Development Review Process: Incorporating Stormwater Requirements with Stormwater Management Plans

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San Mateo Countywide Pollution Prevention Program

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Presentation Overview

- Typical Review Process and Submittals
- How to Review a Stormwater Management Plan (SWMP)
  - Required Contents
  - Site Design and Source Controls
  - Drainage Management Areas (DMAs)
  - Flow Lines and Entry Points
  - Treatment Measure Sizing and Design
- Helpful Resources

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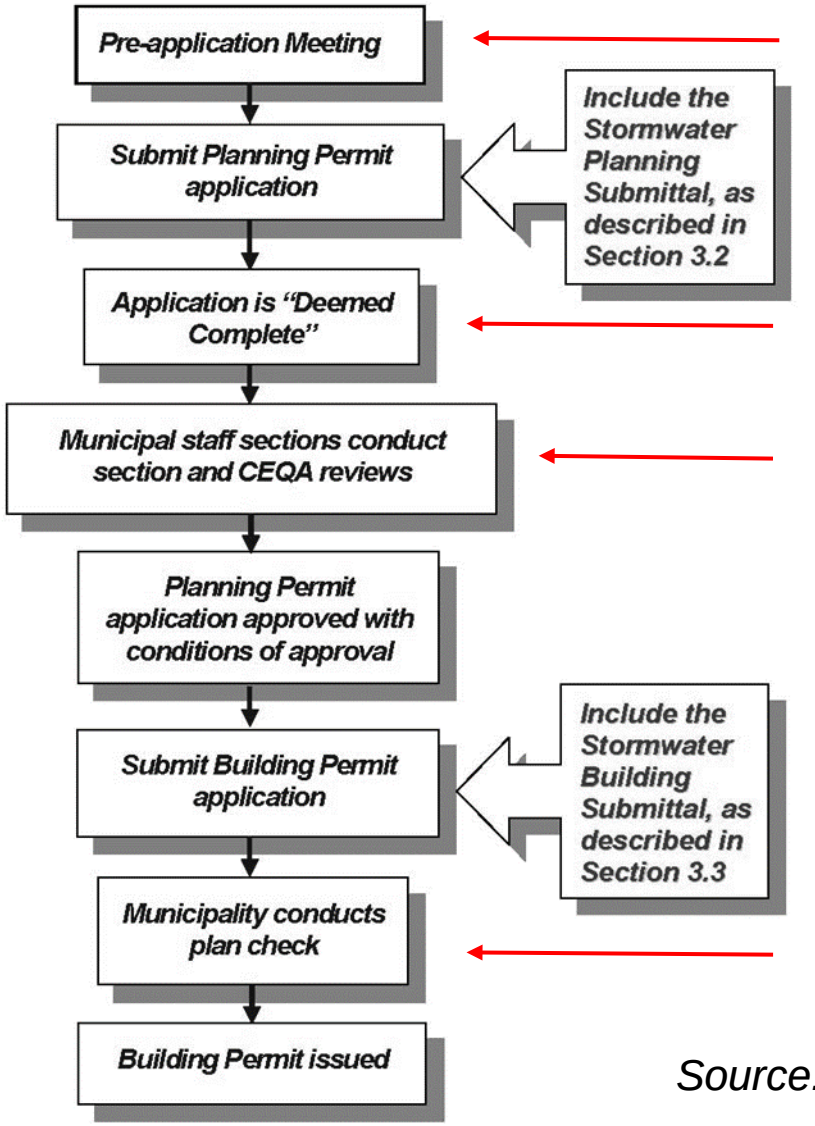
Typical Development Review Process



Advise applicant of requirements (address early on!)

"Preliminary Stormwater Management Plan"

Ensure all required stormwater documents are included

Municipal staff reviews Preliminary SWMP

"Final Stormwater Management Plan"

Municipal staff reviews Final SWMP

Source: C.3 Regulated Projects Guide, Figure 3-1

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SWMP Review – Required Contents

- Written SWMP Report
  - Project description: type of project, site constraints/opportunities (soil types, depth to groundwater), approach to site design and treatment, etc.
  - Preliminary/final calculations for sizing each treatment or hydromodification management (HM) measure
  - List of source control measures included in the project
  - Preliminary/final maintenance plan for treatment and HM measures
- Forms
  - C.3-C.6 Regulated Projects Checklist
  - Special Projects Narrative
  - Treatment Measure O&M Checklists (Final SWMP)
  - If HM required, Bay Area Hydrology Model (BAHM) Report

SWMP Review – Required Contents, cont'd

- Project Plan Sheets
  - Existing hydrologic features and natural areas to be protected
  - Proposed site design measures to minimize impervious surface and promote infiltration
  - Existing and proposed drainage network, including DMAs for site design and treatment, directions of flow, and flow entry points
  - Existing and proposed impervious and pervious surface quantities for the project and by DMA
  - Proposed locations and design details for treatment and HM measures
  - Conceptual plant palette for vegetated treatment measures
  - Pollutant source areas and required source controls

Site Design Measures

- List of measures provided in C.3-C.6 Checklist
- Confirm that measures selected are shown on plan sheet(s) and incorporated into DMAs

Plan Sheet No.	Site Design Measures
	a. Direct roof runoff into cisterns or rain barrels and use rainwater for irrigation or other non-potable use.
	b. Direct roof runoff onto vegetated areas.
	c. Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas.
	d. Direct runoff from driveways and/or uncovered parking lots onto vegetated areas.
	e. Construct sidewalks, walkways, and/or patios with pervious or permeable surfaces.
	f. Construct bike lanes, driveways, and/or uncovered parking lots with pervious surfaces.
	g. Limit disturbance of natural water bodies and drainage systems; minimize compaction of highly permeable soils; protect slopes and channels; and minimize impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies;
	h. Conserve natural areas, including existing trees, other vegetation and soils.
	i. Minimize impervious surfaces.
	j. Self-treating area (see Section 4.2 of the C.3 Regulated Projects Guide)
	k. Self-retaining area (see Section 4.3 of the C.3 Regulated Projects Guide)

Source Control Measures

- List of measures provided in C.3-C.6 Checklist
- Confirm that measures selected are appropriate for the project and are shown on the plan sheet(s)

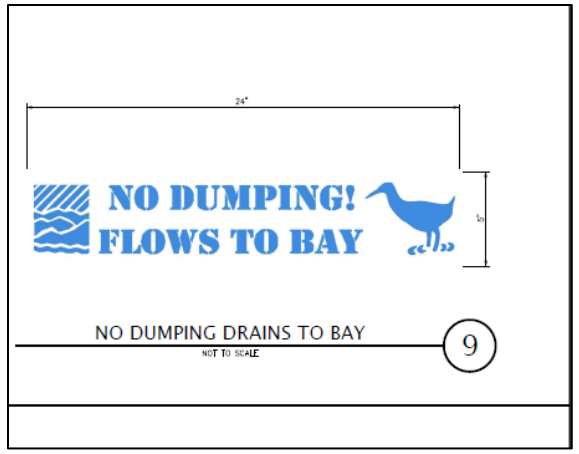
Detail/Plan Sheet No.	Features that require source control	Source Control Measures (Refer to Local Source Control List for detailed requirements)
	Storm Drain	Mark on-site inlets with the words “No Dumping! Flows to Bay” or equivalent.
	Floor Drains	Plumb interior floor drains to sanitary sewer [or prohibit].
	Parking garage	Plumb interior parking garage floor drains to sanitary sewer.[8]
	Landscaping	■ Retain existing vegetation as practicable. ■ Follow ReScape (www.rescapeca.org) principles. Select diverse species appropriate to the site. Include plants that are pest- and/or disease-resistant, drought-tolerant, and/or attract beneficial insects. ■ Minimize use of pesticides and quick-release fertilizers.
	Pool/Spa/Fountain	Provide connection to the sanitary sewer to facilitate draining.[8]
	Food Service Equipment (non-residential)	Provide sink or other area for equipment cleaning, which is: ■ Connected to a grease interceptor prior to sanitary sewer discharge.[8] ■ Large enough for the largest mat or piece of equipment to be cleaned. ■ Indoors or in an outdoor roofed area designed to prevent stormwater run-on and run-off, and signed to require equipment washing in this area.

