

SCVURPPP C.3 Workshop
April 25, 2023

Reviewing Stormwater Management Plans

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Santa Clara Valley Urban Runoff Pollution Prevention Program

Presentation Overview

- Required Submittals
- Reporting Impervious Surface Area Quantities
- Drainage Management Areas (DMAs)
- Flow Lines and Entry Points
- Treatment Measure Details
- Plant List, Soil Mix Requirements



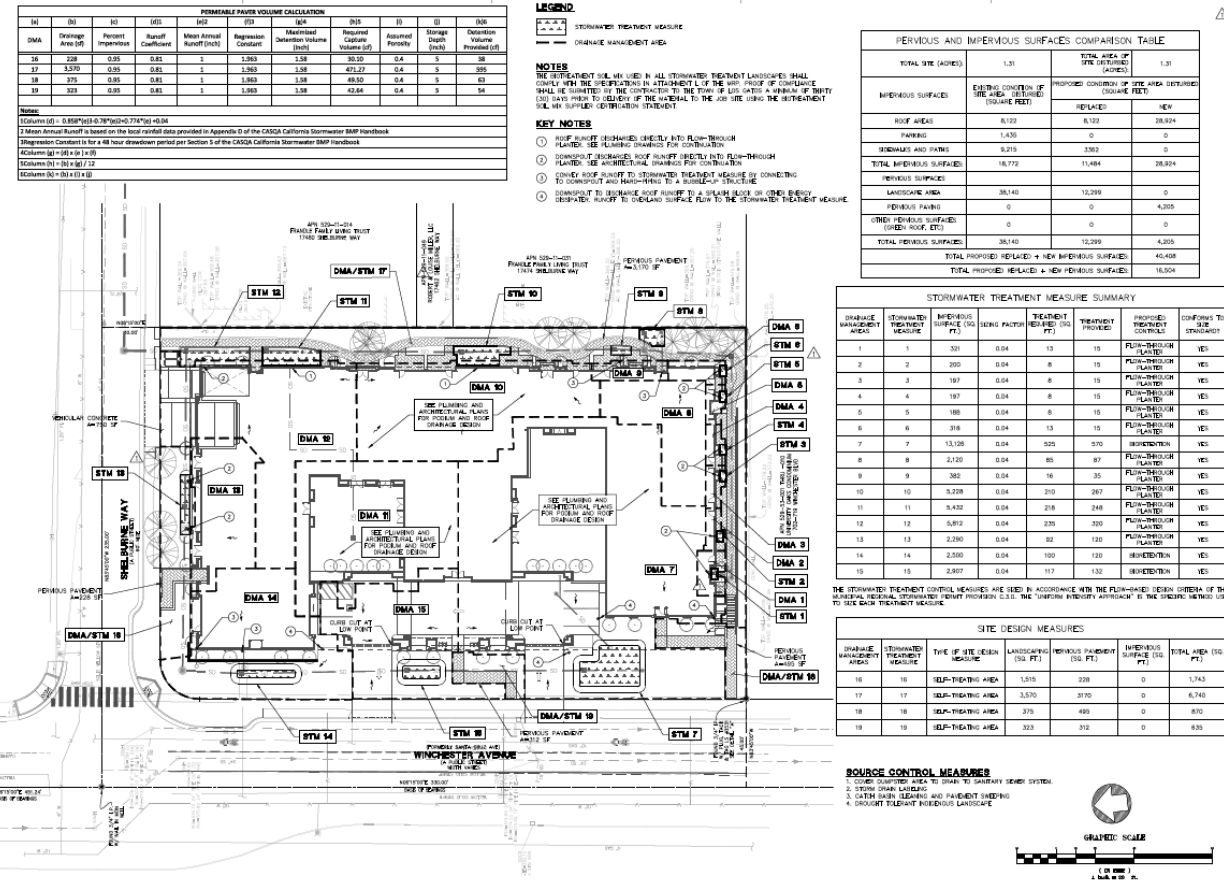
SWMP Components

- Forms
 - C3 Data Form
 - Special Projects worksheet, if applicable
 - Special Projects narrative, if applicable
 - Treatment Measure O&M Checklists (final SWMP)
 - If HM required, Bay Area Hydrology Model (BAHM) Report

SWMP Components

Stormwater treatment plan sheets

- Drainage Management Areas
- Location of treatment measures
- Runoff flow lines and entry points
- DMA summary table
- Sizing calculations
- Stormwater treatment measure details
- Site design and source control measures




SWMP Components

- Additional Submittals
 - Written SWMP Report (optional but very helpful)
 - Project description, site constraints/opportunities (soil types, depth to groundwater), approach to site design and treatment, etc.
 - Grading plan sheets
 - Utility plan sheets
 - Landscape plan or description

C3 Data Form

- Critical part of the SWMP Submittal
- Used to fill out the Annual Report which is submitted to the Water Board
- Applicants must complete all fields on the C3 Data Form

Date Form Completed: _____
Completed by: _____

 Santa Clara Valley
Urban Runoff
Pollution Prevention Program

Provision C.3 Data Form

Which Projects Must Comply with Stormwater Requirements?
Effective July 1, 2023, the following projects must comply with Stormwater Requirements:

- All development/redevelopment projects (except single-family home projects) that create and/or replace 5,000 sq. ft. or more of impervious surface on the project site must fill out this worksheet and submit it with the development project application.
- All large single-family home projects that create and/or replace 10,000 sq. ft. or more of impervious surface on the project site must also fill out this worksheet.

These projects are called **Regulated Projects**. The Regulated Project area includes portions of the public right-of-way that are developed or redeveloped as part of the Regulated Project.

Excluded Projects - Interior remodeling projects, routine maintenance or repair projects such as re-roofing and re-surfacing, and smaller single-family homes that are not part of a larger plan of development are **NOT** required to complete this worksheet.

What is an Impervious Surface?
An impervious surface is a surface covering or pavement that prevents the land's natural ability to absorb and infiltrate rainfall/stormwater. Impervious surfaces include, but are not limited to rooftops, walkways, paved patios, driveways, parking lots, storage areas, impervious concrete and asphalt, gravel surfaces, and any other continuous watertight pavement or covering.

Pervious pavement, underlain with pervious soil and pervious storage material (e.g., drain rock), that infiltrates rainfall at a rate equal to or greater than surrounding unpaved areas OR that stores and infiltrates the water quality design volume specified in Provision C.3.d of the Municipal Regional Stormwater Permit (MRP), is not considered an impervious surface.

For More Information
The SCVURPPP [C.3 Stormwater Handbook](#) provides more information on selection of site design, source control, and treatment measures for a development project as well as guidance on preparing a stormwater control plan.

1. Project Information
Project Name: _____ APN # _____
Project Address: _____
Cross Streets: _____
Applicant/Developer Name: _____
Project Phase(s): _____ of _____ Engineer: _____

Project Type (Check all that apply): New Development Redevelopment
 Private Public Large Detached Single-Family Home
 Residential Commercial Industrial Mixed Use Institutional
 Other _____

Project Description: _____

Project Watershed/Receiving Water (creek, river or bay): Choose from list _____

SCVURPPP C.3 Data Form Page 1 of 5 April 2023

C3 Data Form – Reporting New and Replaced Impervious Area

- The Regulated Project threshold applies to impervious surface area created and/or replaced **cumulatively over the entire project site**
- The “new” and “replaced” Impervious Area (IA) are based on the total site area and not specific locations within the site
- A project will have “new” Impervious Area only if the total post-project IA exceeds the total pre-project IA (total post-project IA – total pre-project IA = New IA)
- Constructed IA on a site that does not exceed the total pre-project IA is considered “replaced” IA

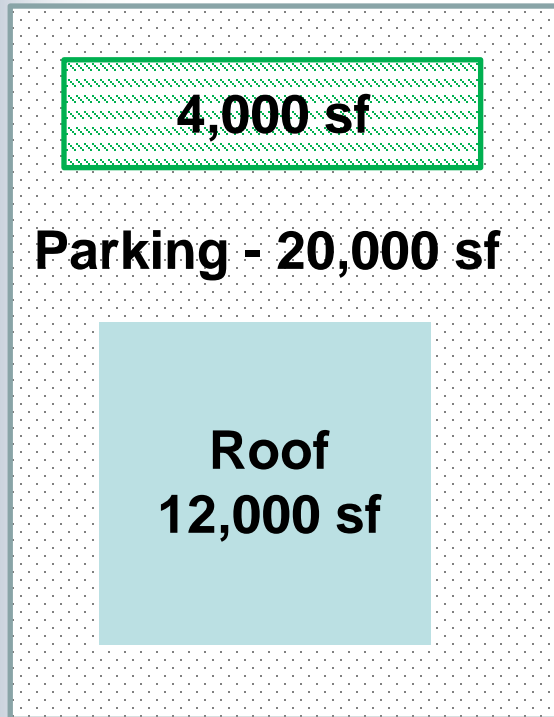
C3 Data Form – Reporting New and Replaced Impervious Area

- Correctly identifying “replaced” IA is important to determine if stormwater treatment is required for the entire site (50% rule)
- The “new” and “replaced” IAs must be reported in the Annual Report.

