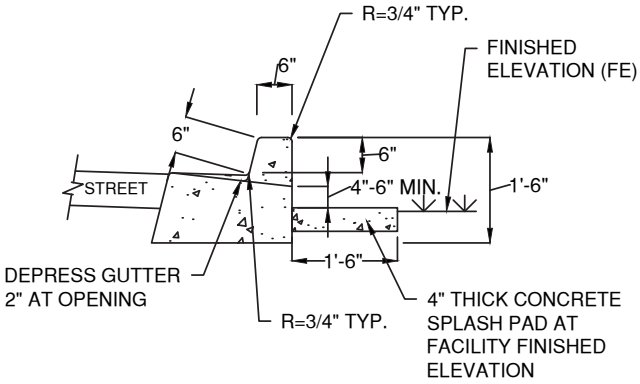
LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PARKING LOT EDGE OPTIONS USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-16 SHEET 1 OF 1



PLAN VIEW



PERSPECTIVE VIEW



SECTION A-A

BIORETENTION DESIGN NOTES

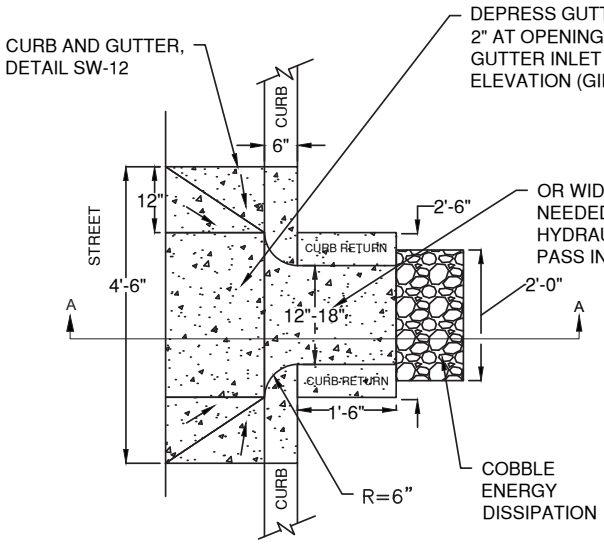
1. FOR USE WITH STORMWATER FACILITIES WITH FLAT BOTTOMS.
2. PROVIDE SPOT ELEVATIONS ON PLANS (FE, OE, GIE, IE). SEE DETAIL SW-2, SW-2A, SW-4 OR SW-4A.
3. CURB AND WALL DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS SUBJECT TO APPROVAL BY CITY ENGINEER.
4. CURB HEIGHT MAY BE REDUCED TO 4-INCHES WHERE ADJACENT TO A SIDEWALK. SEE DETAILS SW-12 & SW-13.

CONSTRUCTION NOTES

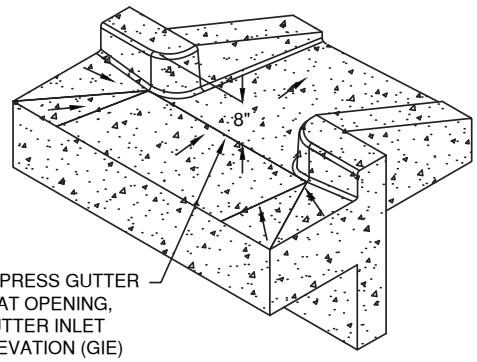
1. AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

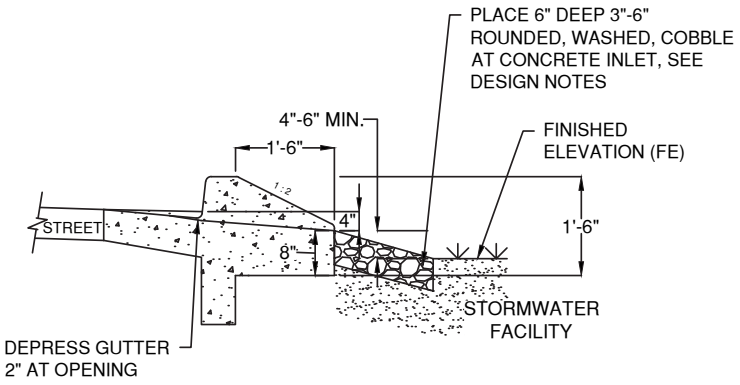
CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	CURB CUT INLET FOR PLANTERS USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-17 SHEET 1 OF 1



PLAN VIEW



PERSPECTIVE VIEW



SECTION A-A

BIORETENTION DESIGN NOTES

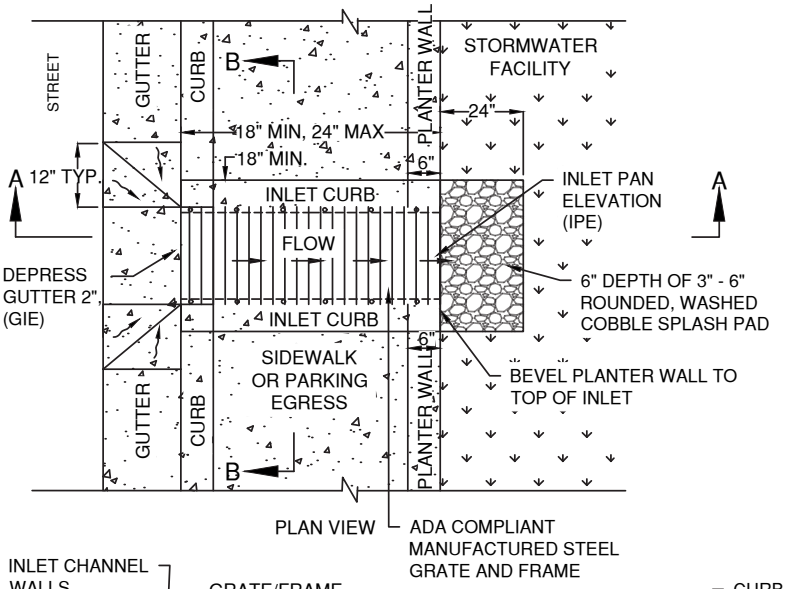
1. FOR USE WITH STORMWATER FACILITIES WITH SIDE SLOPES.
2. PROVIDE SPOT ELEVATIONS ON PLANS (FE, OE, GIE, IE). SEE DETAIL SW-1, SW-1A, SW-3 OR SW-3A.
3. CURB AND WALL DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS SUBJECT TO APPROVAL BY CITY ENGINEER.
4. WHERE INLET FLOW VELOCITY IS HIGH, EXTEND COBBLE INTO FACILITY, BUT AVOID EXCESSIVE USE.
5. CURB HEIGHT MAY BE REDUCED TO 4-INCHES WHERE ADJACENT TO A SIDEWALK. SEE DETAILS SW-12 & SW-13.