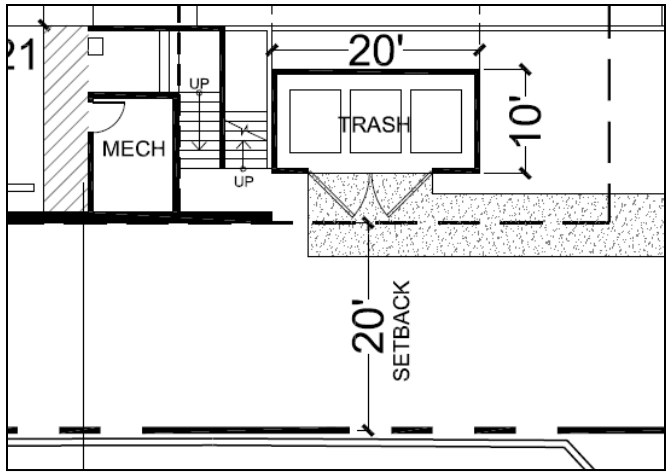
Partial List – see Worksheet B in C.3-C.6 Checklist

Showing Source Controls on Plans

STORMWATER SOURCE CONTROLS

1. COVERED DUMPSTER AREA CONNECTED TO SANITARY SEWER.
2. BENEFICIAL LANDSCAPING, INCLUDING MINIMIZING IRRIGATION, RUNOFF, SYNTHETIC PESTICIDES, AND QUICK RELEASE FERTILIZER.
3. MAINTENANCE ACTIVITIES, INCLUDING PAVEMENT SWEEPING, CATCH BASIN CLEANING, AND GOOD HOUSEKEEPING.
4. STORM DRAIN LABELING.





Detail should show cover on dumpster area

Utility Plan should show connection to sanitary sewer

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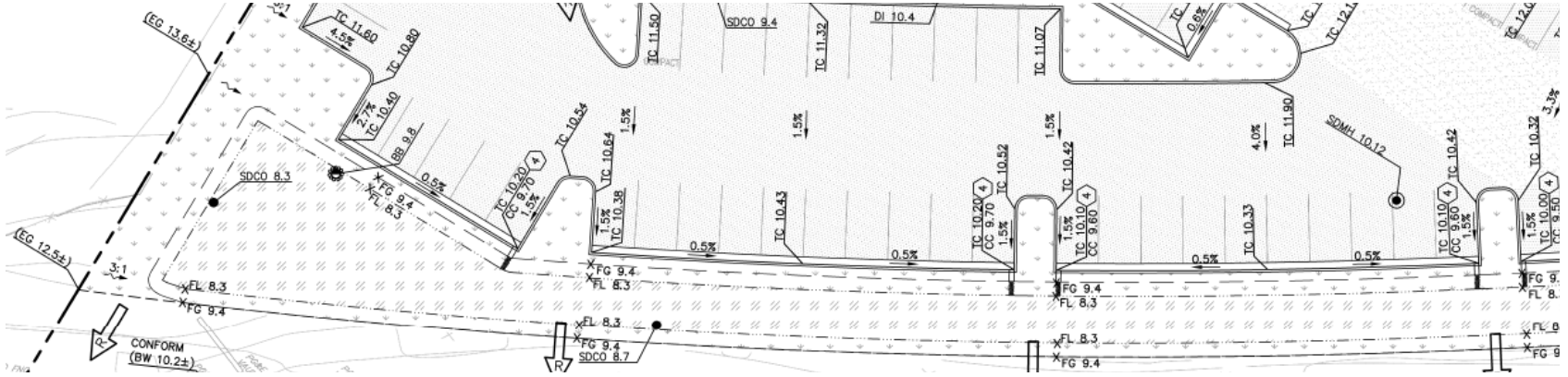
Reviewing DMAs

- Review site topography/grading
  - Runoff should flow toward treatment measures by gravity
  - Pumping runoff into treatment measures strongly discouraged (extra maintenance, failure during storms, vector issues)



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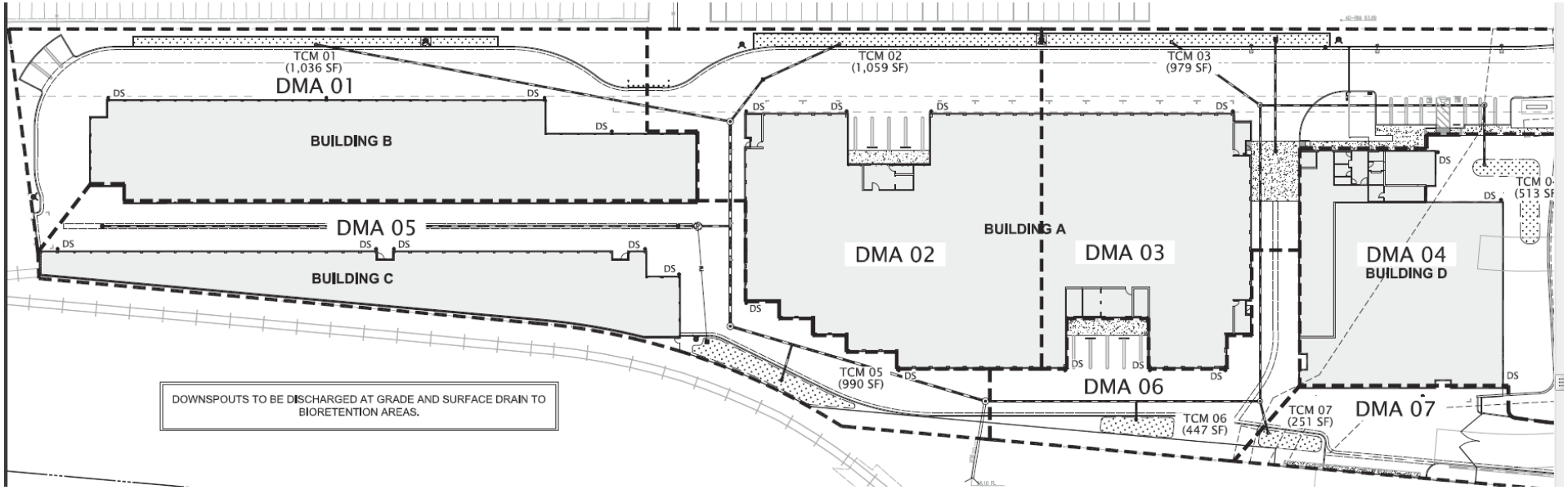
Reviewing DMAs, cont'd

- The entire project site should be divided into DMAs
- DMAs should be labeled as self-treating areas, self-retaining areas, or treatment measures



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Reviewing DMAs – DMA Summary Tables

- All impervious areas within the DMA should drain toward a treatment measure or self-retaining area
- Indicate DMAs and treatment measures on plan sheets

SITE DESIGN MEASURES

DRAINAGE MANAGEMENT AREAS	STORMWATER TREATMENT MEASURE	TYPE OF SITE DESIGN MEASURE	LANDSCAPING (SQ. FT.)	PERVIOUS PAVEMENT (SQ. FT.)	IMPERVIOUS SURFACE (SQ. FT.)	TOTAL AREA (SQ. FT.)
16	16	SELF-TREATING AREA	1,515	228	0	1,743
17	17	SELF-TREATING AREA	3,570	3170	0	6,740
18	18	SELF-TREATING AREA	375	495	0	870
19	19	SELF-TREATING AREA	323	312	0	635