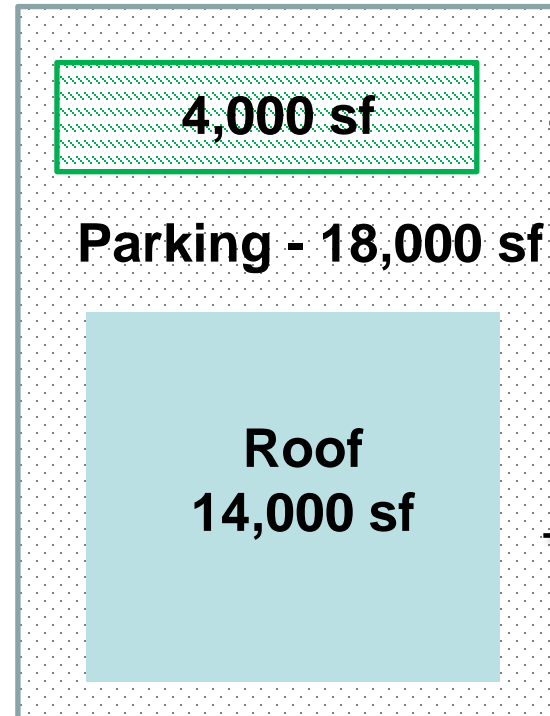
C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 1) – Projects Approved During the Fiscal Year Reporting Period												
Project Name Project No.	Project Location ¹ , Street Address	Name of Developer	Project Phase No. ²	Project Type & Description ³	Project Watershed ⁴	Total Site Area (Acres)	Total Area of Land Disturbed (Acres)	Total New Impervious Surface Area (ft ²) ⁵	Total Replaced Impervious Surface Area (ft ²) ⁶	Total Pre-Project Impervious Surface Area ⁷ (ft ²)	Total Post-Project Impervious Surface Area ⁸ (ft ²)	
Private Projects												
Public Projects												

Reporting Impervious Areas (IA)

Pre-Project Scenario



Post-Project Scenario



→ Landscape as-is

→ Parking reduced & replaced

→ Building replaced and expanded

Pre-project IA - 32,000 sf
Post-project IA - 32,000 sf
Replaced IA - 32,000 sf
New – 0 sf

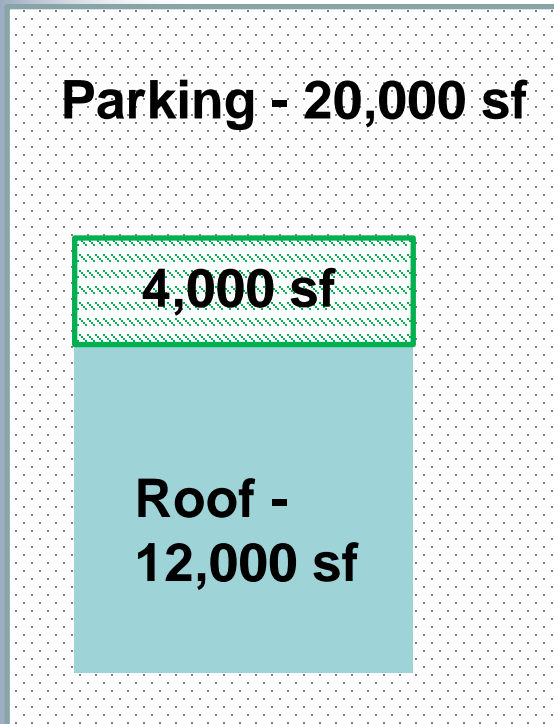
Reporting Impervious Areas (IA)

2. Project Size

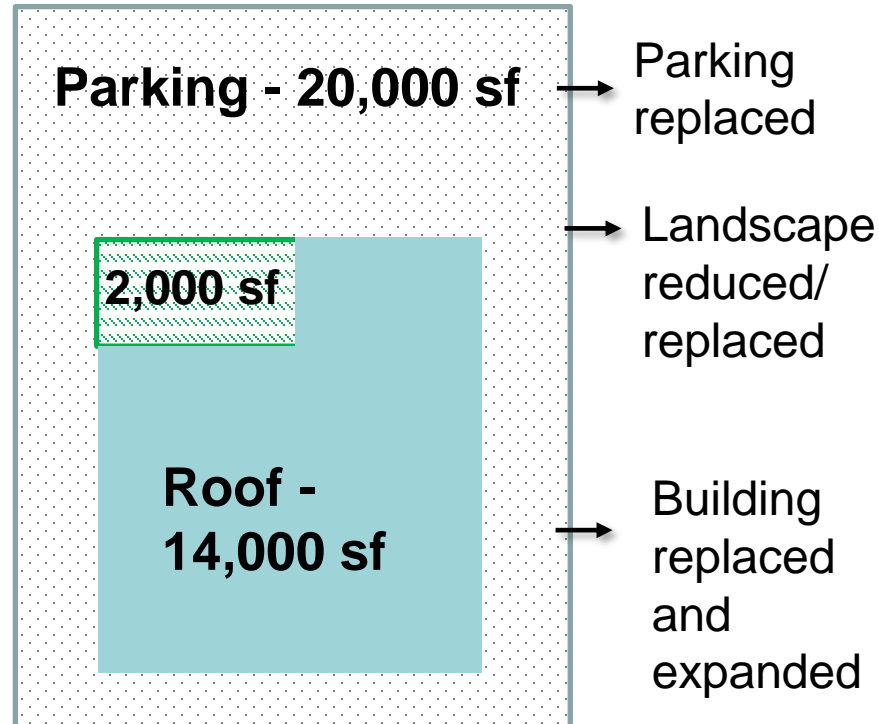
a. Total Site Area: _____ (ft ²)		b. Total Land Area Disturbed During Construction: _____ (ft ²) (including clearing, grading, stockpiling, or excavating)			
Project Totals	Total Existing (Pre-project) Area (ft ²)	Existing Area Retained ¹ (ft ²)	Existing Area Replaced ² (ft ²)	New Area Created ² (ft ²)	Total Post-Project Area (ft ²)
<i>Impervious Area (IA)</i>					
c. Total on-site IA	32,000		32,000	0	32,000
d. Total off-site IA ³					0
e. Total project IA	32,000	0	32,000	0	32,000
f. Total new and replaced IA			32,000		
<i>Pervious Area (PA)⁴</i>					
g. Total on-site PA	4,000				4,000
h. Total off-site PA ³					
i. Total project PA	4,000				4,000
j. Total Project Area (2.e.+2.i.)	36,000				36,000
k. Percent Replacement of IA in Redevelopment Projects: (Existing on-site IA Replaced ÷ Existing Total on-site IA) x 100%					
100 %					

Reporting Impervious Areas

Pre-Project Scenario



Post-Project Scenario



Pre-project IA - 32,000 sf
Post-project IA - 34,000 sf
Replaced IA - 32,000 sf
New IA – 2,000 sf

Reporting Impervious Areas (IA)

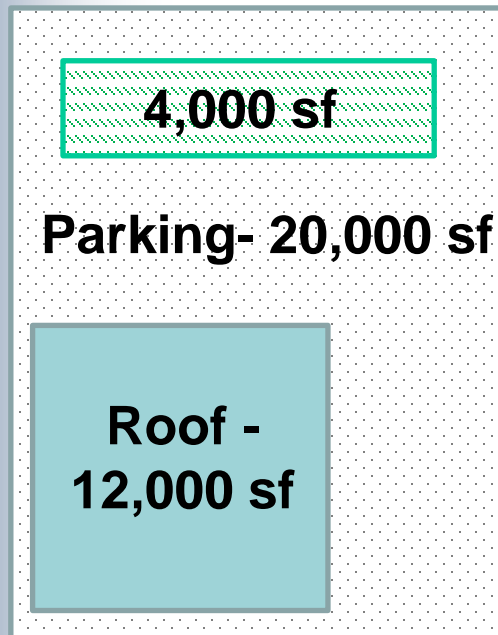
2. Project Size

a. Total Site Area: _____ (ft ²)		b. Total Land Area Disturbed During Construction: _____ (ft ²) (including clearing, grading, stockpiling, or excavating)			
Project Totals	Total Existing (Pre-project) Area (ft ²)	Existing Area Retained ¹ (ft ²)	Existing Area Replaced ² (ft ²)	New Area Created ² (ft ²)	Total Post-Project Area (ft ²)
Impervious Area (IA)					
c. Total on-site IA	32,000		32,000	2,000	34,000
d. Total off-site IA ³					0
e. Total project IA	32,000	0	32,000	2,000	34,000
f. Total new and replaced IA			34,000		
Pervious Area (PA)⁴					
g. Total on-site PA	4,000				2,000
h. Total off-site PA ³					
i. Total project PA	4,000				2,000
j. Total Project Area (2.e.+2.i.)	36,000				36,000
k. Percent Replacement of IA in Redevelopment Projects: (Existing on-site IA Replaced ÷ Existing Total on-site IA) x 100%					
100 %					

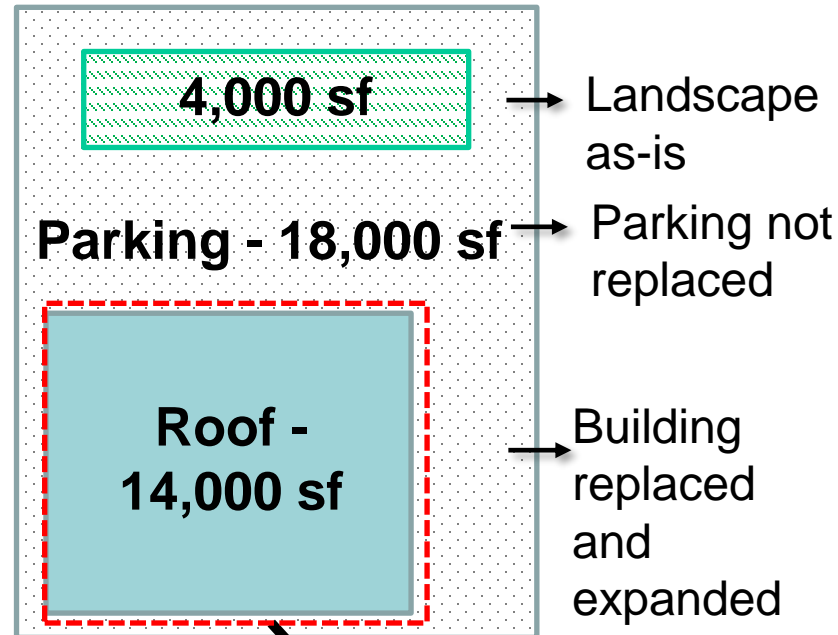


Reporting Impervious Areas

Pre-Project Scenario



Post-Project Scenario



- Landscape as-is
- Parking not replaced
- Building replaced and expanded

Area Requiring Treatment

Pre-project IA - 32,000 sf
Post-project IA - 32,000 sf
Replaced IA - 14,000 sf
Existing IA retained – 18,000 sf
New IA – 0 sf
Percent replaced –
 $14,000/32,000 = 43.75\%$