CONSTRUCTION NOTES

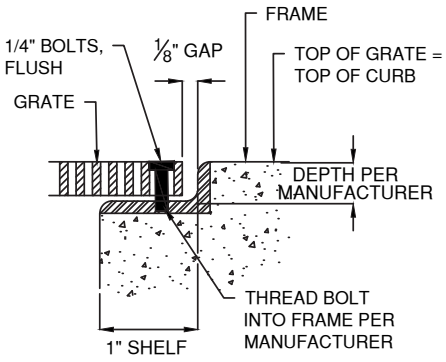
1. AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY:	CURB CUT INLET FOR SLOPE SIDED BIORETENTION SWALE	STANDARD PLAN NO. SW-18
	VERSION: 08/31/2017	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 1

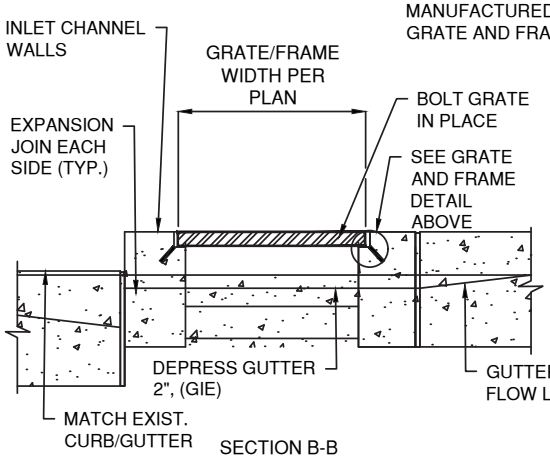


PLAN VIEW

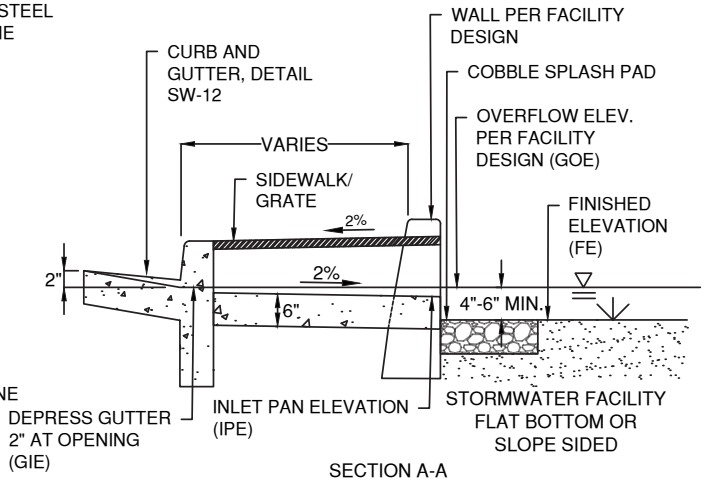


GRATE AND FRAME

ADA COMPLIANT MANUFACTURED STEEL GRATE AND FRAME



SECTION B-B



SECTION A-A

BIORETENTION DESIGN NOTES

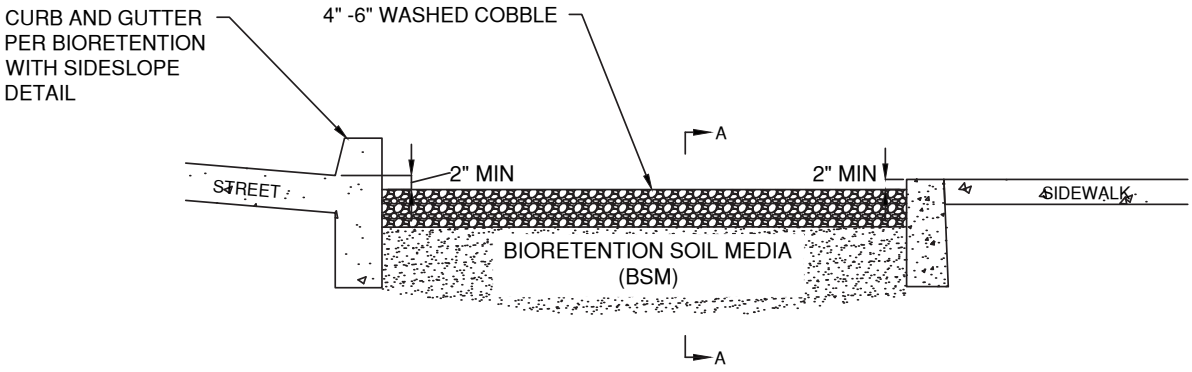
1. FOR USE WITH STORMWATER FACILITIES WITH SLOPED SIDES OR FLAT BOTTOMS.
2. PROVIDE SPOT ELEVATIONS ON PLANS (FE, OE, GIE, IPE). SEE DETAIL SW-2, SW-2A, SW-4 OR SW-4A.
3. REFER TO MUNICIPAL STANDARD DRAWINGS AND MATCH GUTTER PAN OF ADJACENT CURB AND GUTTER.
4. IF SLOPED SIDES, WHERE INLET FLOW VELOCITY IS HIGH, EXTEND COBBLE INTO FACILITY, BUT AVOID EXCESSIVE USE.
5. BASE MATERIAL FOR CURB, GUTTER, AND SIDEWALK PER MUNICIPAL STANDARDS.
6. GRATE AND FRAME SHALL SUPPORT H-20 LOADING (ALHAMBRA FOUNDRY A-1540/A-1551 OR EQUIVALENT).
7. SOLID COVER AND FRAME (ALHAMBRA FOUNDRY A-1430/A-1433 OR EQUIVALENT) MAY BE USED IN PLACE OF GRATE AND FRAME.

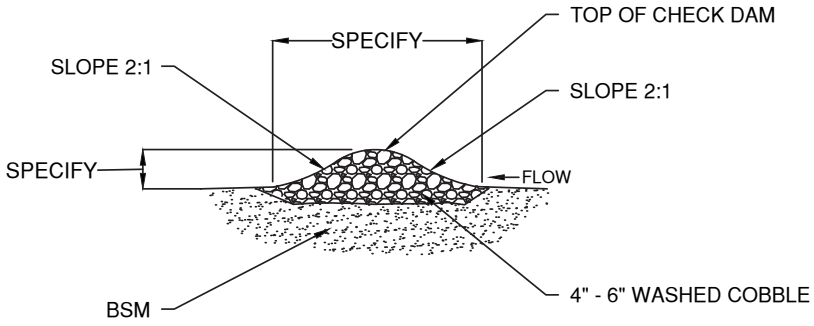
CONSTRUCTION NOTES

1. AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	INLET WITH GRATE USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-19 SHEET 1 OF 1