STORMWATER TREATMENT MEASURE SUMMARY

DRAINAGE MANAGEMENT AREAS	STORMWATER TREATMENT MEASURE	IMPERVIOUS SURFACE (SQ. FT.)	SIZING FACTOR	TREATMENT REQUIRED (SQ. FT.)	TREATMENT PROVIDED	PROPOSED TREATMENT CONTROLS	CONFORMS TO SIZE STANDARD?
1	1	321	0.04	13	15	FLOW-THROUGH PLANTER	YES
2	2	200	0.04	8	15	FLOW-THROUGH PLANTER	YES
3	3	197	0.04	8	15	FLOW-THROUGH PLANTER	YES
4	4	197	0.04	8	15	FLOW-THROUGH PLANTER	YES
5	5	188	0.04	8	15	FLOW-THROUGH PLANTER	YES
6	6	318	0.04	13	15	FLOW-THROUGH PLANTER	YES
7	7	13,128	0.04	525	570	BIORETENTION	YES
8	8	2,120	0.04	85	87	FLOW-THROUGH PLANTER	YES
9	9	382	0.04	16	35	FLOW-THROUGH PLANTER	YES
10	10	5,228	0.04	210	267	FLOW-THROUGH PLANTER	YES
11	11	5,432	0.04	218	248	FLOW-THROUGH PLANTER	YES
12	12	5,812	0.04	235	320	FLOW-THROUGH PLANTER	YES
13	13	2,290	0.04	92	120	FLOW-THROUGH PLANTER	YES
14	14	2,500	0.04	100	120	BIORETENTION	YES
15	15	2,907	0.04	117	132	BIORETENTION	YES

THE STORMWATER TREATMENT CONTROL MEASURES ARE SIZED IN ACCORDANCE WITH THE FLOW-BASED DESIGN CRITERIA OF THE MUNICIPAL REGIONAL STORMWATER PERMIT PROVISION C.3.D. THE "UNIFORM INTENSITY APPROACH" IS THE SPECIFIC METHOD USED TO SIZE EACH TREATMENT MEASURE.

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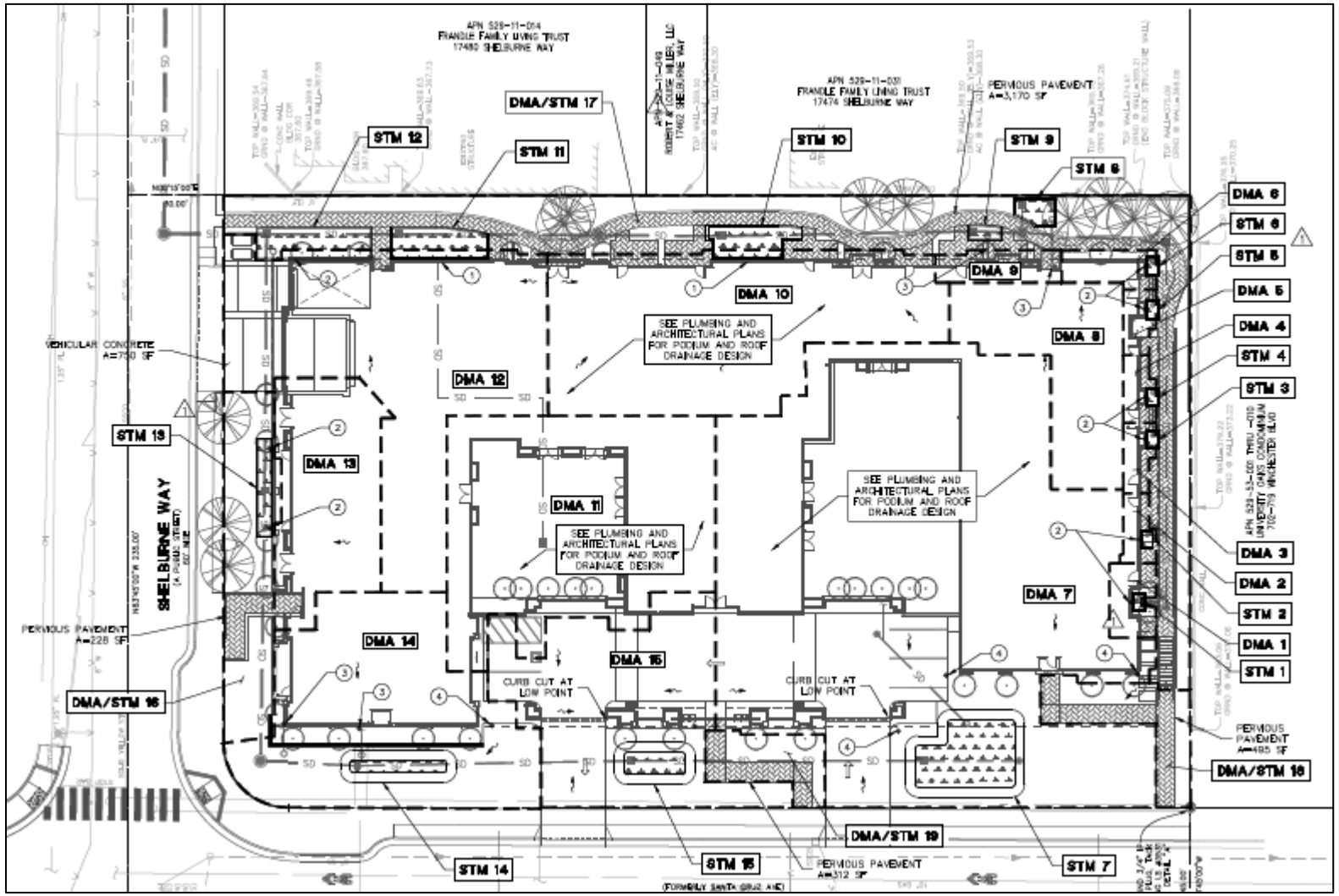
DMA Summary Table Should Match Plan Sheet