Reporting Impervious Areas (IA)

2. Project Size

a. Total Site Area: _____ (ft ²)		b. Total Land Area Disturbed During Construction: _____ (ft ²) (including clearing, grading, stockpiling, or excavating)			
Project Totals	Total Existing (Pre-project) Area (ft ²)	Existing Area Retained ¹ (ft ²)	Existing Area Replaced ² (ft ²)	New Area Created ² (ft ²)	Total Post-Project Area (ft ²)
<i>Impervious Area (IA)</i>					
c. Total on-site IA	32,000	18,000	14,000	0	32,000
d. Total off-site IA ³					0
e. Total project IA	32,000	18,000	14,000	0	32,000
f. Total new and replaced IA			14,000		
<i>Pervious Area (PA)⁴</i>					
g. Total on-site PA	4,000				4,000
h. Total off-site PA ³					
i. Total project PA	4,000				4,000
j. Total Project Area (2.e.+2.i.)	36,000				36,000
k. Percent Replacement of IA in Redevelopment Projects: (Existing on-site IA Replaced ÷ Existing Total on-site IA) x 100%					
<u>43.75</u> %					

C3 Data Form: Common Errors

uring Construction: _____ (ft²)
 (e.g., or excavating)

New Area Created ² (ft ²)	Total Post-Project Area (ft ²)
0	192,000
	0
0	192,000
,000	
	18,000
	18,000
	210,000
g Total on-site IA) x 100%	

BMP Volume Calculations - CASQA BMP Handbo

Drainage Area ID	Area (SF)	Imperv Area (SF)	% Imperv
H1	191,340	156,412	82%
H2	59,930	47,944	80%
H3	5,960	0	0%
Total	257,230	205,784	80%

- C3 data form not updated as plan sheets are updated

C3 Data Form: Common Errors

2. Project Size

a. Total Site Area: _____ (ft ²)		b. Total Land Area Disturbed During Construction: _____ (ft ²) (including clearing, grading, stockpiling, or excavating)			
Project Totals	Total Existing (Pre-project) Area (ft ²)	Existing Area Retained ¹ (ft ²)	Existing Area Replaced ² (ft ²)	New Area Created ² (ft ²)	Total Post-Project Area (ft ²)
<i>Impervious Area (IA)</i>					
c. Total on-site IA	32,000	18,000	14,000	2,000	34,000
d. Total off-site IA ³					0
e. Total project IA	32,000	18,000	14,000	2,000	34,000
f. Total new and replaced IA			16,000		
<i>Pervious Area (PA)⁴</i>					
g. Total on-site PA	4,000				4,000
h. Total off-site PA ³					
i. Total project PA	4,000				4,000
j. Total Project Area (2.e.+2.i.)	36,000				38,000
k. Percent Replacement of IA in Redevelopment Projects: (Existing on-site IA Replaced ÷ Existing Total on-site IA) x 100%					
43.75 %					

- Inconsistent totals

Special Projects

- Smart growth or high-density projects that may receive LID treatment reduction credit, i.e., allowed limited use of non-LID treatment measures
- Non-LID measures are limited to tree box filters and media filters
- Required to demonstrate infeasibility of 100% LID treatment prior to receiving LID treatment reduction credits
- Amount of credit based on size, lot coverage, location, density, surface parking and affordable housing units



Special Projects Reporting

Special Projects Worksheet	
Project Name:	
Project Address:	
Applicant/Developer Name:	
"Special Project" Determination:	
Special Project Category "A"	
Does the project have ALL of the following characteristics?	
<input type="checkbox"/>	Located in a municipality's designated central business district, downtown core area or downtown core zoning district, neighborhood business district or comparable pedestrian-oriented commercial district, or historic preservation site and/or district ¹ ;
<input type="checkbox"/>	Creates and/or replaces 0.5 acres or less of impervious <u>surface</u> ;
<input type="checkbox"/>	Includes no surface parking, except for incidental parking for emergency vehicle access, ADA access, and passenger or freight loading <u>zones</u> ;
<input type="checkbox"/>	Has at least 85% coverage of the entire site by permanent structures. The remaining 15% portion of the site may be used for safety access, parking structure entrances, trash and recycling service, utility access, pedestrian connections, public uses, landscaping and stormwater treatment.
<input type="checkbox"/> No (continue)	<input type="checkbox"/> Yes – complete Section 2 of the Special Project Worksheet
Special Project Category "B"	
Does the project have ALL of the following characteristics?	
<input type="checkbox"/>	Located in a municipality's designated central business district, downtown core area or downtown core zoning district, neighborhood business district or comparable pedestrian-oriented commercial district, or historic preservation site and/or district ¹ ;
<input type="checkbox"/>	Creates and/or replaces an area of impervious surface that is greater than 0.5 acres, and no more than 2.0 acres;
<input type="checkbox"/>	Includes no surface parking, except for incidental parking for emergency access, ADA access, and passenger or freight loading zones;
<input type="checkbox"/>	Has at least 85% coverage of the entire site by permanent structures. The remaining 15% portion of the site may be used for safety access, parking structure entrances, trash and recycling service, utility access, pedestrian connections, public uses, landscaping and stormwater treatment;
<input type="checkbox"/>	Minimum <u>Gross</u> ² density of either 50 dwelling units per acre (for residential or mixed use projects) or a <u>Floor Area Ratio</u> ³ (FAR) of 2:1 (for commercial or mixed use projects)
<input type="checkbox"/> No (continue)	<input type="checkbox"/> Yes – complete Section 2 of the Special Project Worksheet
Special Project Category "C"	

Special Projects Worksheet - calculates LID treatment reduction credits

Narrative Discussion of Low Impact Development Feasibility/Infeasibility	
This report provides a narrative discussion of the feasibility or infeasibility of providing 100 percent low impact development (LID) treatment for <u>[[= Insert Project Name =]]</u> , which has been identified as a potential Special Project, based on Special Project criteria provided in Provision C.3 e ii of the Municipal Regional Stormwater Permit (MRP). This report is prepared in accordance with the requirement in MRP Provision C.3 e <u>vi(2)</u> , to include in Special Projects reporting a narrative discussion of the feasibility or infeasibility of 100 percent LID treatment onsite or offsite.	
1. Feasibility/Infeasibility of Onsite LID Treatment	
The project site was reviewed <u>with regard to</u> the feasibility and infeasibility of onsite LID treatment. The results of this review showed that it was <u>[[= feasible/infeasible =]] to treat <u>[[= ___ percent [fill in percentage] =]]</u> of the C.3.d amount of runoff with LID treatment. The findings of this review are presented below.</u>	
a. On-site Drainage Conditions.	
b. Self-treating and Self-Retaining Areas and LID Treatment Measures.	
c. Maximizing Flow to LID Features and Facilities.	
d. Constraints to Providing On-site LID.	
i. Impervious paved areas:	
<ul style="list-style-type: none">• Landscaped areas: Inadequate size to accommodate biotreatment facilities that meet sizing requirements for the tributary area.• Slopes too steep to <u>terrace</u>;• Proximity to an unstable bank or <u>slope</u>;• Environmental constraints (for example, landscaped area is within riparian corridor);• High groundwater or shallow <u>bedrock</u>;• Conflict with subsurface <u>utilities</u>;• Cap over polluted soil or <u>groundwater</u>;• Lack of head or routing path to move collected runoff to the landscaped area or from the landscaped area to a disposal <u>point</u>;• Other conflicts, including required uses that preclude use for stormwater treatment (describe in more detail).	
2. Feasibility/Infeasibility of Off-Site LID Treatment. The possibility of providing off-site LID treatment was found to be <u>[[= feasible/infeasible =]]</u> for the following reasons.	
i. <u>[[= Describe whether the project proponent owns or otherwise controls land within the same watershed of the project that can accommodate in perpetuity off-site bioretention facilities adequately sized to treat the runoff volume of the primary project. =]]</u>	
ii. <u>[[= Indicate whether there is a regional LID stormwater mitigation program available to the project for in-lieu C.3 compliance. =]]</u>	

Narrative describing infeasibility of providing 100% LID on-site or off-site

Special Projects Reporting

- Applicant should provide supporting documentation for project characteristics identified:
 - Gross density credit calculation - Dwelling Units per acre (DU/ac)
 - Location credit – map showing distance to transit station or location in Priority Development Area
 - Parking credit – evidence that there is no surface parking, except for emergency vehicles, ADA compliance, etc.
 - Affordable Housing credit calculations

Site Design and Source Control Measures

- List of measures provided on C3 Data form
- Measures should be project-specific
- Measures should be indicated on plan sheets or SWMP narrative