SECTION A-A

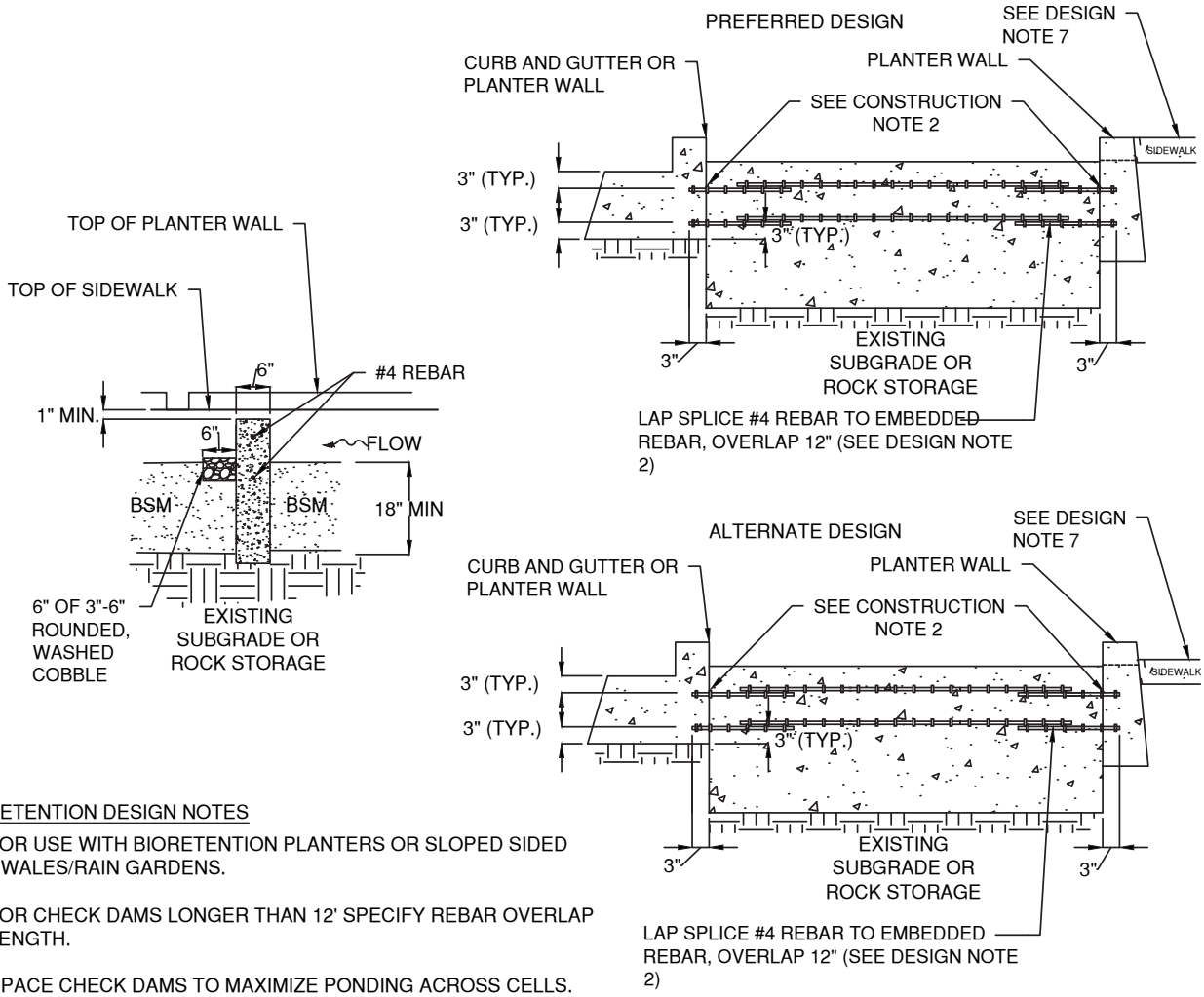
BIORETENTION DESIGN NOTES

1. FOR USE WITH STORMWATER FACILITIES WITH SLOPED SIDES.
2. BEST SUITED FOR FACILITIES WITH <= 2% LONGITUDINAL SLOPE.
3. PROVIDE ELEVATIONS AND STATIONING AND/OR DIMENSIONING FOR CHECK DAMS.
4. SPACE CHECK DAMS TO MAXIMIZE PONDING ACROSS ENTIRE CELL.
5. ENSURE THAT CHECK DAM ELEVATIONS DO NOT CAUSE STORMWATER TO OVERFLOW TO SIDEWALK.

CONSTRUCTION NOTES

1. DO NOT WORK DURING RAIN OR UNDER WET CONDITIONS.
2. KEEP ALL HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	GRAVEL CHECK DAM USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-20 SHEET 1 OF 1



BIORETENTION DESIGN NOTES

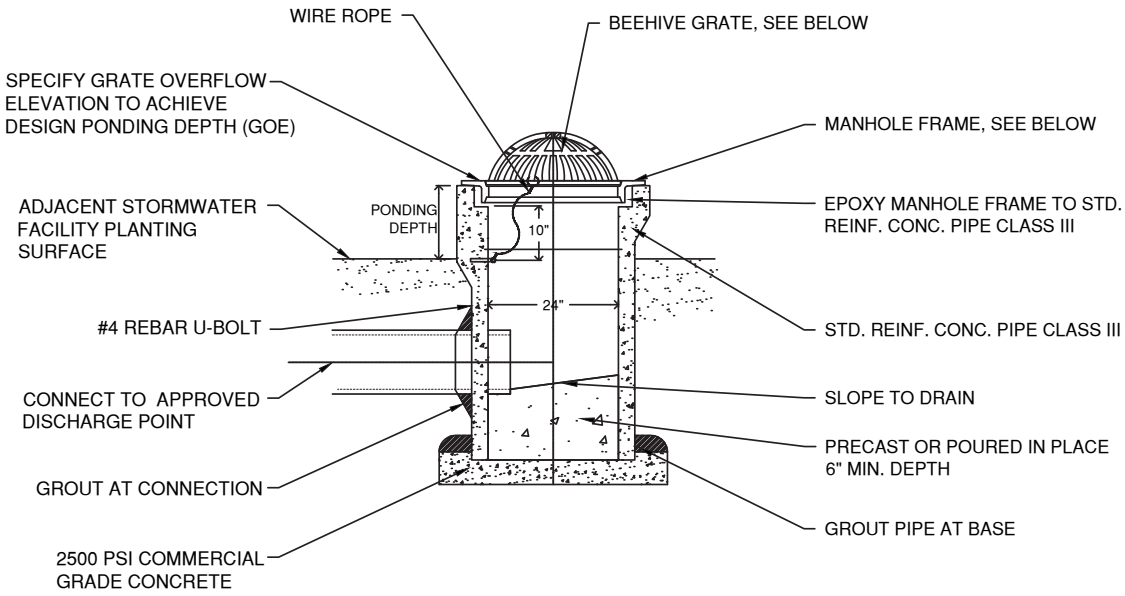
1. FOR USE WITH BIORETENTION PLANTERS OR SLOPED SIDED SWALES/RAIN GARDENS.
2. FOR CHECK DAMS LONGER THAN 12' SPECIFY REBAR OVERLAP LENGTH.
3. SPACE CHECK DAMS TO MAXIMIZE PONDING ACROSS CELLS.
4. PROVIDE ELEVATIONS AND STATIONING AND/OR DIMENSIONING FOR CHECK DAMS.
5. ENSURE THAT CHECK DAM ELEVATIONS DO NOT CAUSE STORMWATER TO OVERFLOW TO SIDEWALK.
6. SHOW PLANTER WALL EMBEDDED IN EXISTING SUBGRADE OR DRAINROCK.
7. PREFERRED DESIGN IS TO CONSTRUCT TOP OF SIDEWALK AT GRADE WITH TOP OF PLANTER WALL TO ALLOW RUNOFF TO SHEETFLOW INTO BIORETENTION PLANTER. IF CURB IS NEEDED, USE ALTERNATE DESIGN AND ENSURE TOP OF CONCRETE CHECK DAM IS A MINIMUM OF 1" BELOW BOTTOM OF CURB NOTCH.