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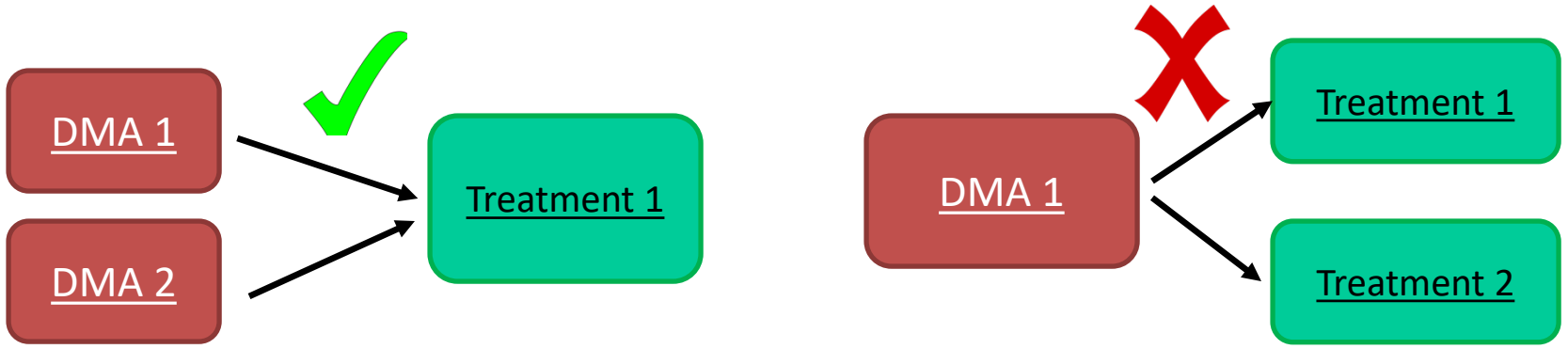
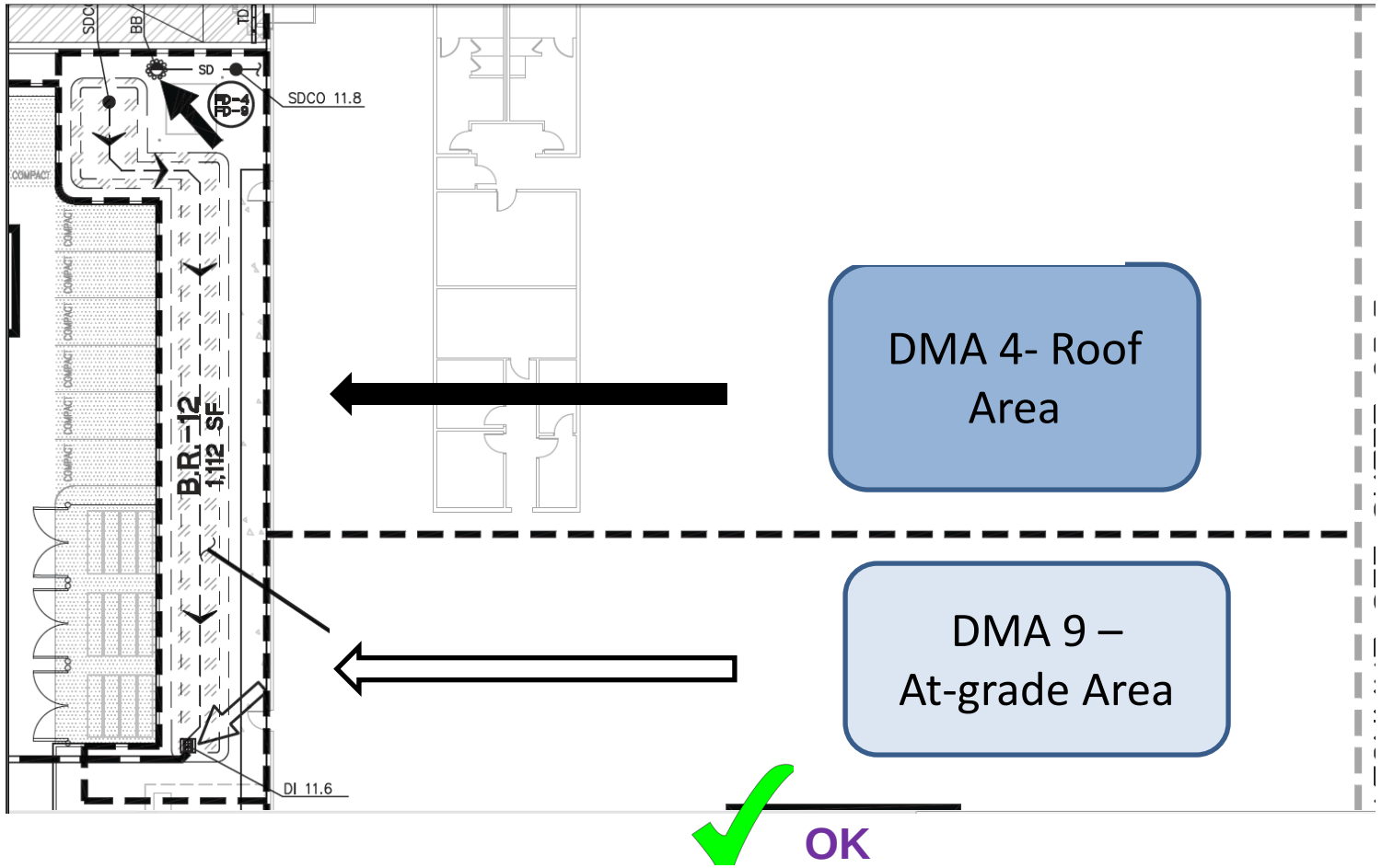
Reviewing DMAs, cont'd

- Multiple DMAs may flow to same treatment measure
  - Treatment measure should be sized adequately
  - Flow path should be indicated
- One DMA should not flow to multiple treatment measures



Multiple DMAs Flowing to Same Treatment Measure



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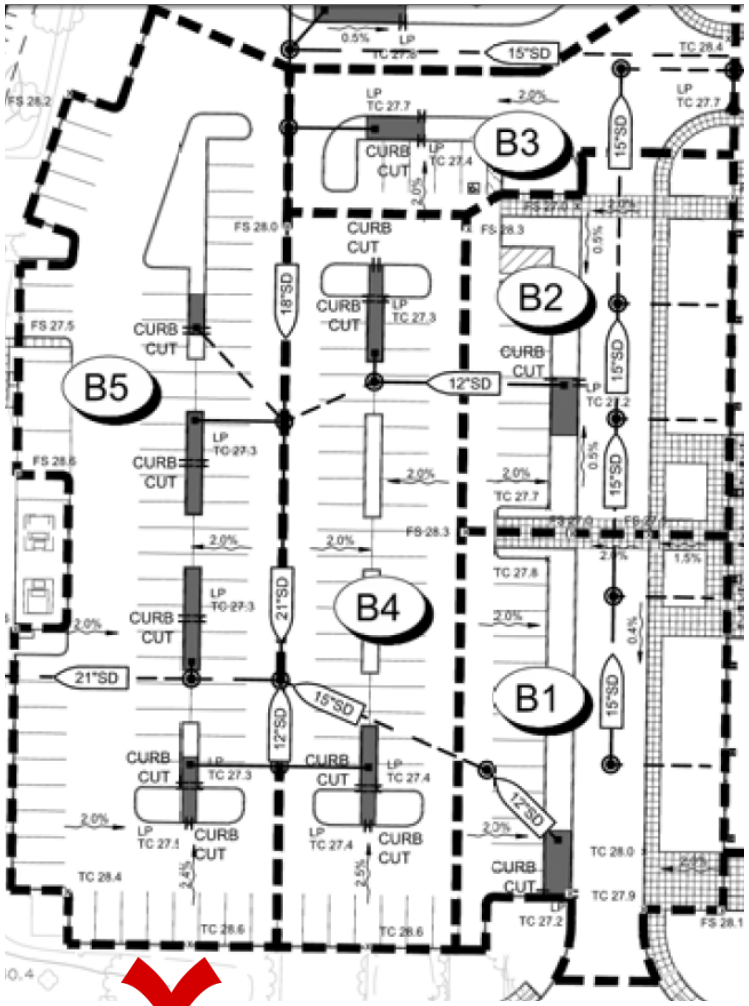
Each DMA Flowing Into One Treatment Measure



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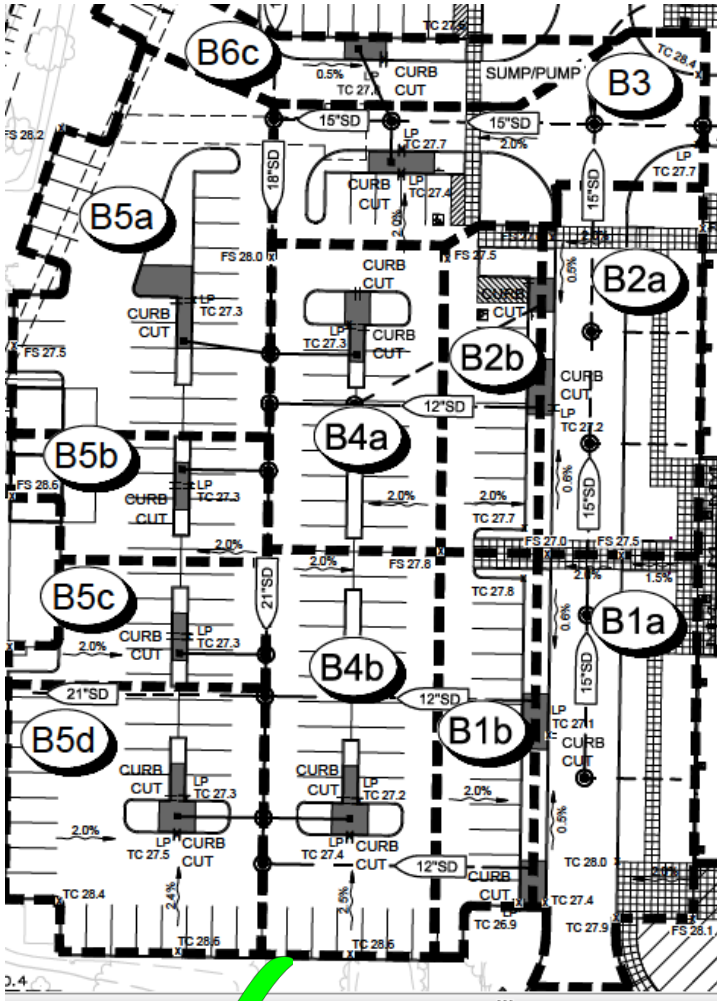