6. Selection of Specific Stormwater Control Measures:

Site Design Measures

- Minimize land disturbed (e.g., protect trees and soil)
- Minimize impervious surfaces (e.g., reduction in post-project impervious surface)
- Minimum-impact street or parking lot design (e.g., parking on top of or under buildings)
- Cluster structures/ pavement
- Disconnected downspouts (direct runoff from roofs, sidewalks, patios to landscaped areas)
- Pervious pavement
- Green roof
- Other self-treating⁵ area (e.g., landscaped areas)
- Self-retaining⁵ area
- Rainwater harvesting and use (e.g., rain barrel, cistern for designated use)⁶
- Preserved open space
- Protected riparian and wetland areas/buffers
- Other _____

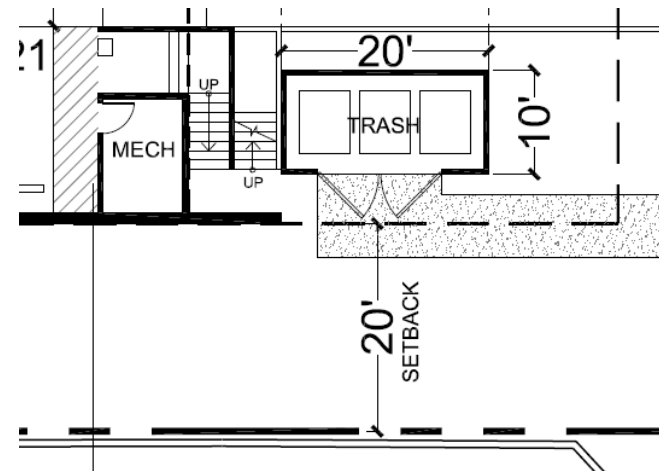
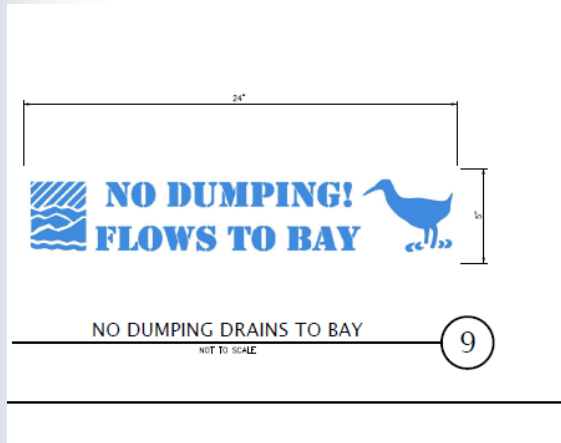
Source Control Measures

- Wash area/racks, drain to sanitary sewer⁷
- Covered dumpster area, drain to sanitary sewer⁷
- Sanitary sewer connection or accessible cleanout for swimming pool/spa/fountain⁷
- Beneficial landscaping (minimize irrigation, runoff, pesticides and fertilizers; promotes treatment)
- Outdoor material storage protection
- Covers, drains for loading docks, maintenance bays, fueling areas
- Maintenance (pavement sweeping, catch basin cleaning, good housekeeping)
- Storm drain labeling
- Other _____

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.

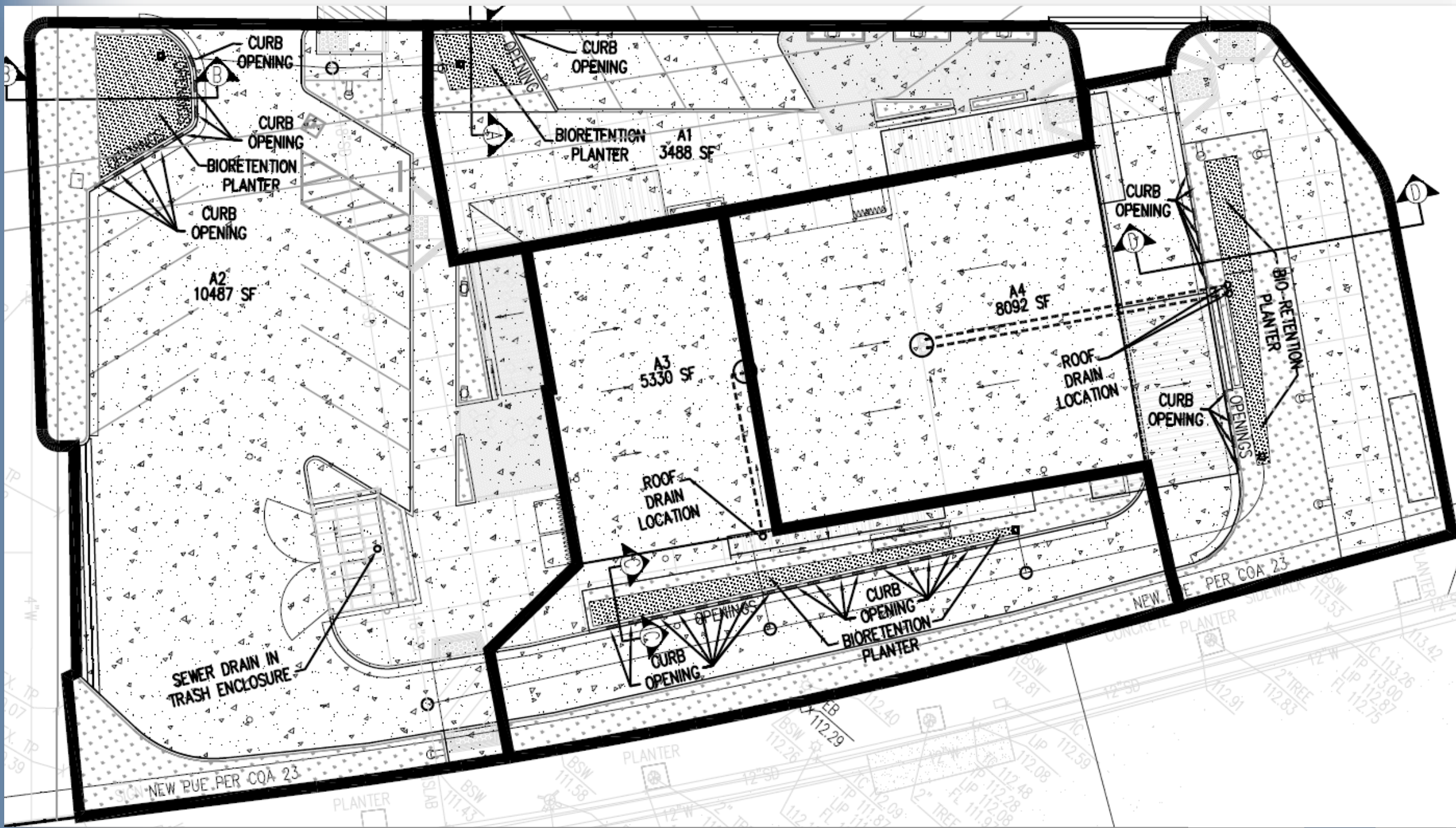


Detail should show cover on dumpster area

Utility Plan should show connection to sanitary sewer

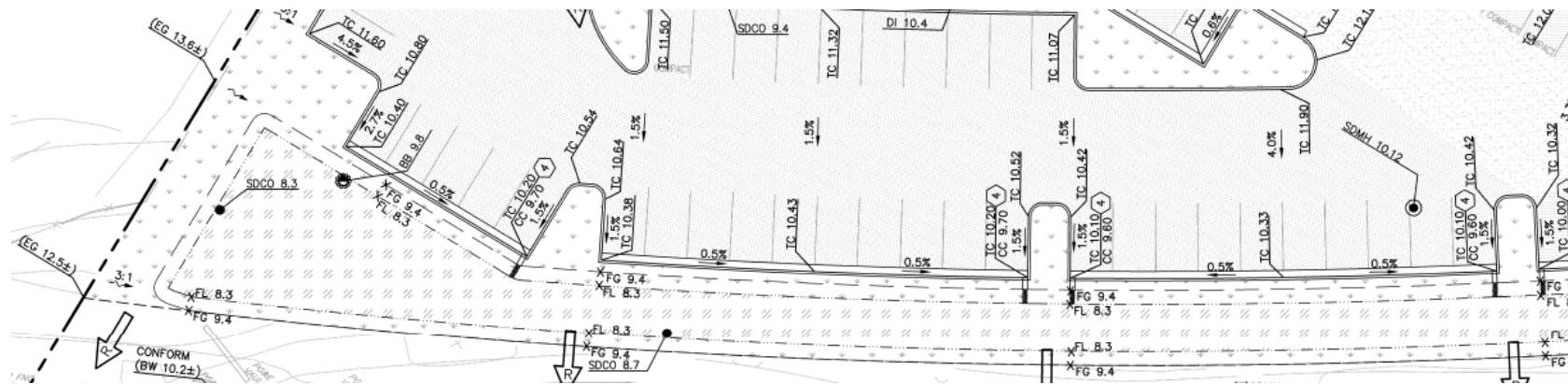
Reviewing DMAs

- The entire project site should be divided into DMAs
- DMAs and treatment measures should be indicated on plan sheets
- DMAs should be labeled as self-treating areas or self-retaining areas, or show treatment measures
- All impervious areas within the DMA should drain toward a treatment measure or self-retaining area



Reviewing DMAs, cont'd

- 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)