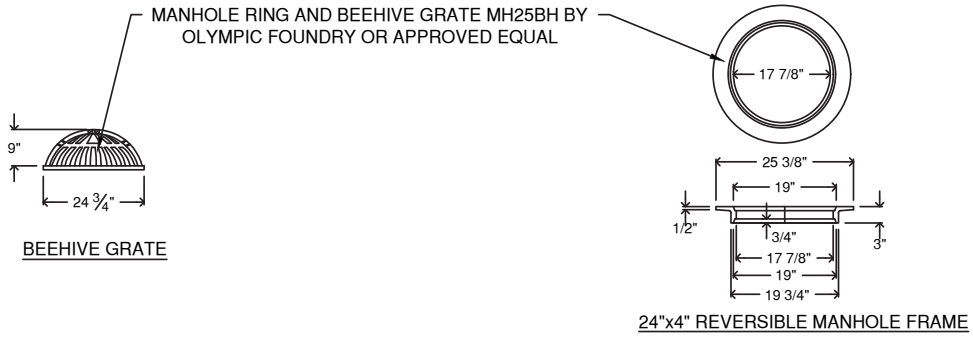
CONSTRUCTION NOTES

1. EMBED #3 REBAR 3" INTO CURB AND PLANTER WALL.
2. DO NOT WORK DURING RAIN OR UNDER WET CONDITIONS.
3. KEEP ALL HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	CONCRETE CHECK DAM USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-21 SHEET 1 OF 1





BEEHIVE GRATE

24"x4" REVERSIBLE MANHOLE FRAME

DESIGN NOTES

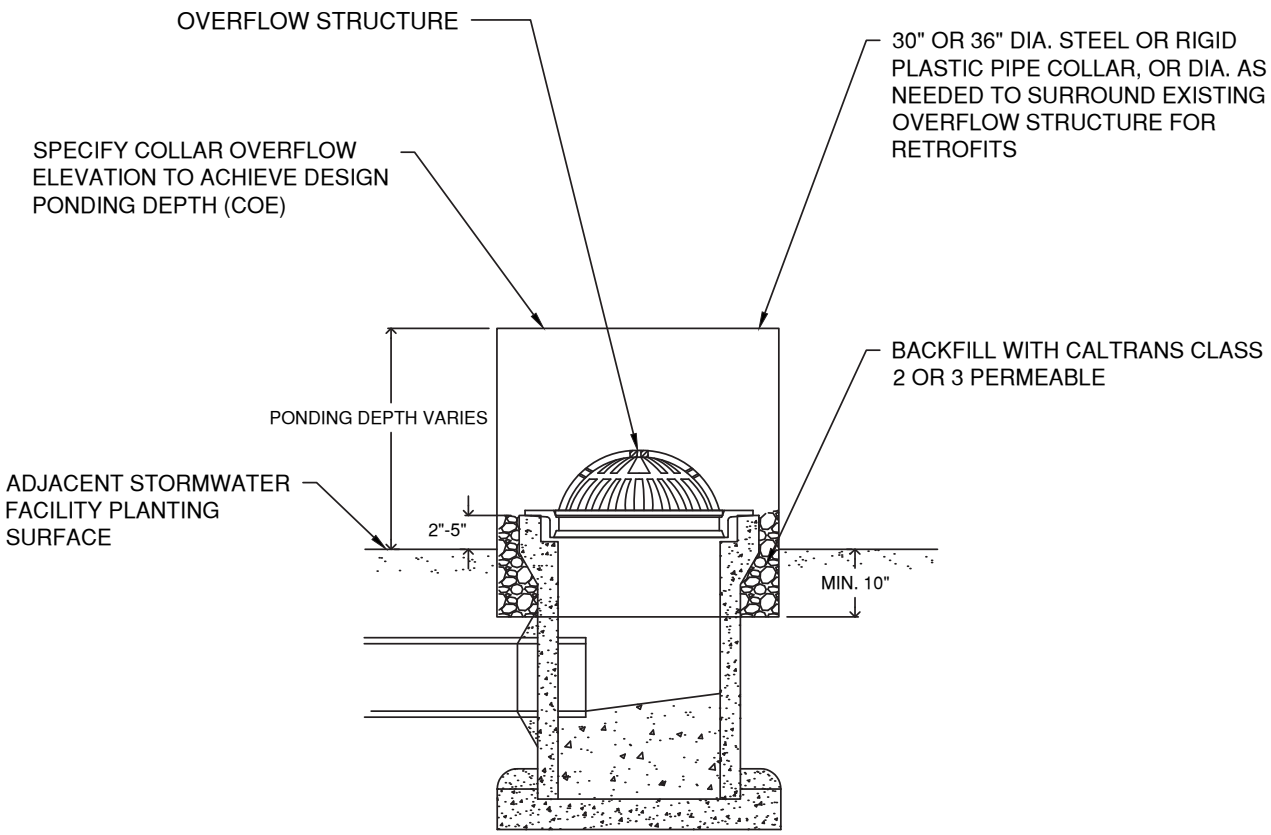
1. PROVIDE GRATE OVERFLOW ELEVATION ON PLANS.
2. TO INCORPORATE FLEXIBILITY INTO DESIGN OVERFLOW ELEVATION OR CORRECT ELEVATION OF AN EXISTING STRUCTURE, INSTALL OVERFLOW COLLAR, PER DETAIL SW-22A.
3. IN PRIVATE SITES NOT IN CITY R/W THE PROJECT CIVIL ENGINEER MAY PROPOSE ALTERNATIVES FOR GRATE INSTALLATIONS USING ALTERNATIVE MANUFACTURER'S PRODUCT/CONFIGURATION.

CONSTRUCTION NOTES

1. DO NOT ADJUST OVERFLOW GRATE ELEVATION, CONSTRUCT AS SHOWN ON PLANS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	OVERFLOW STRUCTURE WITH BEEHIVE GRATE USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-22 SHEET 1 OF 1



DESIGN NOTES

1. MAY BE USED IN CONJUNCTION WITH OVERFLOW STRUCTURES TO ALLOW FOR FIELD ADJUSTMENT OF OVERFLOW ELEVATION, OR AS RETROFIT TO CORRECT EXISTING STRUCTURE THAT DOES NOT ALLOW PONDING TO OCCUR.
2. PROVIDE COLLAR OVERFLOW ELEVATION (COE) ON PLANS.
3. PCC PIPE RISER EXTENSIONS MAY BE UTILIZED IN LIEU OF OVER FLOW STRUCTURE COLLAR.

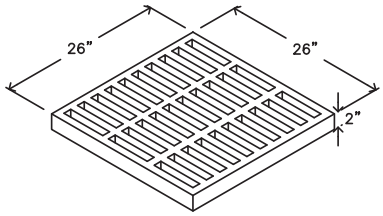
CONSTRUCTION NOTES

1. CENTER COLLAR ON OVERFLOW GRATE.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

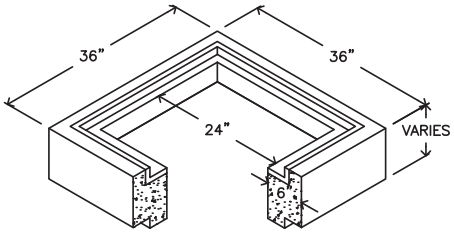
CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY:	OVERFLOW STRUCTURE COLLAR	STANDARD PLAN NO. SW-22A
	VERSION: 08/31/2017	USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	SHEET 1 OF 1