✓ Correct

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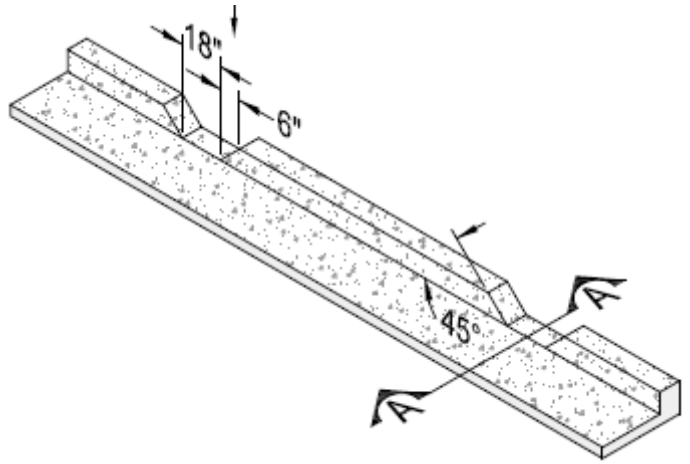
Flow Lines and Runoff Entry Points

- Direction of flow and how runoff enters treatment measures should be indicated
  - Roof downspouts
  - Area drain inlets
  - Bubblers/pop-up emitters
  - Curb cuts
  - Flush curb



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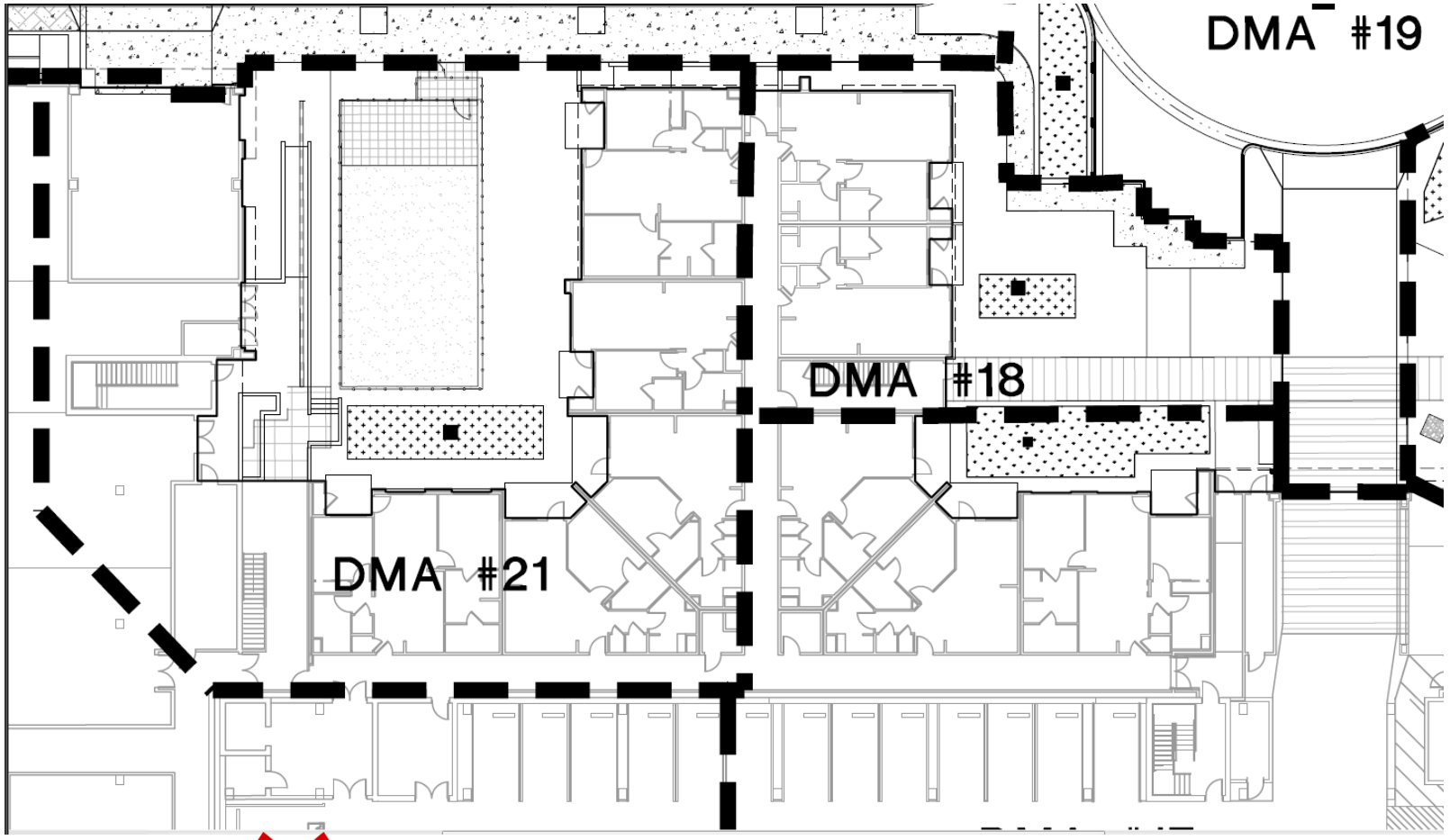
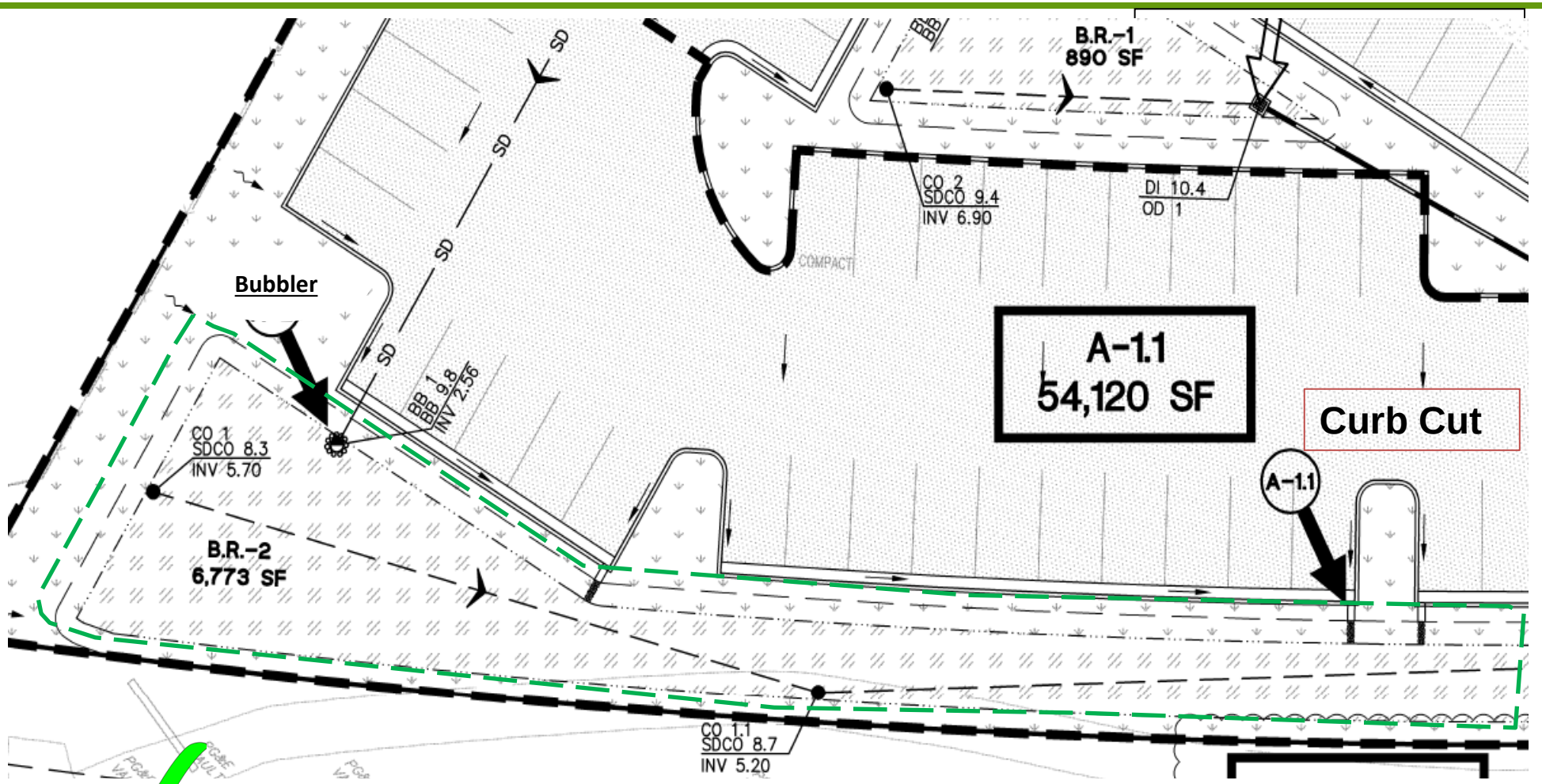