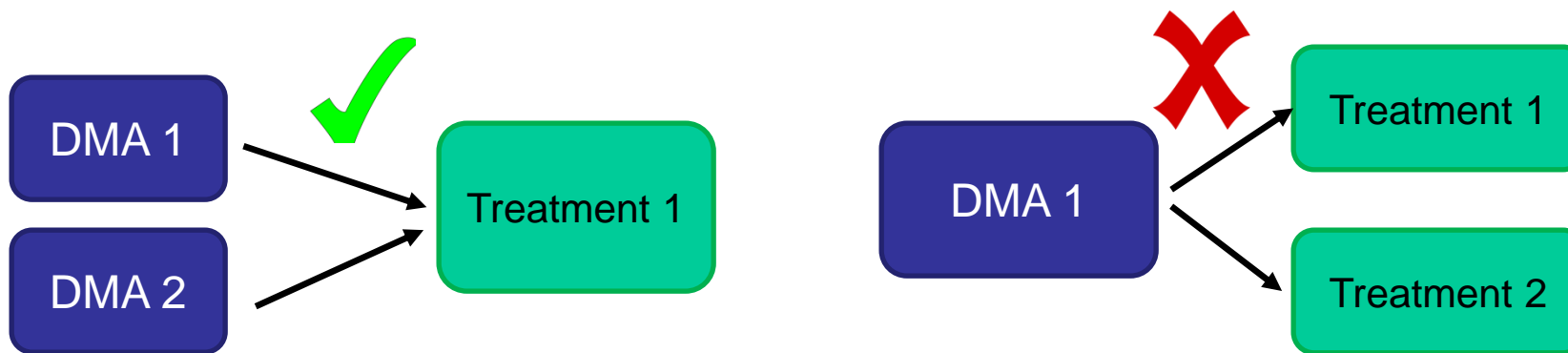
Reviewing DMAs – DMA Summary Tables

TREATMENT CONTROL MEASURE SUMMARY TABLE

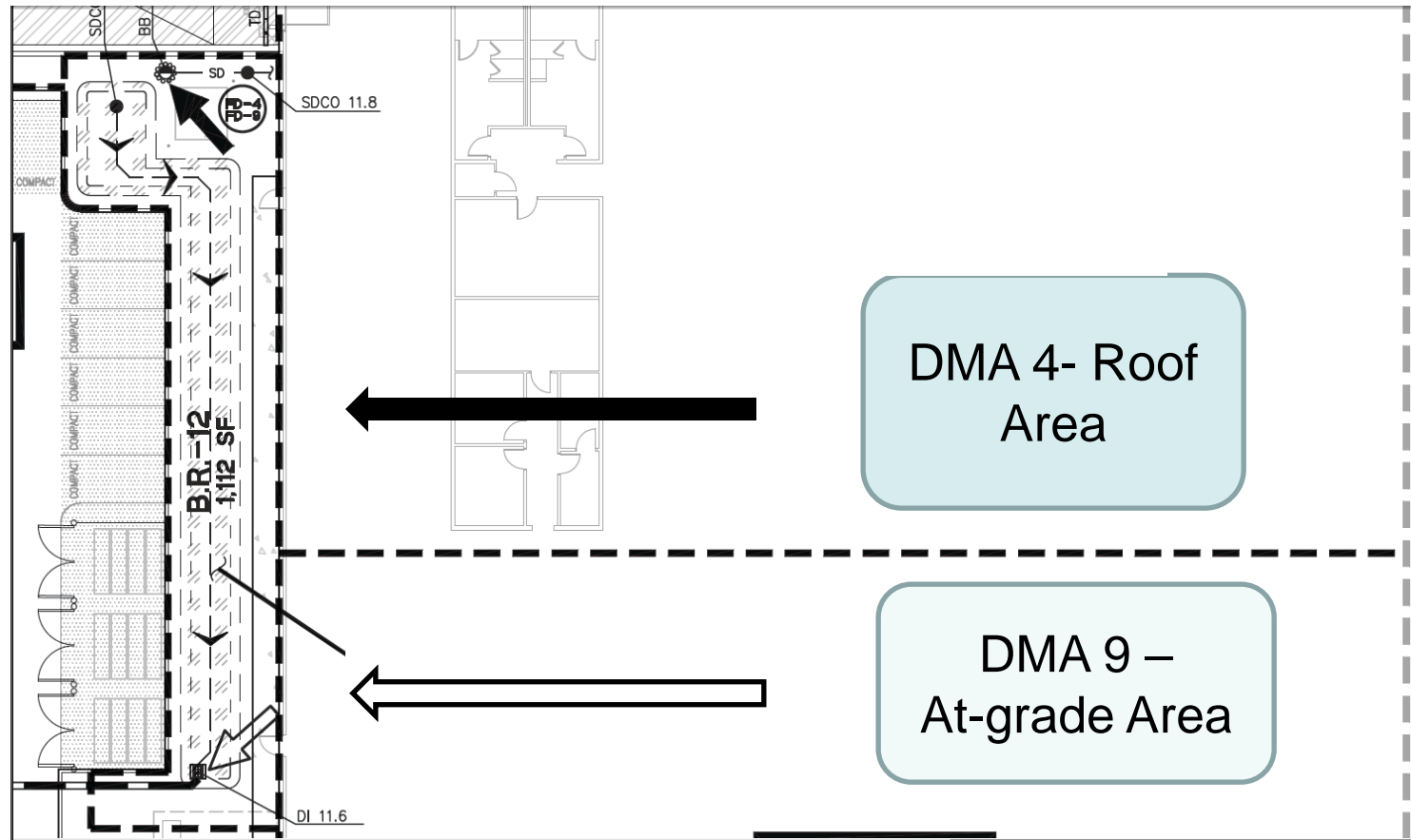
DRAINAGE MANAGEMENT AREA	TCM#	LOCATION	TYPE OF TREATMENT USED	LID or NON-LID	SIZING METHOD	DRAINAGE AREA (SF)	IMPERVIOUS SURFACE (SF)	PERVIOUS SURFACE (PERMEABLE PAVEMENT) (SF)	PERVIOUS SURFACE (OTHER) (SF)	% ONSITE AREA TREATED BY LID OR NON-LID TCM	BIORETENTION AREA REQUIRED (SF)	BIORETENTION AREA PROVIDED (SF)
DMA-A	N/A	ONSITE	Self-treating areas	LID	N/A	17648	0	0	17648	13.90%	N/A	N/A
DMA-B	B	ONSITE	Bioretention unlined w/ underdrain	LID	2C. Flow: 4% Method **	5067	4851	0	216	3.99%	194	216
DMA-C	N/A	ONSITE	Self-retaining areas	LID	N/A	3026	1890	0	1136	2.38%	N/A	N/A
DMA-D	D	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	696	696	0	0	0.55%	28	29
DMA-E	E	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	979	979	0	0	0.77%	39	40
DMA-F	F	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	3745	3653	0	92	2.95%	146	148
DMA-G	G	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	4118	3994	0	124	3.24%	160	160
DMA-H	H	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	3049	3012	0	37	2.40%	120	128
DMA-I	I	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	1976	1976	0	0	1.56%	79	82
DMA-J	J	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	879	845	0	34	0.69%	34	34
DMA-K	K	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	1883	1823	0	60	1.48%	73	82
DMA-L	L	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	945	909	0	36	0.74%	36	36
DMA-M	M	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	2092	2045	0	47	1.65%	82	85
DMA-N	N	ONSITE	Flow-Through planter concrete lined* w/ underdrain	LID	2C. Flow: 4% Method **	2690	2600	0	90	2.12%	104	110
DMA-O	O	ONSITE	Bioretention lined* w/ underdrain	LID	2C. Flow: 4% Method **	8627	8279	0	348	6.80%	331	348
DMA-P	N/A	ONSITE	Self-retaining areas	LID	N/A	3354	834	0	2520	2.64%	N/A	N/A
DMA-Q	N/A	ONSITE	Self-retaining areas	LID	N/A	3000	116	0	2884	2.36%	N/A	N/A
DMA-R	N/A	ONSITE	Self-retaining areas	LID	N/A	30837	3087	26495	1255	24.30%	N/A	N/A

Reviewing DMAs, cont'd

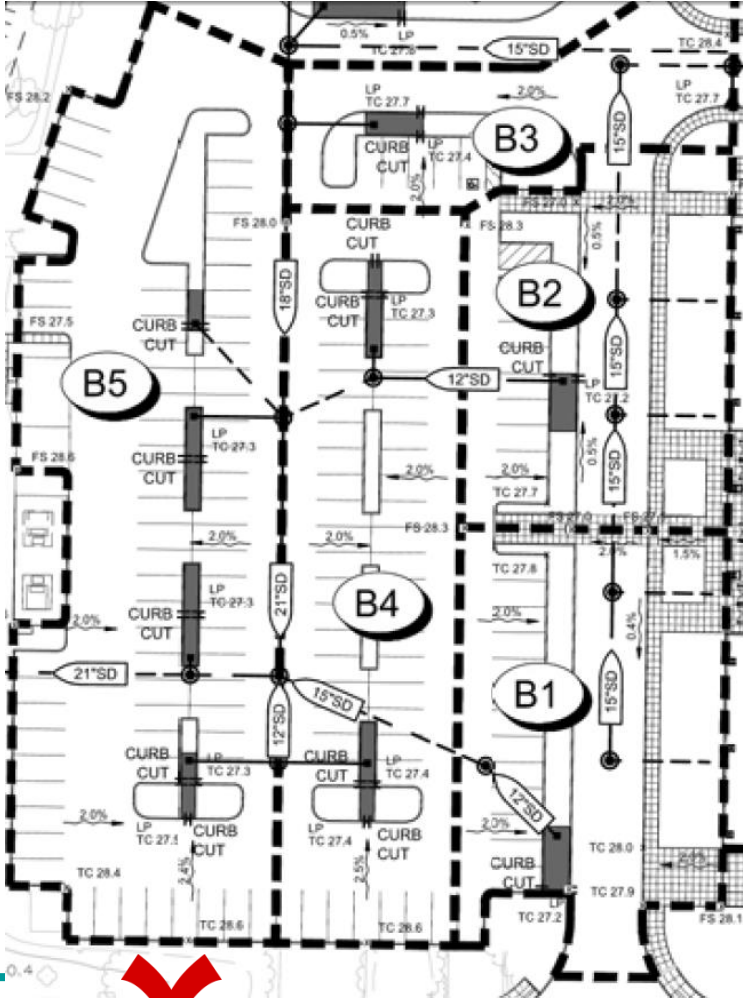
- Multiple DMAs may flow to same treatment measure
 - Treatment measure should be sized adequately
 - Flow path should be indicated
- One DMA should not flow to multiple treatment measures



