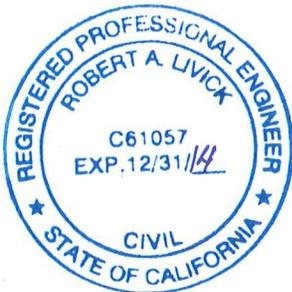


STORMWATER MANAGEMENT
GUIDANCE MANUAL
FOR
LOW IMPACT DEVELOPMENT
&
POST-CONSTRUCTION
REQUIREMENTS

EZ MANUAL

March 6, 2014

This Guidance Manual is a supplement to the City of Morro Bay
Department of Public Services Standard Drawings and Specifications



City of Morro Bay, California

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2-27-2014

Date

Introduction

Post-Construction Stormwater Management Performance Requirements

The primary objective of these Post-Construction Stormwater Management Performance Requirements is to minimize the downstream impact of increased stormwater runoff that often occurs as the result of development or redevelopment projects. The Post-Construction Requirements emphasize protecting and, where degraded, restoring key watershed processes to create and sustain healthy watersheds. Maintenance and restoration of watershed processes is necessary to protect water quality and beneficial uses.

The intention of this Guidance Manual is to provide developers a tool to both determine the specific requirements for a given project and to plan and design the project so that those requirements are met as efficiently as possible. The requirements in this Manual are based on Resolution R3-2013-0032 and Attachments adopted July 12, 2013 by the Central Coast Regional Water Quality Control Board. In the event of conflict, the requirements of Resolution R3-2013-0032 shall take precedence over those contained in this Guidance Manual. Attachment 1 of the Resolution, which contains the referenced requirements, can be viewed or downloaded at:

http://www.waterboards.ca.gov/centralcoast/water_issues/programs/stormwater/docs/lid/hydromod_lid_docs/2013_0032_attach1_post_construction_requirements.pdf

This EZ Manual can be used for individual single-family residence projects (Net Impervious Area <15,000 SF) in Morro Bay; if your project doesn't fit into this category then the Main Manual shall be used.

Definitions Related to Post-Construction Requirements

Discretionary Approval – A project approval which requires the exercise of judgment or deliberation when the MS4 decides to approve or disapprove a particular activity, as distinguished from situations where the MS4 merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations.

Dispersion – The practice of routing stormwater runoff from impervious areas, such as rooftops, walkways, and patios, onto the surface of adjacent pervious areas. Stormwater runoff is dispersed via splash block, dispersion trench, or sheet flow and soaks into the ground as it moves slowly across the surface of the pervious area.

Evapotranspiration (ET) – The loss of water to the atmosphere by the combined processes of evaporation (from soil and plant surfaces) and transpiration (from plant tissues).

Gross Impervious Area – Impervious surfaces that are created or replaced by the project. Manufactured permeable surfaces (pervious paving, gapped paving stones, etc.) may be considered as a pervious surface and are considered on a case by case basis. If sidewalks or new pavement in the City right of way is planned or required by code, these surfaces shall also be included in the total. Do not include the surface area of decks with gaps that allow runoff to drain to permeable surfaces below. Gross Impervious Area is used in the initial determination of performance requirements.

Impervious Surface – A hard, non-vegetated surface area that prevents or significantly limits the entry of water into the soil mantle, as would occur under natural conditions prior to development. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater. Open, uncovered retention/detention facilities shall not be considered as impervious surfaces for purposes of determining whether the thresholds for application of Performance Requirements are exceeded. However, for modeling purposes, open, uncovered facilities that retain/detain water (e.g., retention ponds, pools) shall be considered impervious surfaces. There are three methods of calculating impervious surface area, depending on the context of the calculation. For more details, see ***Net Impervious Area, Gross Impervious Area, and Equivalent Impervious Area*** definitions.

Landscaped Areas – Areas of soil and vegetation not including any impervious surfaces of ancillary features such as impervious patios, BBQ areas, and pools.

Low Impact Development (LID) – A stormwater and land use management strategy that strives to mimic pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation, and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design.

Ministerial Approval – A project approval which involves little or no personal judgment by the MS4 as to the wisdom or manner of carrying out the project and only involves the use of fixed standards or objective measurements.

Native Vegetation – Vegetation comprised of plant species indigenous to the Central Coast Region and which reasonably could have been expected to naturally occur on the site.