C.I. GRATE

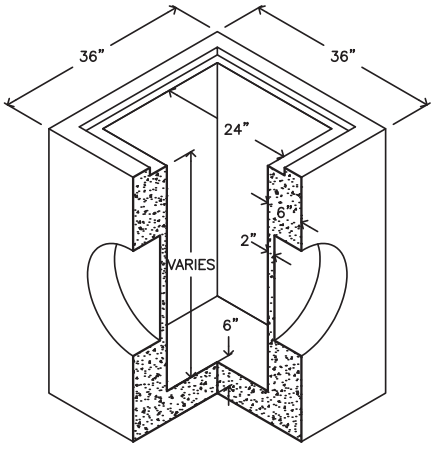


C.I. FRAME

EXTENSION



BOTTOM



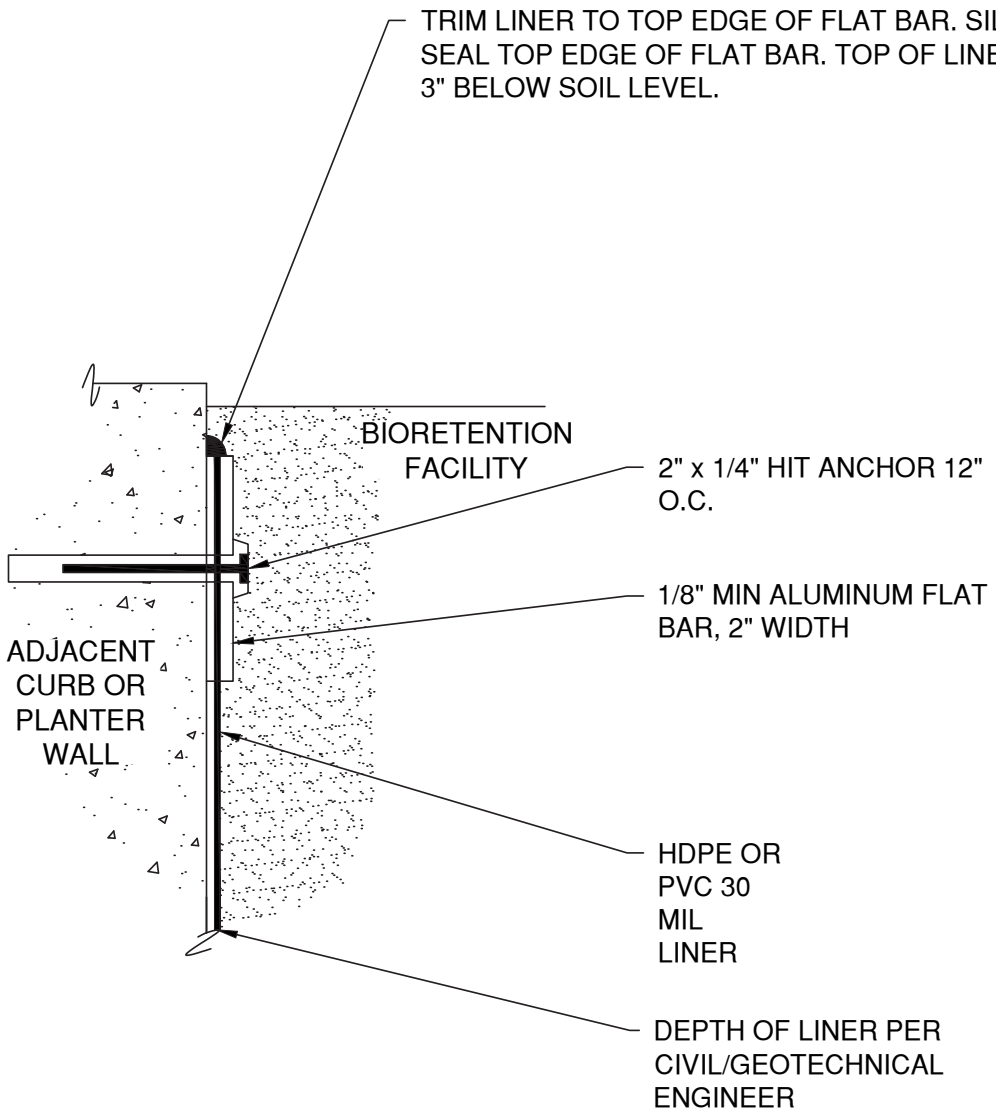
DESIGN NOTES

1. PROVIDE GRATE OVERFLOW ELEVATION ON PLANS.
2. PROVIDE EXTENSION OVERFLOW ELEVATION (COE) ON PLANS.
3. ON PRIVATE SITES NOT IN CITY RIGHT-OF-WAY THE PROJECT CIVIL ENGINEER MAY PROPOSE ALTERNATIVES FOR GRATE INSTALLATIONS USING ALTERNATIVE MANUFACTURER'S PRODUCTION/CONFIGURATION.

CONSTRUCTION NOTES

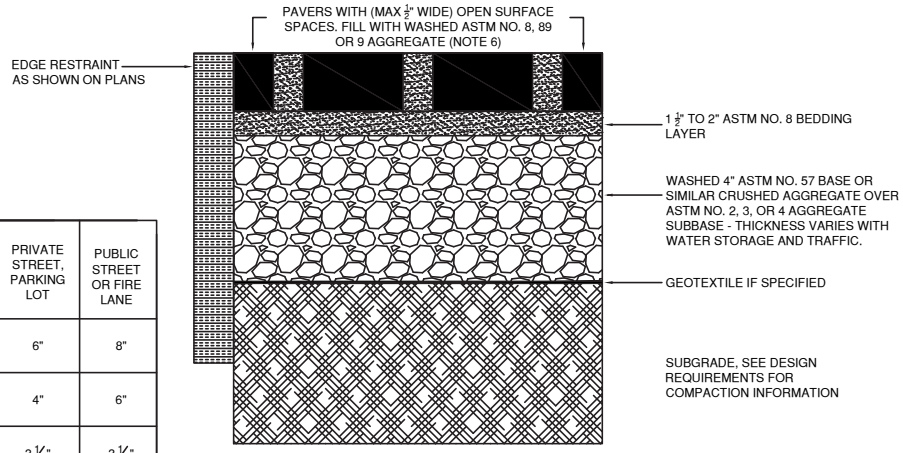
1. DO NOT ADJUST OVERFLOW GRATE ELEVATION, CONSTRUCT AS SHOWN ON PLANS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS			
CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	OVERFLOW STRUCTURE WITH SQUARE GRATE USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-23 SHEET 1 OF 1

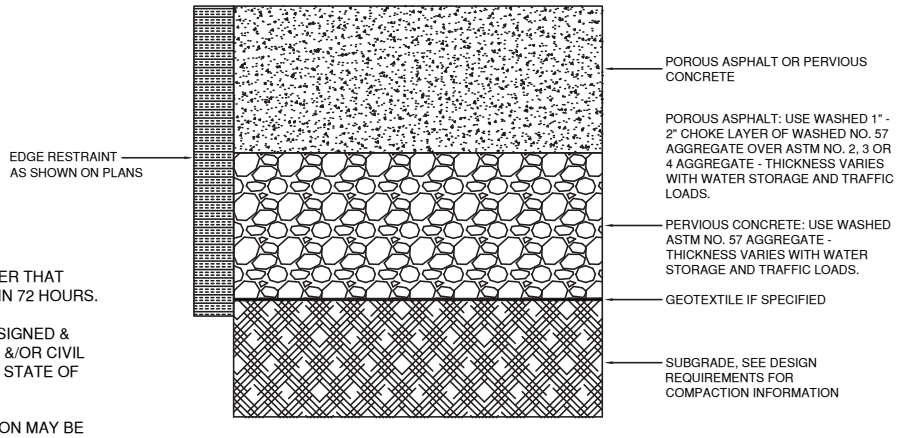


LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	IMPERMEABLE LINER CONNECTION USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-24 SHEET 1 OF 1