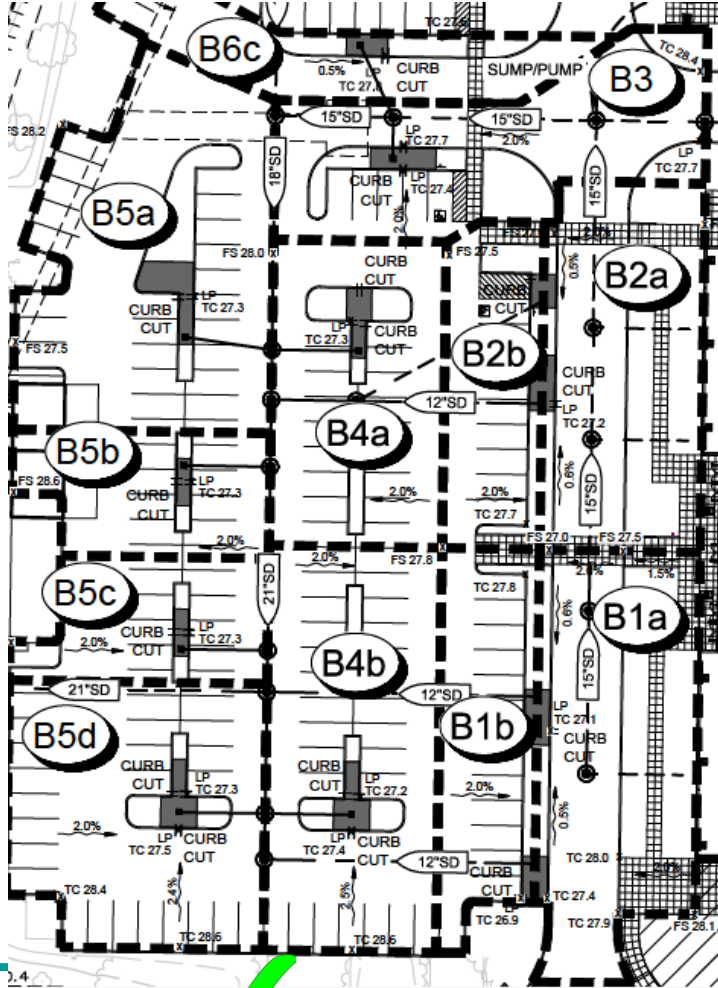
Multiple DMAs Flowing to Same Treatment Measure



Each DMA Flowing Into One Treatment Measure



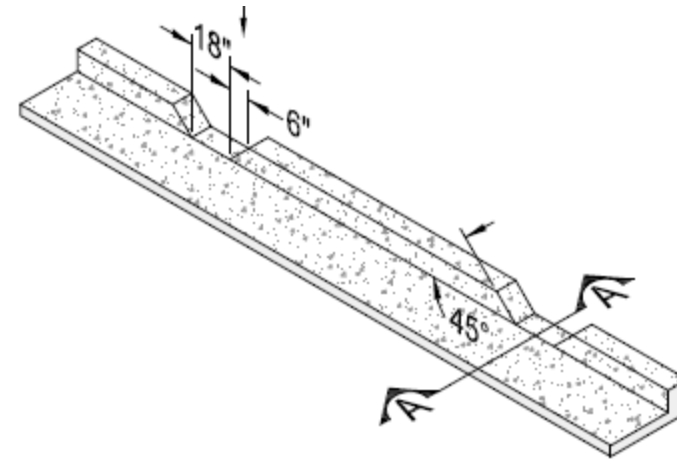
X Incorrect



✓ Correct

Flow Lines and Runoff Entry Points

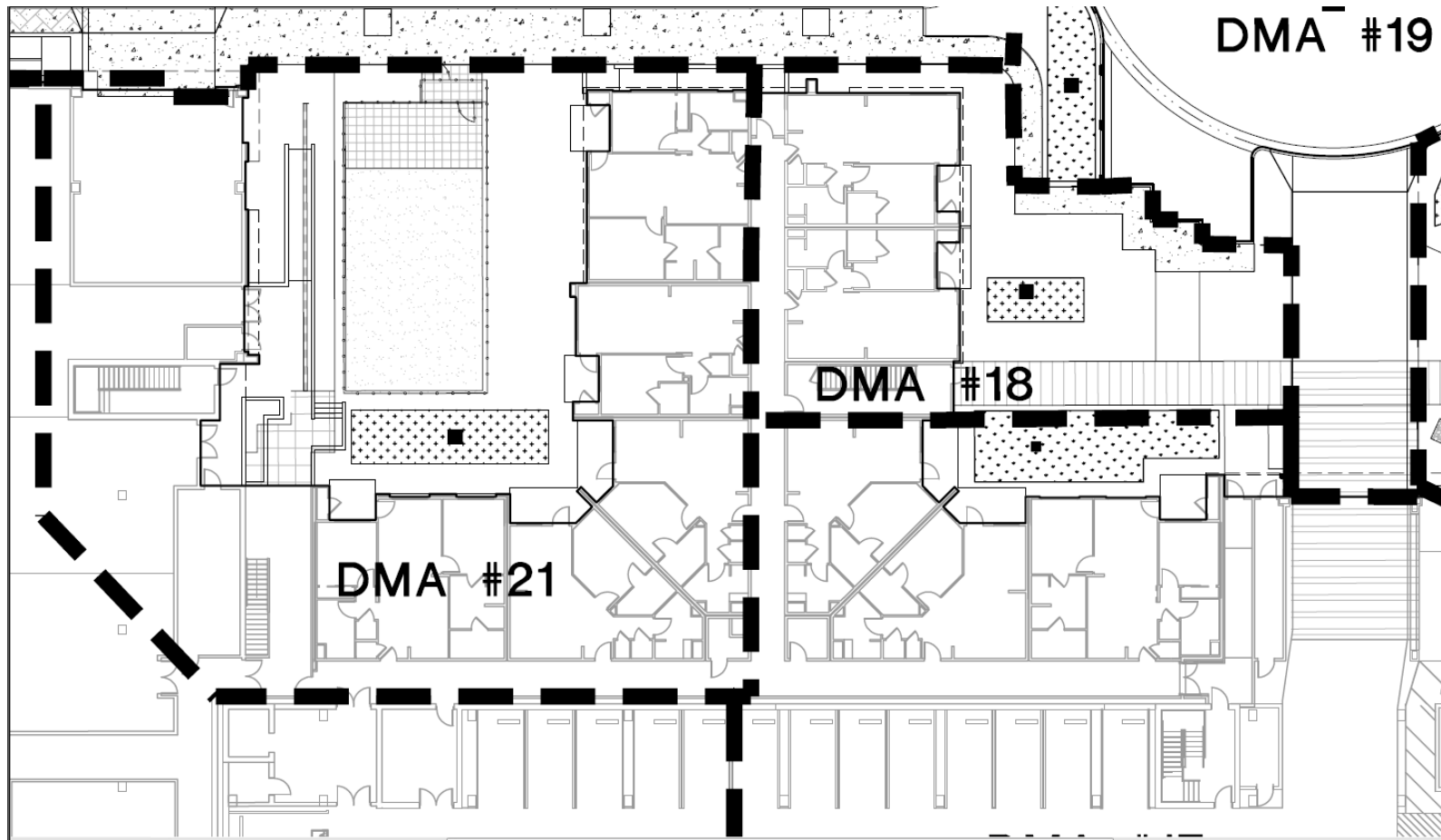
- Direction of flow and how runoff enters treatment measures should be indicated
 - Roof downspouts
 - Area drain inlets
 - Bubblers/pop-up emitters
 - Curb cuts
 - Flush curb