Net Impervious Area – The sum of new and replaced post-project impervious areas, minus any reduction in total imperviousness from the pre-project to post-project condition: *Net Impervious Area = (New and Replaced Impervious Area) – (Reduced Impervious Area Credit)*, where *Reduced Impervious Area Credit* is the total pre-project to post-project reduction in impervious area, if any.

New Development – Land disturbing activities that include the construction or installation of buildings, roads, driveways and other impervious surfaces. Development projects with pre-existing impervious surfaces are not considered New Development.

Permeable or Pervious Surface – A surface that allows varying amounts of stormwater to infiltrate into the ground. Examples include pasture, native vegetation areas, landscape areas, and permeable pavements designed to infiltrate.

Pre-Project – Stormwater runoff conditions that exist onsite immediately before development activities occur. This definition is not intended to be interpreted as that period before any human-induced land activities occurred. This definition pertains to redevelopment as well as initial development.

Project Site – The area defined by the legal boundaries of a parcel or parcels of land within which the new development or redevelopment takes place and is subject to these Post-Construction Stormwater Management Requirements.

Rainwater Harvest – Capture and storage of rainwater or stormwater runoff for later use, such as irrigation (without runoff), domestic use (e.g. toilets), or storage for fire suppression.

Receiving Waters – Bodies of water, surface water systems or groundwater that receive surface water runoff through a point source, sheet flow or infiltration.

Redevelopment – On a site that has already been developed, construction or installation of a building or other structure subject to the Permittee’s planning and building authority including: 1) the creation or addition of impervious surfaces; 2) the expansion of a building footprint or addition or replacement of a structure; or 3) structural development including construction, installation or expansion of a building or other structure. It does not include routine road maintenance, nor does it include emergency construction activities required to immediately protect public health and safety.

Replaced Impervious Surface – The removal of existing impervious surfaces down to bare soil, base course or foundation slab and replacement with new impervious surface. Replacement of impervious surfaces that are part of routine maintenance activities are not considered replaced impervious surfaces.

Routine Road Maintenance – includes pothole and square cut patching; overlaying existing asphalt or concrete pavement with asphalt or concrete without expanding the area of coverage; shoulder grading; reshaping/regrading drainage systems; crack sealing; resurfacing with in-kind material without expanding the road prism or altering the original line and grade and/or hydraulic capacity of the road.

Self-Retaining Areas – (also called “zero discharge” areas), are designed to retain some amount of rainfall (by ponding and infiltration and/or evapotranspiration) without producing stormwater runoff. Self-Retaining Areas may include graded depressions with landscaping or pervious pavement.

Self-Treating Areas – are a portion of a Regulated Project in which infiltration, evapotranspiration and other natural processes remove pollutants from stormwater. The self-treating areas may include conserved natural open areas and areas of native landscaping. The self-treating area only treats the rain falling on itself and does not receive stormwater runoff from other areas.

Single-Family Residence – The building of one single new house or the addition and/or replacement of impervious surface associated with one single existing house, which is not part of a larger plan of development.

Stormwater Control Measures (SCM) – Stormwater management measures integrated into project designs that emphasize protection of watershed processes through replication of pre-development runoff patterns (rate, volume, duration). Physical control measures include, but are not limited to, bioretention/rain gardens, permeable pavements, roof downspout controls, dispersion, soil quality and depth, minimal excavation foundations, vegetated roofs, and water use. Design control measures include but are not limited to conserving and protecting the function of existing natural areas, maintaining or creating riparian buffers, using onsite natural drainage features, directing runoff from impervious surfaces toward pervious areas, and distributing physical control measures to maximize infiltration, filtration, storage, evaporation, and transpiration of stormwater before it becomes runoff.

Stormwater Control Plan – A plan, developed by the Regulated Project applicant, detailing how the project will achieve the applicable Post-Construction Stormwater Management Requirements (for both onsite and offsite systems). A preliminary Stormwater Control Plan is required for Planning Permits and the final version is required prior to issuance of a Building Permit. See Appendix B for required contents.

Tributary Area – The entire project area except for undisturbed areas of planted areas with native vegetation that do not receive runoff from other areas and impervious surface areas that discharge to infiltration areas that will not produce runoff or create nuisance ponding. The Drainage Management Areas are smaller Tributary Areas that cumulatively make up the Tributary Area of the entire site.

Does My Project Need to Meet Post-Construction Performance Requirements?