	RESIDENTIAL DRIVEWAY OR PEDESTRIAN ONLY	PRIVATE STREET, PARKING LOT	PUBLIC STREET OR FIRE LANE
PERVIOUS CONCRETE	4"	6"	8"
POROUS ASPHALT	3"	4"	6"
PERMEABLE INTERLOCKING PAVERS	2 ⅜"	3 ⅛"	3 ⅛"
ENGINEERING REQ'D	NO	YES	YES
COMPACTION REQ'D	NO	YES	95%



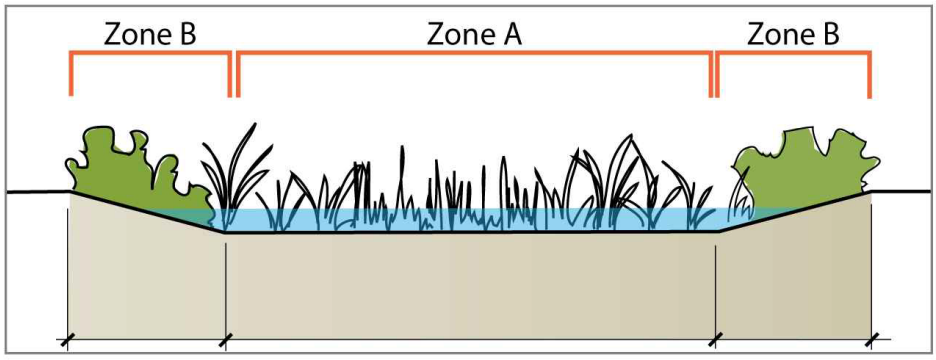
NOTES:

1. UNDERDRAIN TO REMOVE WATER THAT CANNOT BE INFILTRATED WITHIN 72 HOURS.
2. DESIGNS PROVIDED SHALL BE SIGNED & STAMPED BY A GEOTECHNICAL &/OR CIVIL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA.
3. GEOTEXTILE USE AND SELECTION MAY BE DETERMINED BY A GEOTECHNICAL ENGINEER PER AASHTO M-288.
4. UNDERDRAIN AND ORIFICE CONFIGURATION SHALL BE BASED ON ENGINEERED DESIGN.

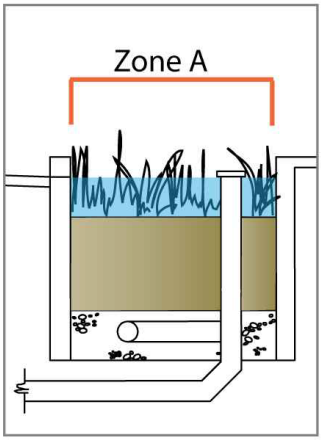
LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PERVIOUS PAVEMENT USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-25 SHEET 1 OF 1

Varying slope and ponding levels: Varying slope and ponding levels: This bioretention planting area has sloped edges. Plants in the bottom area will be inundated during storms (**Zone A**). Those planted on the sideslopes are above the level of ponding, but will experience seasonally wet conditions (**Zone B**).

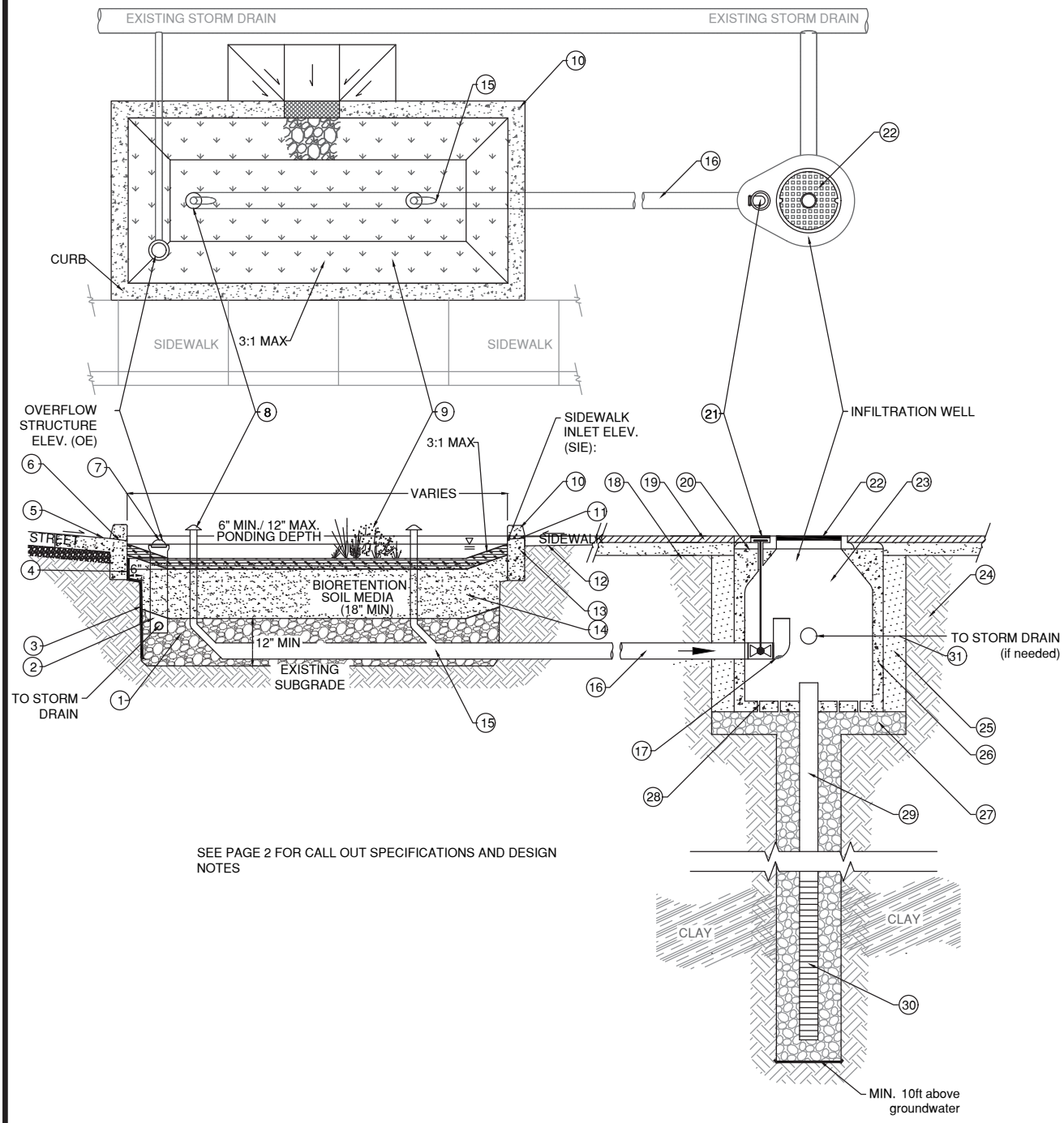


Uniform surface grade: This stormwater planter has a flat bottom with consistent depth of ponding across the structure. All of the plants selected for this design must be tolerant of periodic inundation (**Zone A**).



LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	PLANTING INUNDATION ZONES USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-26 SHEET 1 OF 4



SEE PAGE 2 FOR CALL OUT SPECIFICATIONS AND DESIGN NOTES

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA / central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	DRYWELL STORMWATER BMP USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-27 SHEET 1 OF 2

SPECIFICATIONS

1. 12" DEEP OPEN GRADED WASHED STONE (TYPICALLY 3/4" TO 1-1/2" (ASTM #4 STONE) OR 1" TO 2" (ASTM #3 STONE).
2. BRIDGING LAYER(S) PER LIDI BIORETENTION TECHNICAL SPECIFICATIONS (BTS). DO NOT USE FILTER FABRIC BETWEEN BSM AND AGGREGATE. DO NOT USE FILTER FABRIC BETWEEN BIOFILTER SOIL MATERIAL (BSM) AND AGGREGATE.
3. 30 ML LINER MAY BE REQUIRED TO AVOID LATERAL INFILTRATION BELOW STREET; SUBJECT TO GEOTECHNICAL RECOMMENDATIONS.
4. MAINTAIN 6" MINIMUM BENCH OF NATIVE SOIL FOR SUPPORT OF ADJACENT SIDEWALK/ROAD (TYPICAL).
5. CURB AND GUTTER DETAIL SW-12.
6. CURB INLET DETAIL SW-17, GUTTER INLET ELEV (GIE). LOCATE ENERGY DISSIPATION COBBLE PADS AS SPECIFIED IN INLET DETAILS.
7. OVERFLOW STRUCTURE REQUIRED FOR IN-LINE SYSTEMS WITHOUT OVERFLOW BYPASS, DETAIL SW-22, SW-22A, and SW-23.
8. MAINTENANCE PIPES - 4" MIN. DIA. VERTICAL PVC PIPES CONNECTED TO UNDERDRAIN. PLACED AT START AND 3 FEET BEFORE END OF UNDERDRAIN. REQUIRES DIRECTIONAL SWEEP BEND. THREADED AND CAPPED
9. VEGETATION - PLANT SELECTION AND MULCH (OPTIONAL) PER BIORETENTION TECHNICAL SPECIFICATIONS.
10. 4" MIN. EXPOSED WALL HEIGHT
11. SIDEWALK DRAINAGE NOTCH 1" LOWER THAN SIDEWALK, SLOPED TO FACILITY
12. SEE PLANS FOR SIDEWALK RESTORATION
13. DEEP CURB DETAIL SW-13
14. BIORETENTION SOIL MEDIA (BSM). SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS (BTS). SPECIFICATION SHOULD AVOID COMPOST OR OTHER MATERIAL KNOWN TO LEACH NUTRIENTS.
15. UNDERDRAIN, MIN. 4" DIA. PVC SDR 35 PERFORATED PIPE OR LARGER AS NEEDED TO CONVEY PEAK TREATED FLOWRATE WITH MINIMAL HEAD LOSS, SEE CONSTRUCTION NOTES.
16. 8" INLET PIPE OR OTHER.
17. LOW FLOW ORIFICE. (SEE DESIGN NOTE 11).
18. STABILIZED BACKFILL - TWO-SACK SLURRY MIX.
19. SIDEWALK PER MUNICIPAL STANDARDS.
20. COMPACTED BASE MATERIAL.
21. ACCESS HATCH WITH SHUT OF VALVE SWITCH. CONNECTED TO SHUT OF VALVE IN INLET PIPE.
22. MAINTENANCE HOLE COS TYPE 204-204 MH A OR B. ¾" I.D. MIN OBSERVATION PORT.
23. MANHOLE CONE - MODIFIED FLAT BOTTOM.
24. EXISTING SOILS. (SEE CONSTRUCTION NOTE 4, 8).
25. COMPACTED BACKFILL
26. PRE-CAST OR INSITU CAST CONTROL VAULT (SEE DESIGN NOTE 8)
27. ROCK - WASHED, SIZED BETWEEN 3/8" AND 1-1/2"
28. PERFORATED BASE OF CONTROL VAULT
29. DRILLED SHAFT WITH 6" WELDED STEEL OR THREADED PVC CASING (SEE DESIGN NOTE 13 & CONSTRUCTION NOTE 7,8)
30. 6 - 8" O.D. WELDED WIRE STAINLESS STEEL WELL SCREEN OR THREADED PVC SLOTTED SCREEN. SCREEN LENGTH + LENGTH + SLOT WIDTH TO BE DETERMINED IN ACCORDANCE WITH LOCAL CONSTRAINTS .I.E. DISTANCE BETWEEN CLAY LAYER AND MIN. 10FT ABOVE SEASONAL HIGH GROUNDWATER LEVEL
31. PVC STORMDRAIN CONNECTOR PIPE. SAME DIAMETER AS INFLOW PIPE TO CONTROL VAULT.

DESIGN NOTES

1. ADDITIONAL DESIGN GUIDANCE FOR BIOFILTRATION SYSTEM PROVIDED IN LIDI BIORETENTION TECHNICAL SPECIFICATIONS (BTS) DOCUMENT.
2. BOTTOM WIDTH - PROVIDE 2 FT MINIMUM FLAT BREGENALL
3. BOTTOM WITH A MAX 3:1 SLOPE FOR SURFACE FINISHING WITHIN BIOFILTRATION SYSTEM
4. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP LAYER OF ¾" (NO. 4) OPEN-GRADED AGGREGATE.
5. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE, OE, GIE, SIE). SEE DETAIL SW-17.
6. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, WALL, AND SIDEWALK DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS.
7. PROVIDE MONITORING WELL IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
8. LONGITUDINAL SLOPE 6% WITH CHECK DAMS.
9. IF CHECK DAMS ARE NEEDED, SEE CONCRETE CHECK DAM DETAIL SW-18.
10. VARIATIONS IN DRY WELL DESIGN SHOULD BE MADE TO ACCOMMODATE STORAGE VOLUME DESIGN AND TO SUIT LOCAL CONDITIONS AND CONSTRAINTS.
11. IN AREAS WITHOUT A STORMDRAIN, THE SYSTEM SHOULD ONLY BE CONSTRUCTED WHERE THE MAINTENANCE HOLE SURFACE INVERT IS ABOVE THE BIOFILTER OVERFLOW ELEVATION.
12. ALTERNATIVE VAULT LOCATIONS POSSIBLE INCLUDING WITHIN THE BIOFILTER FOOTPRINT.
13. VALVE CAN BE MOVED TO THE BIOFILTER IF DESIRED. REQUIRES STRUCTURAL SUPPORT.
14. ALTERNATIVE PRODUCTS SUCH AS VENDOR-SUPPLIED DRY WELL PRODUCTS MAY BE USED AS A SUBSTITUTE PROVIDED THAT THE ALTERNATIVE PRODUCT IS EQUAL.
15. THIS DESIGN IS LIKELY TO QUALIFY AS A CLASS V WELL SUBJECT TO REGISTRATION WITH THE USEPA.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

CASQA central coast LIDI DEVELOPED UNDER PROP. 84 GRANT	APPROVED BY: VERSION: 08/31/2017	DRYWELL STORMWATER BMP USE WITH STANDARD SPECIFICATIONS FOR PUBLIC WORK CONSTRUCTION	STANDARD PLAN NO. SW-27 SHEET 2 OF 2

Low Impact Development Initiative (LIDI)
Bioretention Technical Specifications (Adapted from CASQA)

The following technical information is for use in conjunction with the complete set of bioretention area standard details developed by the LIDI for use in the Central Coast region and throughout California. Central Coast region-specific requirements are noted where applicable.