Flow Lines and Runoff Entry Points

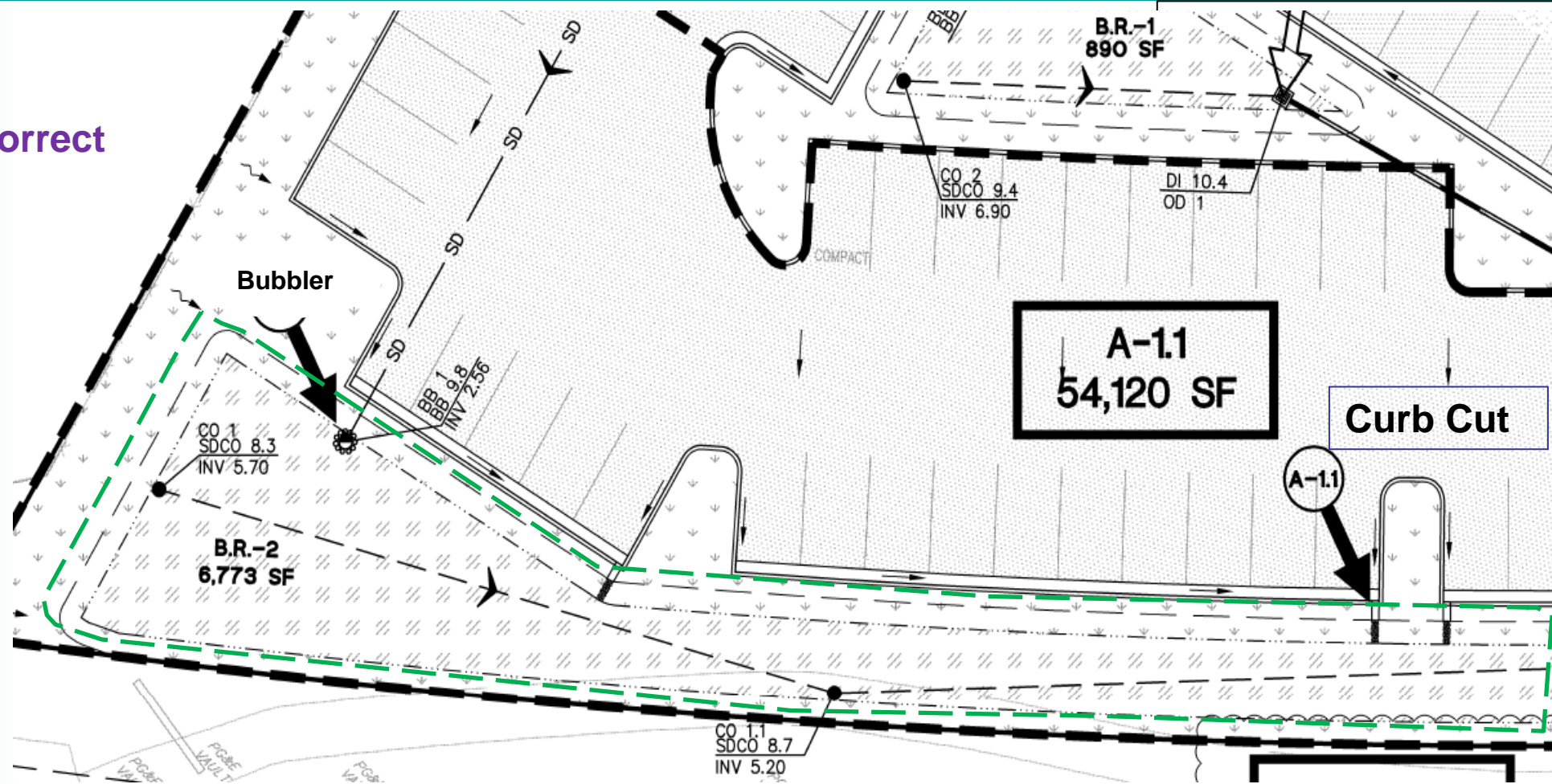


Incorrect



Flow Lines and Runoff Entry Points

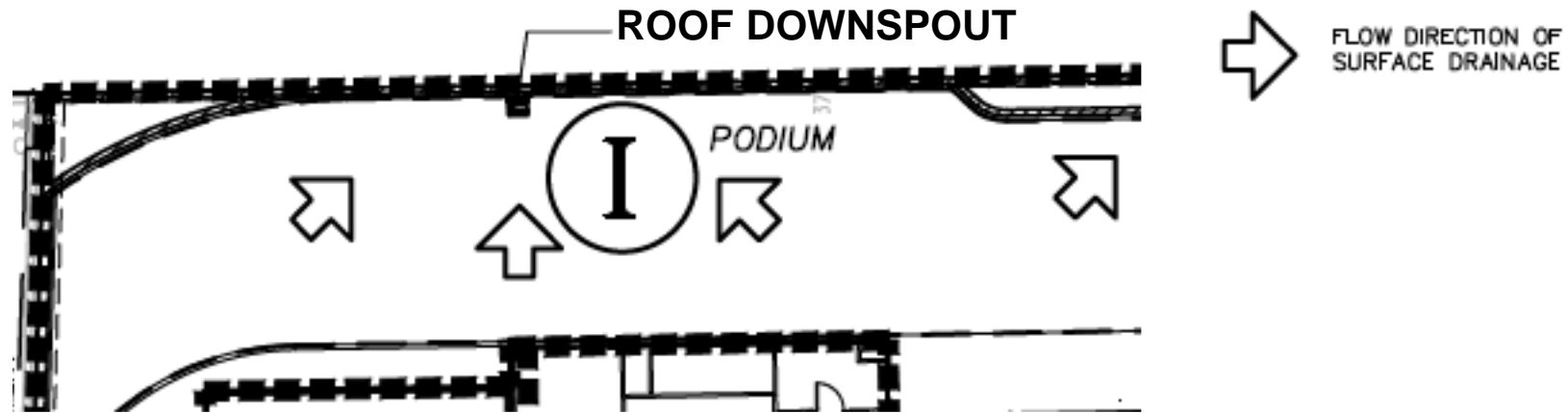
✓ Correct



Flow Lines and Runoff Entry Points



Correct



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.

Treatment Measure Sizing

- Check for submittal of complete sizing calculations



Correct

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.

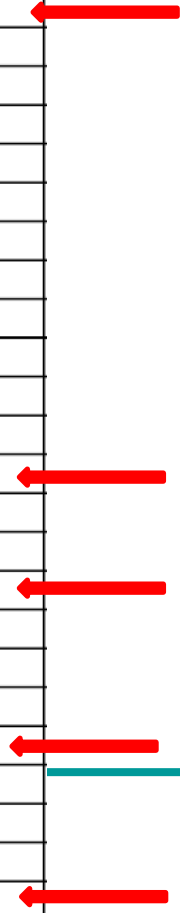
Reviewing DMAs – Adequate Treatment Surface Area Not Provided



Incorrect

STORMWATER TREATMENT CALCULATION

AREA ID	SURFACE	IMPERVIOUS AREA (SF)	BMP USED	SIZING FACTOR	REQUIRED SURFACE AREA (SF)	SURFACE AREA AS PROVIDED (SF)
AREA 1	PAV	4,405	BIO RETENTION	0.04	176	0
AREA 2	PAV	3,350	BIO RETENTION	0.04	134	143
AREA 3	ROOF/PAV	3,071	BIO RETENTION	0.04	123	150
AREA 4	ROOF/PAV	6,094	BIO RETENTION	0.04	244	245
AREA 5	ROOF/PAV	3,771	BIO RETENTION	0.04	151	151
AREA 6	ROOF/PAV	10,887	BIO RETENTION	0.04	435	380
AREA 7	ROOF/PAV	3,627	BIO RETENTION	0.04	145	147
AREA 8	ROOF/PAV	4,787	BIO RETENTION	0.04	192	197
AREA 9	ROOF/PAV	1,784	BIO RETENTION	0.04	71	72
AREA 10	ROOF/PAV	1,275	BIO RETENTION	0.04	51	51
AREA 11	ROOF/PAV	2,298	BIO RETENTION	0.04	92	92
AREA 12	ROOF/PAV	1,760	BIO RETENTION	0.04	70	70
AREA 13	ROOF/PAV	6,268	BIO RETENTION	0.04	251	190
AREA 14	ROOF/PAV	5,000	BIO RETENTION	0.04	200	203
AREA 15	ROOF/PAV	3,084	BIO RETENTION	0.04	124	157
AREA 16	ROOF/PAV	12,072	BIO RETENTION	0.04	483	338
AREA 17	ROOF/PAV	12,871	BIO RETENTION	0.04	515	522
AREA 18	ROOF/PAV	4,235	BIO RETENTION	0.04	169	170
AREA 19	PAV	7,234	BIO RETENTION	0.04	290	298
AREA 20	PAV	7,006	BIO RETENTION	0.04	280	0
AREA 21	ROOF/PAV	8,808	BIO RETENTION	0.04	352	355
AREA 22	ROOF/PAV	11,774	BIO RETENTION	0.04	471	306
AREA 23	ROOF/PAV	4,561	BIO RETENTION	0.04	182	242
AREA 24	ROOF/PAV	27,028	BIO RETENTION	0.04	1,081	0



Treatment Measure Details

- Typical detail guidance is included in the C.3 Handbook
- Details should be specific to the project