Projects subject to these Post-Construction Performance Requirements include all New Development or Redevelopment projects that create and/or replace $\geq 2,500$ square feet of impervious surface (collectively over the entire project site). In general, the larger the impervious surface created or replaced, the more rigorous the requirements become. However, a single family residence (SFR) project has a higher threshold before advance requirements apply. Consequently, these two elements (gross impervious area and project type) need to be determined and quantified as a first step in the process.

1. **Gross Impervious Area:** Gross Impervious Area is the total of newly created and replaced impervious surfaces. Existing impervious surfaces that are within the project site but are not being replaced do not count in this calculation. Impervious surfaces are any hard, non-vegetated surface areas that prevent or significantly limit the entry of water into the soil. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater. Manufactured permeable surfaces (pervious paving, gapped paving stones, etc.) may be considered as pervious surfaces and are considered on a case by case basis. If sidewalks or new pavement in the City right of way is planned or required by code, these surfaces shall also be included in the total. Surface areas of decks with gaps that allow runoff to drain to permeable surfaces below are not considered impervious areas. For redevelopment projects, both new and replaced impervious surfaces are included. If the Gross Impervious Area is less than 2,500 square feet, the project is exempt from requirements.
2. **Type of Project:** A list of types of projects that are exempt for all stormwater requirements is detailed below. If not exempt:
 - a. Is the project a new development or redevelopment project? Projects are classified as redevelopment if the project replaces or adds to existing impervious surfaces. Projects located on land with no existing impervious surfaces are considered new development.
 - b. Does the project involve the construction or reconstruction of one detached single family residence (SFR)? If not, the applicant must use the Main Manual.

The Performance Requirement Determination Form in Appendix A is provided to document the results of the above assessment. It shall be completed and filed with the Planning permit application. If the project is exempt, no further documentation is required. If not exempt, a calculation of the Net Impervious Area is required.

PROJECTS EXEMPT FROM STORMWATER REQUIREMENTS

Project that are exempt from the Post-Construction Performance are as follows (check any box on the list and no further action is required):

- Road and Parking Lot maintenance:
 - Road surface repair including slurry sealing, fog sealing, and pothole and square cut patching
 - Overlaying existing asphalt or concrete pavement with asphalt or concrete without expanding the area of coverage
 - Shoulder grading
 - Cleaning, repairing, maintaining, reshaping, or re-grading drainage systems
 - Crack sealing
 - Resurfacing with in-kind material without expanding the road or parking lot
 - Practices to maintain original line and grade, hydraulic capacity, and overall footprint of the road or parking lot
 - Repair or reconstruction of the road because of slope failures, natural disasters, acts of God or other man-made disaster
- Sidewalk and bicycle path or lane projects, where no other impervious surfaces are created or replaced, built to direct stormwater runoff to adjacent vegetated areas
- Trails and pathways, where no other impervious surfaces are replaced or created, and built to direct stormwater runoff to adjacent vegetated areas
- Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics
- Curb and gutter improvement or replacement projects that are not part of any additional creation or replacement of impervious surface area (e.g., sidewalks, roadway)
- Second-story additions that do not increase the building footprint
- Roof repair or replacement
- Raised (not built directly on the ground) decks, stairs, or walkways designed with spaces to allow for water drainage
- Photovoltaic systems installed on/over existing roof or other impervious surfaces, and panels located over pervious surfaces with well-maintained grass or vegetated groundcover, or panel arrays with a buffer strip at the most down gradient row of panels
- Temporary structures (in place for less than six months)
- Electrical and utility vaults, sewer and water lift stations, backflows and other utility devices
- Above-ground fuel storage tanks and fuel farms with spill containment system

Net Impervious Area Calculation

Net Impervious Area is the Gross Impervious Area minus any reduction in total imperviousness from the pre-project to post-project condition: $\text{Net Impervious Area} = (\text{Gross Impervious Area}) - (\text{Reduced Impervious Area Credit})$, where Reduced Impervious Area Credit is the total pre-project to post-project reduction in impervious area, if any. The result of this calculation is used to determine if a project is subject to the requirements described in this EZ Manual

Examples of Calculating **Net Impervious Area**

Example 1:

The project is a property that is an existing residence with 20,000 sf of impervious surface, including residence, garage, driveway, tennis court, etc. The new project will redevelop the site and have a total impervious area of 18,000 sf.

The **Reduced Imperious Area Credit** is $20,000 - 18,000 = 2,000$ sf.

The **Net Impervious Area** is $18,000 - 2,000 = 16,000$ sf.

The **Net Impervious Area** is 16,000 sf which is greater than 15,000 sf .