Facility Design/Dimensions

- Bioretention facilities should be sized to retain and/or treat the water quality design flow and/or volume in accordance with the stormwater permit requirements that apply to the local jurisdiction and appropriate local, countywide, and/or statewide (CASQA) guidance documents. Design parameters specified in stormwater permits will determine the surface area and storage volume required within the facility.
- Bottom width – facilities should have flat bottoms and sufficient width for ease of constructability and maintenance.
  - Provide 2' wide minimum for facilities with side slopes and planters (facilities with vertical side walls).
- Allowable standing water duration – generally 48 to 72 hours

  Allowable ponding time is typically associated with mosquito vector control or perceived nuisance flooding and varies by location.
- Ponding depth - Min. 6", max. 12". The depth is measured from the surface of the bioretention soil media and not adjusted for application of mulch.
- Planter depth – (from adjacent pedestrian walking surface to facility finished elevation/planting surface) is based on desired ponding plus freeboard, but also relates to planter width. Planters can be deeper if they are wider, and need to be shallower as they narrow. This is a pedestrian perception and safety issue. Some recommended width to depth guidelines are as follows (allowable depths and appropriate edge treatments may be specified by the local jurisdiction and may be determined by ADA requirements):

PLANTER WIDTH	MAX. PLANTER DEPTH
> 5'	16"
4' – 5'	12"
3' – 4'	10"
2' – 3'	8"

- Slope/grades
  - Side slope - 4:1 preferred
    - Max. 3:1 allowed with min. 12" wide shoulder (2% slope toward facility) adjacent to pedestrian use or curb.
  - Longitudinal slope – Facility should be relatively flat (i.e., maximum of 2% longitudinal slope of bottom) so that water ponds and infiltrates evenly across the facility surface.
    - If installed on a slope, facilities should be terraced and separated by check dams and weir overflows to provide flat-bottomed cells with proper storage and infiltration.
    - Installation not recommended on slopes > 8%.
  - Grades on opposite sides within a facility should be similar to optimize ponding across the entire basin/cell.

Hard Infrastructure

- Inlet curb cut design selection should be based on application considerations:
  - Sloped sided or planter facility
  - Curb and gutter adjacent to facility or separated by pedestrian sidewalk
- Curb cut width – 12”-18” minimum, with rounded edges, depress gutter 2” at opening (see SW-14, SW-15, SW-16)
- Sidewalk edge type selection should be based on application considerations:
  - New or retrofit
  - Sloped sided or planter box
- Sidewalk wall - planter box requires 4” min. height wall adjacent to sidewalk for pedestrian safety.
- Sidewalk wall drainage notch – when sidewalk drains to planter, provide 4”-6” wide notch openings in wall, opening 1” below sidewalk, slope to facility. Space openings to convey flows.
  - Provide minimum 2” cover between notch and structural dowels in curbs/walls.
- Energy dissipation – provide aggregate or concrete splash pads at inlets per inlet details.
  - For aggregate: 6” depth, 3" – 6" rounded, washed cobble
  - For sloped sided facilities where inlet flow velocity is high, extend cobble into facility, but avoid excessive or decorative use.
- Where impermeable liner is included between facility and adjacent

infrastructure (street, parking lot), use 30 ML HDPE or PVC material, see Impermeable Liner detail.

- Check dams – provide for facilities installed on slope
  - Per check dam details SW-17 and SW-18
  - Check dams should be placed for every 4-6" of elevation change and so that the top of each dam is at least as high as the toe of the next upstream dam.
- Overflow structure – required for on-line systems without an overflow bypass
  - Per overflow structure details SW-19, SW-20
  - Connect to approved discharge point or another downstream bioretention area.
- Provide observation well in facility if required
  - Upright 6 inch rigid PVC (SDR 40 or equivalent) pipe, perforated for the section extending through the depth of the bioretention soil media (and aggregate layer if included), extending 6 inches above the top of soil elevation, with a threaded cap.
  - Locate to avoid damage from maintenance activities.

Facility Media (soil, aggregate, mulch)

- Aggregate layer – where an aggregate layer is included in the design (underdrain design or optional use based on project requirements, depth based on sizing calculations), specify "CalTrans Class 2 Permeable."
  - CalTrans Class 2 Permeable does not require an aggregate filter course between the aggregate storage layer and the bioretention soil media above.
  - When CalTrans Class 2 Permeable is not available, substitute CalTrans Class 3 Permeable.
    - Class 3 Permeable requires an overlying 3" deep layer of ¾" (No. 4) open graded aggregate (between Class 3 and bioretention soil media above).
  - Filter fabric - do NOT use fabric between bioretention soil media and aggregate layer
- Bioretention soil media (BSM) - use local jurisdiction approved/recommended BSM (e.g. Bay Area Stormwater Management Agencies Association (BASMAA) Regional Biotreatment Soil Specification (revised January 29, 2016)[1].

[1] http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/provisionC.3/Revised_%20Biotreatment%

  - Using a performance specification for alternative bioretention soil mix is not recommended (but may be allowed by the local jurisdiction).
  - A pre-mixed bioretention soil media is preferable to mixing soil on-site.
- BSM depth – 18" minimum depth; 24" recommended, or as required by the local jurisdiction. 24" depth required in the Central Coast Region for facilities with underdrains.
  - Where trees are specified, increase BSM depth in tree planting locations, per arborist's or landscape architects direction, or allow trees access to sufficient volume of native soil.
    - Tree planting in bioretention - see BASMAA Literature Review - Bioretention Design for Tree Health (September 15, 2016)[2]
- Bioretention soil media placement and compaction – place BSM in 6" lifts. Compact each lift with a landscape roller or by lightly wetting. Allow BSM to dry overnight before planting.
- Mulch depth – 2" – 3" (3" recommended and required by State Model Water Efficiency Landscape Ordinance)
  - Do not apply mulch in ponding zone just prior to or during rainy season.
  - When mulch is used, excavation must allow for specified bioretention soil depth to achieve finished elevations as shown on civil plans
- Mulch type - when used in ponding zone, must be aged, stabilized, non-floating mulch, such as a specified composted wood mulch. Gravel mulch may also be used when high flow velocities through the system are expected.

Landscape (planting and irrigation)

- Irrigation - Provide irrigation for plant establishment (2-3 years), and supplemental irrigation during periods of prolonged drought.
  - Provide separate zone for connection to water supply
- Planting - see LIDI plant guidance for bioretention areas technical assistance memo (TAM) or use bioretention plant list in other local or countywide guidance document.
  - Landscape Architects who have not previously designed bioretention systems should use plants from the LIDI TAM or other approved plant list. Landscape Architects with experience designing for bioretention may use additional plant species consistent with the above lists and

20_Soil.pdf
[2] www.basmaa.org

appropriate for the facility design and local conditions.

- Do not locate plants at inlets. Consider mature growth to determine planting layout and avoid future blockage of inlets by plants.
- Trees located on slopes should be 5’ minimum from inlets to avoid erosion of soil at root ball.

Underdrain Design

- Aggregate layer depth – 12” minimum depth.
- Underdrain – use 4” diameter, PVC SDR 35 perforated pipe.
  - Install underdrain with holes facing down.
  - Underdrain discharge elevation should be near top of aggregate layer if facility is allowed to infiltrate into native soil.
  - Underdrain slope may be flat or have a slight slope.
  - Connect underdrain to approved discharge point.
  - Provide capped, threaded PVC cleanout for underdrain, 4" min. dia. with sweep bend.
  - Do NOT wrap underdrain with filter fabric.