Incorrect

Flow Lines and Runoff Entry Points



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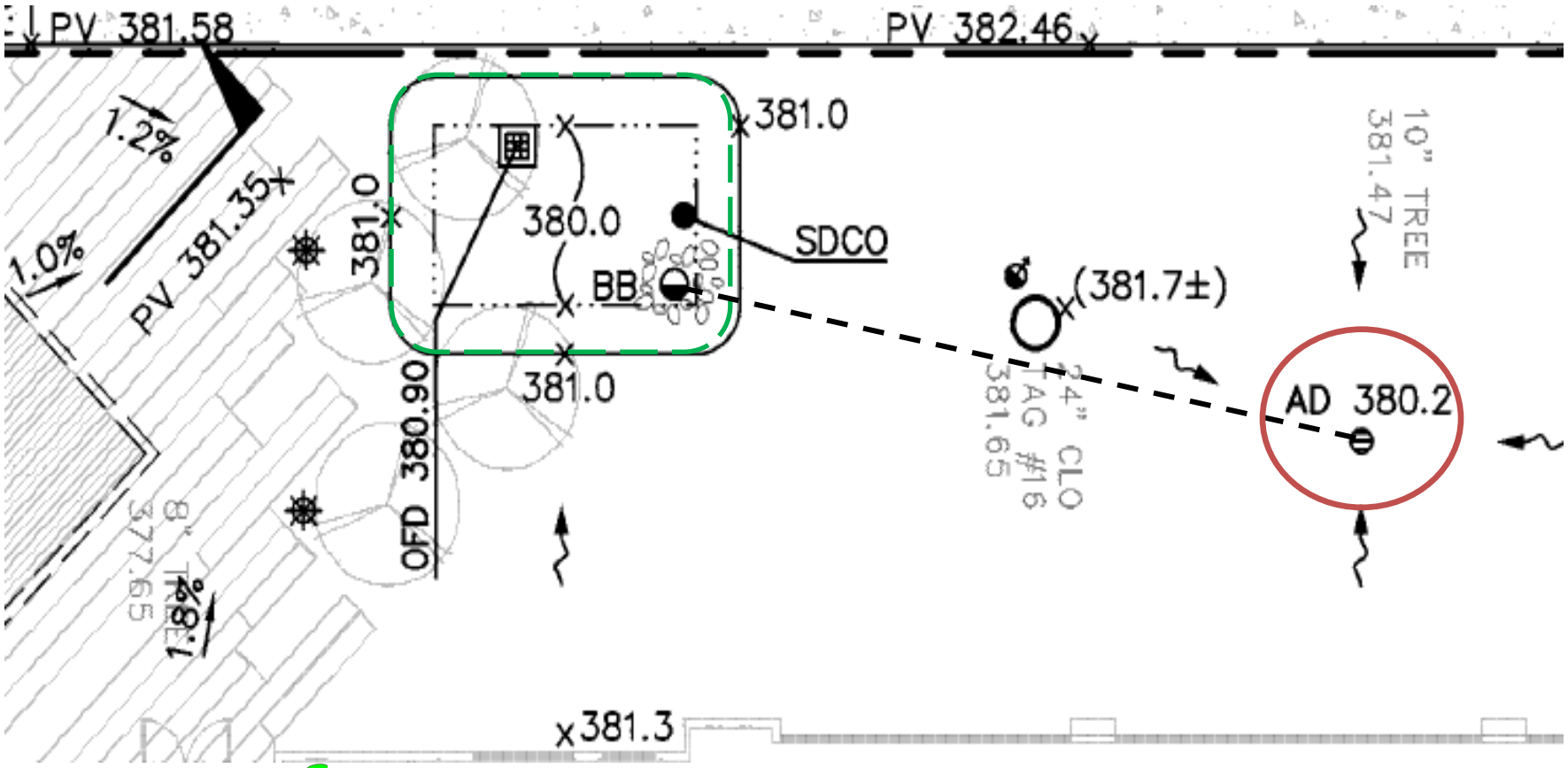
Flow Lines and Runoff Entry Points



✓ **Correct**

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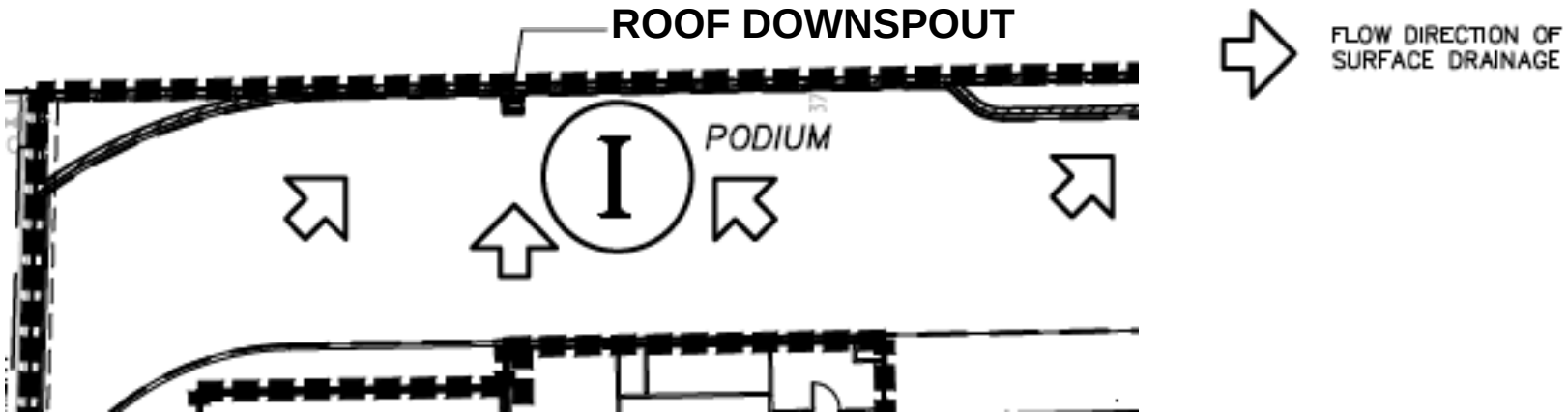
Flow Lines and Runoff Entry Points



GENERAL NOTES

1. DOWNSPOUTS ARE TO BE EITHER:
   1.1. DISCONNECTED FROM STORM DRAIN PIPE AND HAVE STORMWATER RUNOFF SHEET FLOW TO BIORETENTION AREAS; OR
   1.2. HARD PIPED TO BIORETENTION AREAS.