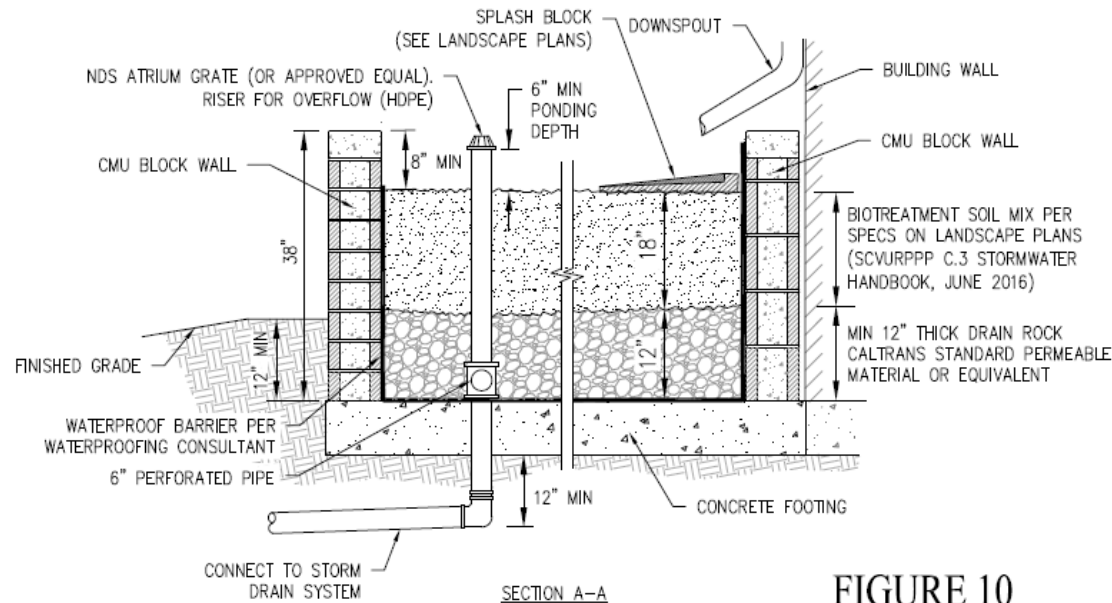


FIGURE 10

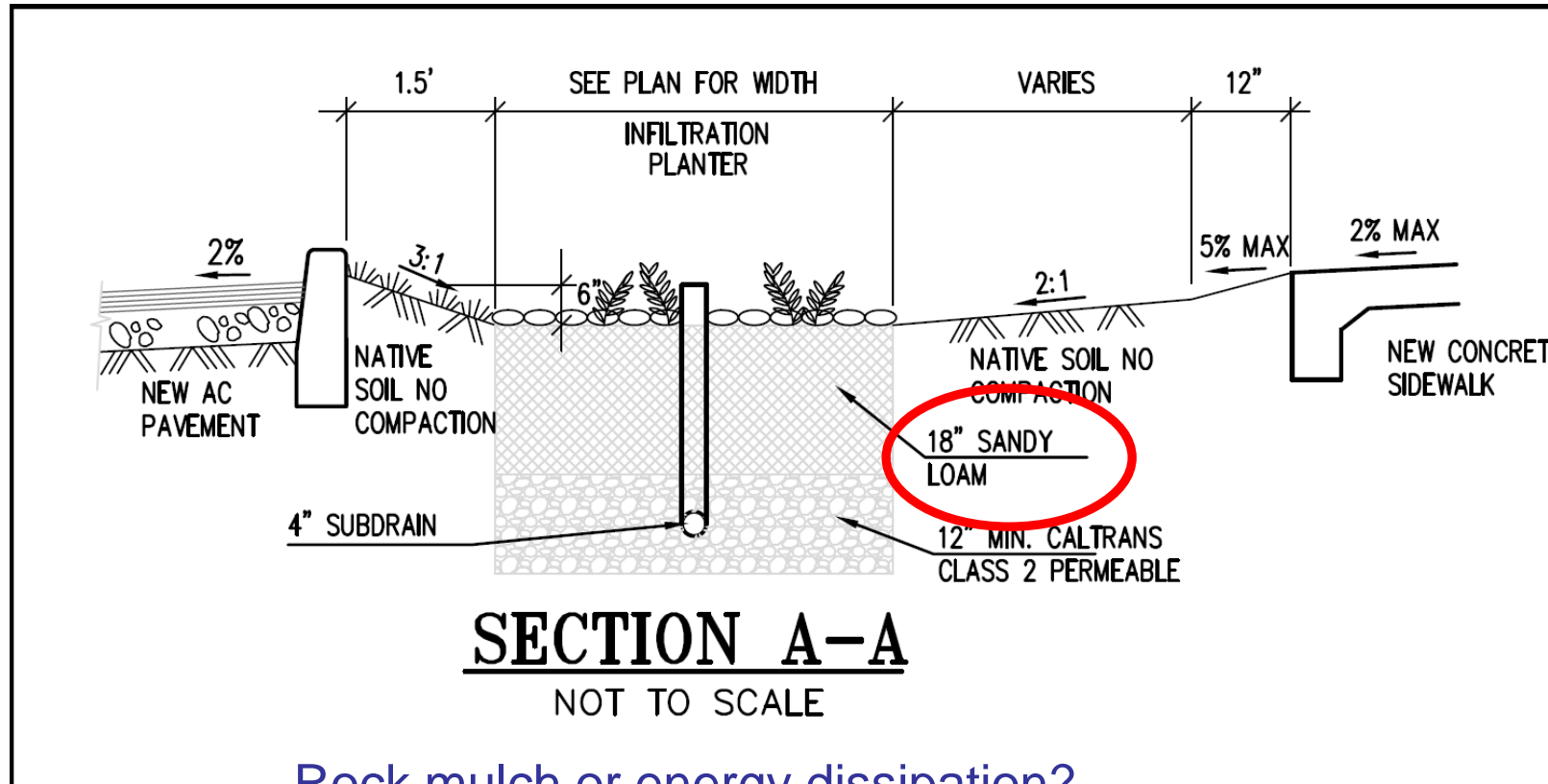
Treatment Measure Details: Common Errors

- Inlets for runoff to enter treatment measure 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

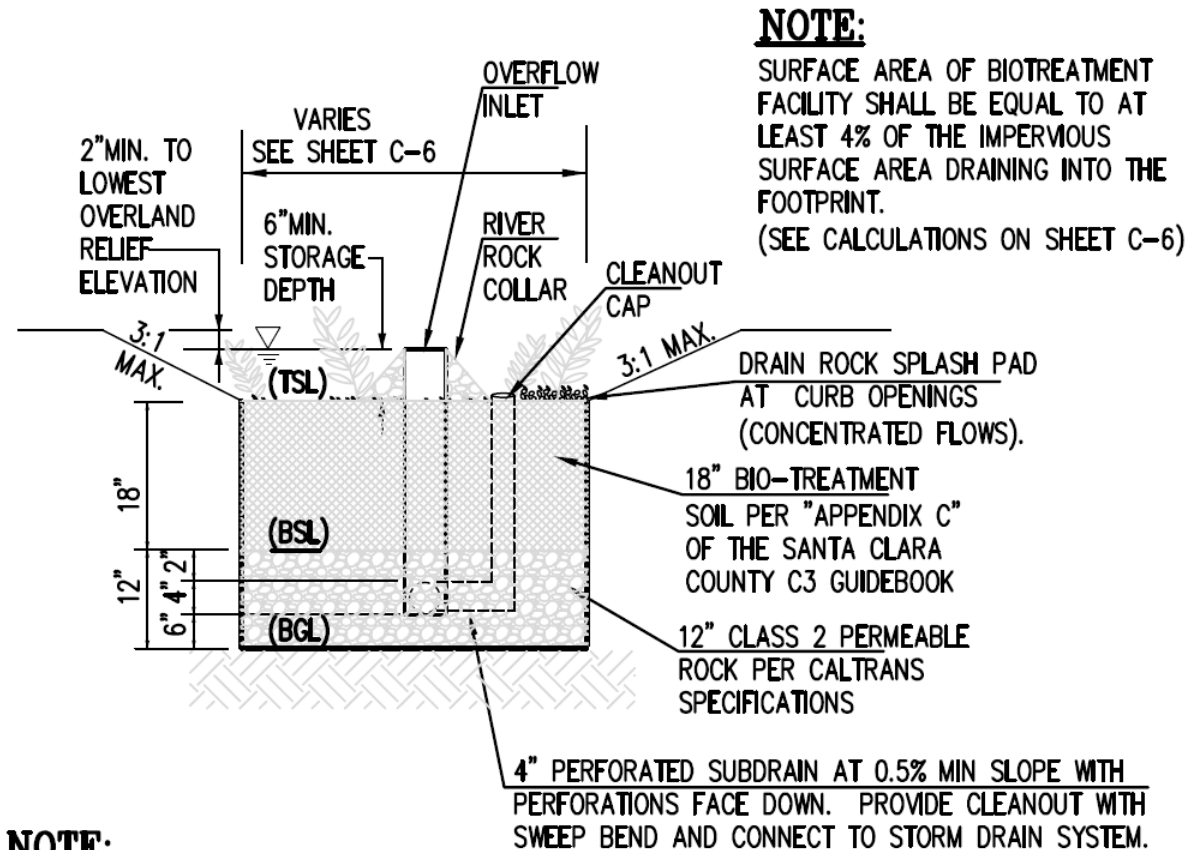
- Bioretention Area/Flow-through Planter
 - Biotreatment soil mix not mentioned or wrong reference (should reference BASMAA spec dated April 2016 or Appendix C of the C.3 Handbook)
 - Mulch not mentioned – need 3” of non-floating (composted) mulch
- Bioretention Area
 - Bottom lined without providing justification, such as:
 - 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

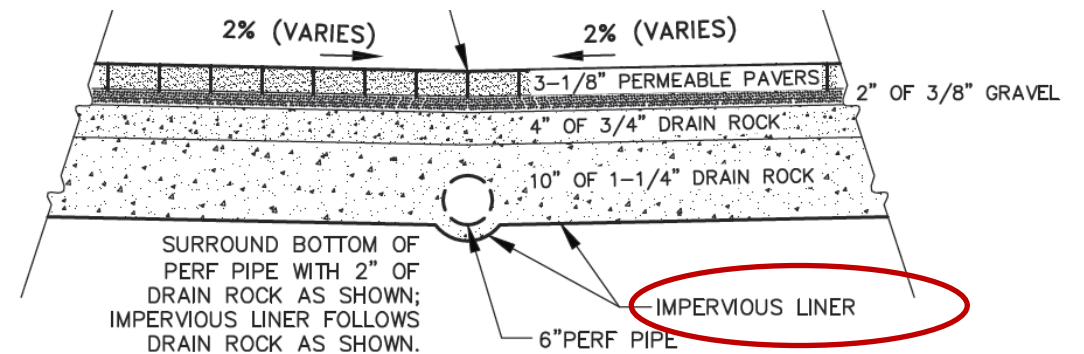


NOTE:
3" COMPOSTED MULCH
OVER SURFACE

NOT TO SCALE

Treatment Measure Details: Common Errors

- Infiltration Trench
 - Lined with impervious liner so can't infiltrate
- Pervious Pavement
 - 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 Handbook, Appendix D
- If plants not listed in Appendix D 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	<i>Epilobium densiflorum</i>	Dense Spike Primrose	Low		Gallon	36" OC
ID	<i>Iris douglasiana</i>	Douglas iris	Low		Gallon	24" OC
MR	<i>Muhlenbergia rigins</i>	Muhly Grass	Low		Gallon	48" OC
RS	<i>Ribes sanguinum</i>	Red Flowering Current	Low		Gallon	48" OC



For more information...

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