✓ Correct

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Treatment Measure Sizing

- Check for submittal of complete sizing calculations

TREATMENT CONTROL MEASURE SUMMARY TABLE							
Area	TCM#	Type	Drainage Area (s.f)	Impervious Area (s.f.)	Pervious Area (s.f)	Bioretention Area Required (s.f)	Bioretention Area Provided (s.f)
A	1	Planter Box	4,571	4,219	352	131 *	140
B	2	Planter Box	4,947	4,625	322	143 *	150
C	3	Planter Box	2,559	2,377	182	74 *	75
D	4	Planter Box	5,317	4,985	332	154 *	155
E	5	Planter Box	5,015	4,675	340	144 *	150
F	6	Planter Box	2,540	2,357	183	73 *	75
G	7	Planter Box	5,141	4,953	188	149 *	152
H	8	Planter Box	4,545	4,295	250	131 *	131

* REQUIRED BIORETENTION SQUARE FOOTAGE OF BASE ON COMBINATION FLOW AND VOLUME CALCULATION ON SHEET TM6.1.

Treatment Measure Details

- Review typical detail guidance in C.3 Regulated Projects Guide and GI Design Guide
- Details should be specific to the project

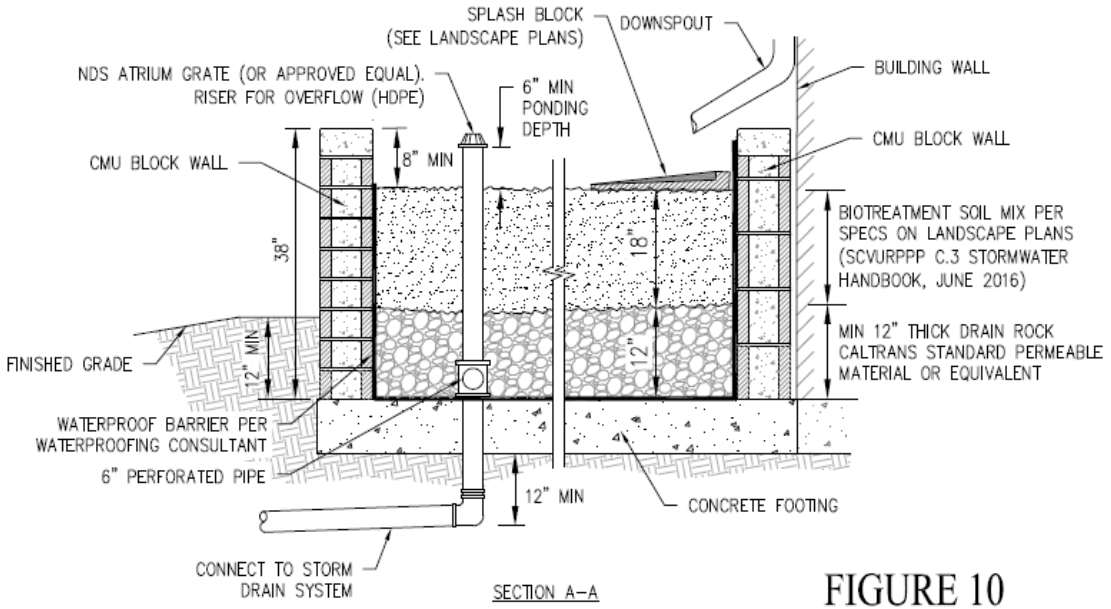

FIGURE 10

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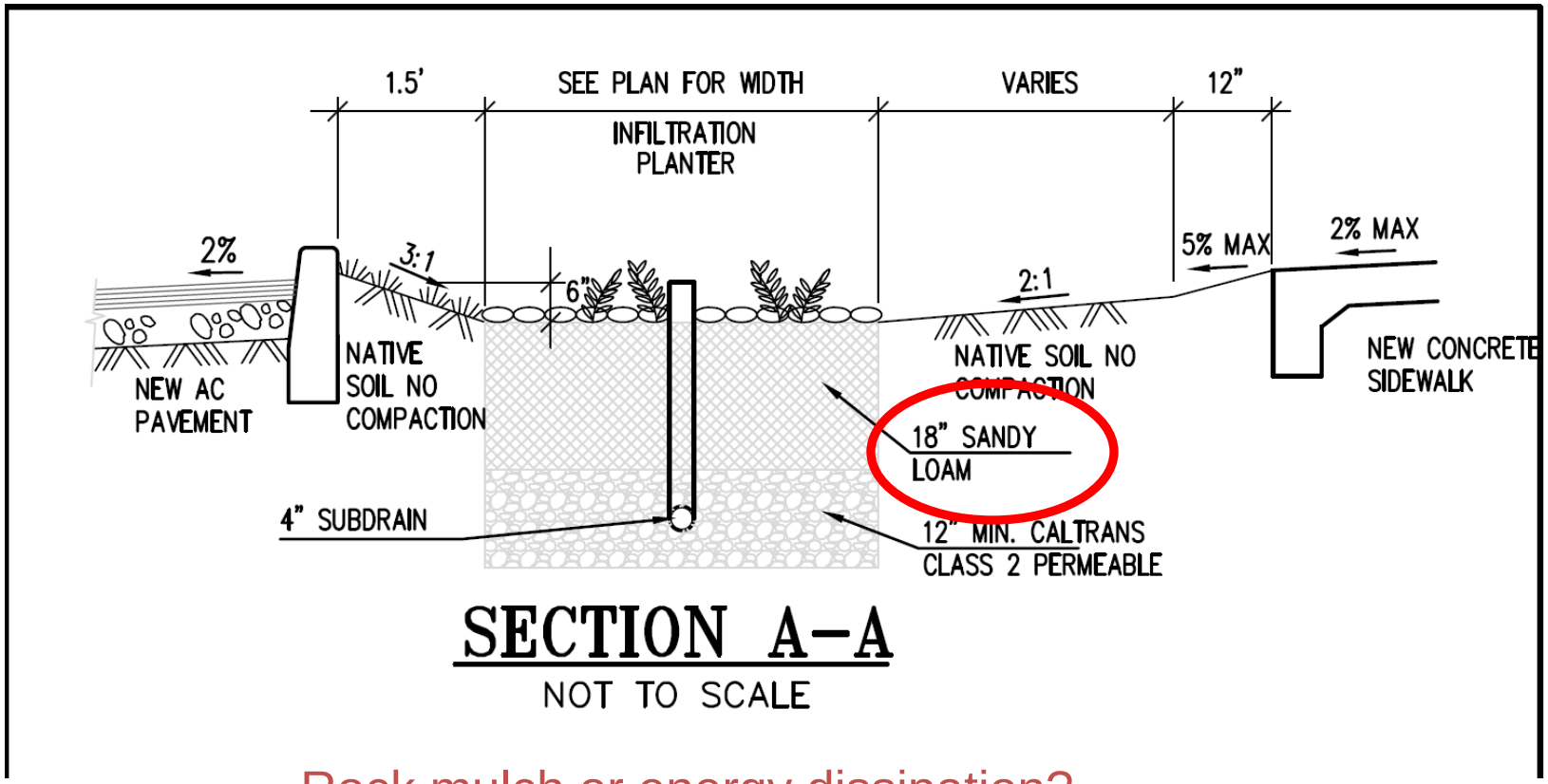
Treatment Measure Details: Common Errors

- Inlets for runoff not shown
- Overflow inlet not set above ponding depth
- Specific ponding depth not indicated
- Cleanout not shown
- Underdrain placement not correct
- Energy dissipation not shown
- Filter fabric between biotreatment soil and drain rock (never allowed)

Treatment Measure Details: Common Errors

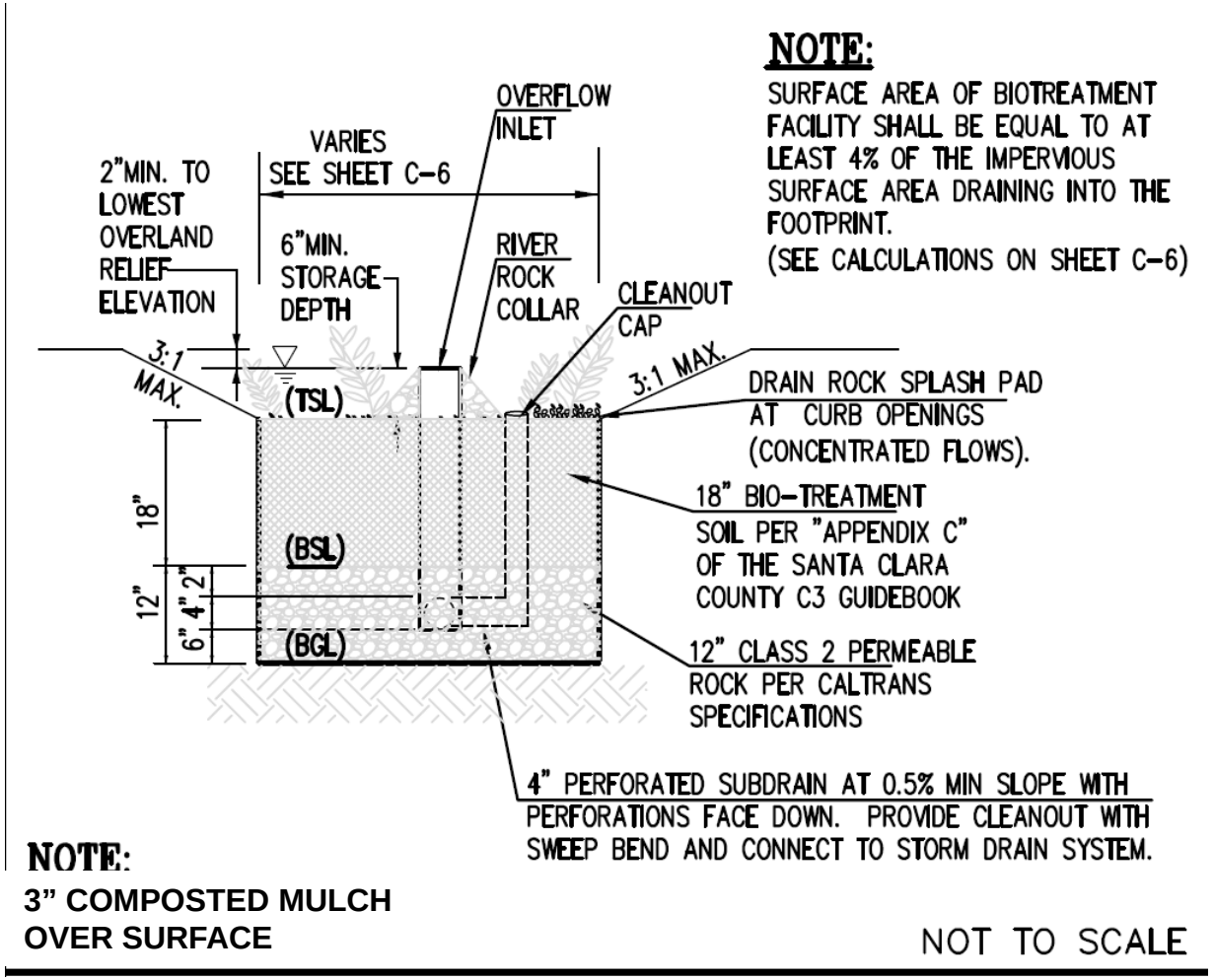
- Bioretention Area/Flow-through Planter
  - Biotreatment soil mix not mentioned or wrong reference (should reference BASMAA spec dated April 2016 or Appendix K of the C.3 Regulated Projects Guide)
  - Mulch not mentioned – need 3” of aged (composted) mulch or rock mulch
- Bioretention Area
  - Bottom lined without providing justification
    - Less than 5’ separation from base to groundwater
    - Located within 10’ of building
    - Infiltration not permitted on site

Treatment Measure Details: Common Errors



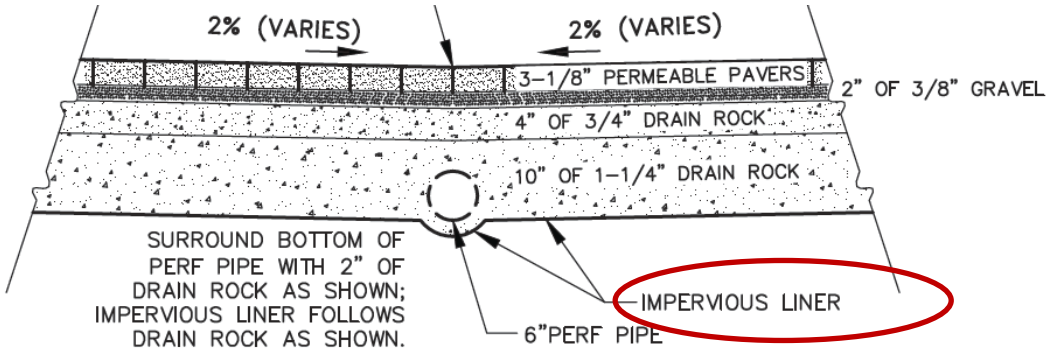
- Rock mulch or energy dissipation?
- No cleanout shown or indicated with note
- Incorrect soil specification

Treatment Measure Details: Good Notes



Treatment Measure Details: Common Errors

- Infiltration Trench
  - Lined with impervious liner
- Pervious Pavement
  - Not consistent with C.3 Regulated Projects Guide specifications
  - Lined with impervious liner
  - Designed to allow surface ponding
  - Underdrain placement not correct



Landscape Plan

- Plants selected for bioretention should be consistent with the Plant List in the C.3 Regulated Projects Guide, Appendix A
- If different plants are shown, should have documentation from landscape architect that plants are similar
- Plan should clearly indicate the plants that will be planted in the treatment areas

Bioretention Plantings

ED	Epilobium densiflorum	Dense Spike Primrose	Low	1 Gallon	36" OC
ID	Iris douglasiana	Douglas Iris	Low	1 Gallon	24" OC
MR	Muhlenbergia rigins	Muhly Grass	Low	1 Gallon	48" OC
RS	Ribes sanguinium	Red Flowering Current	Low	1 Gallon	48" OC

Helpful Resources

- SMCWPPP C.3 Regulated Projects Guide
  https://www.flowstobay.org/preventing-stormwater-pollution/with-new-redevelopment/c-3-regulated-projects/
  - Chapter 3 - Preparing Permit Application Submittals
  - Chapter 4 - Site Design Measures
  - Chapter 5 - General Technical Guidance for Treatment Measures
  - Chapter 6 - Technical Guidance for Specific Treatment Measures
- Other documents on same page:
  - C.3-C.6 Regulated Projects Checklist (PDF and Excel)
  - C.3 Sizing Worksheets

Questions?

Contact information:

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