The project is subject to requirements in the Main Manual.

Example 2:

The project is a property that is an existing residence with 20,000 sf of impervious surface, including residence, garage, driveway, tennis court, etc. The new project will redevelop the site, replacing the 4,000 SF paved tennis court with natural grass bocce courts and landscaping resulting in a total impervious area of 16,000 sf.

The **Reduced Imperious Area Credit** is $20,000 - 16,000 = 4,000$ sf.

The **Net Impervious Area** is $16,000 - 4,000 = 12,000$ sf.

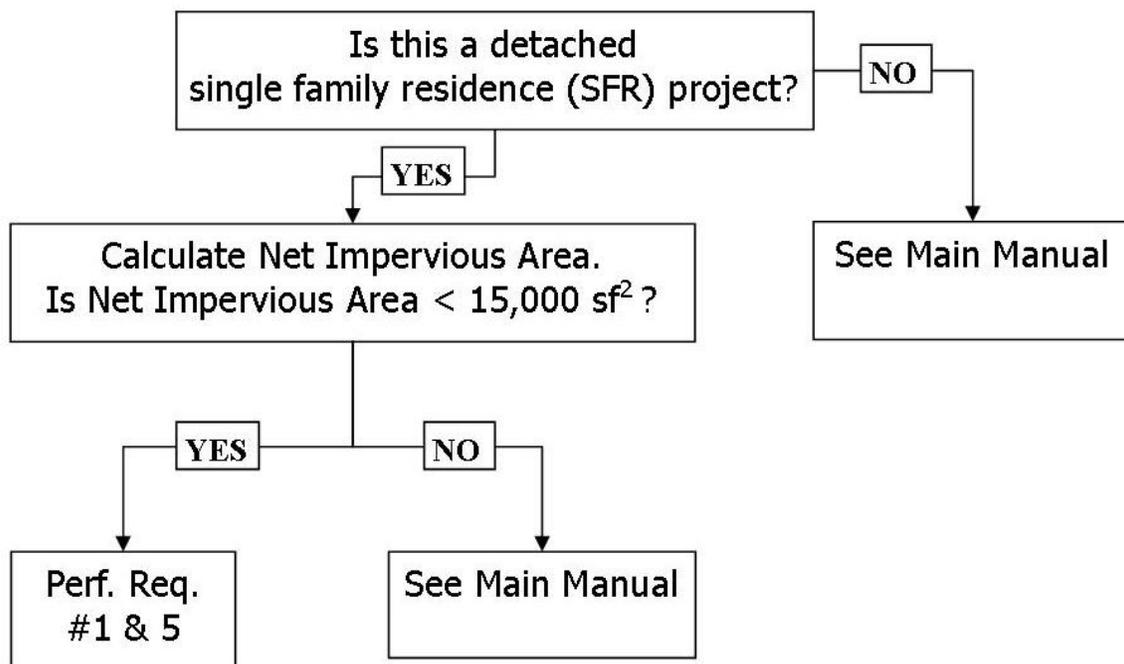
The **Net Impervious Area** is 12,000 sf which is less than 15,000 sf .

The project is subject to requirements in this Manual.

Once the Net Impervious Area Calculation is determined, use the following flow chart to determine the Post-Construction Performance Requirements for the project. Complete the Performance Requirement Determination Form (Appendix A) once the Flow Chart has been used to determine Performance Requirements.

Flow Chart

Performance Requirements Flow Chart for non-exempt projects



Performance Requirement No. 1

Site Design and Runoff Reduction

Projects subject to Performance Requirement No. 1 (PR.1) are:

Projects that create and/or replace $\geq 2,500$ square feet of impervious surface (collectively over the entire project site), including detached single-family homes.

The Project Engineer shall submit a stamped and signed copy of the Performance Requirement No.1 Certification, as included on the following page; certifying Low Impact Development design strategies are included in the project design. Each strategy that has been incorporated into the design should be initialed by the project engineer, or marked NA if not applicable.

PERFORMANCE REQUIREMENT NO. 1 CERTIFICATION	
LOW IMPACT DEVELOPMENT (LID) DESIGN STRATEGY	INCORPORATED
1. Limit disturbance of creeks and natural drainage features.	
2. Minimize compaction of highly permeable soils.	
3. Limit clearing and grading of native vegetation at the site to the minimum area needed to build the project, allow access, and provide fire protection.	
4. Minimize impervious surfaces by concentrating improvements on the least sensitive areas of the site, while leaving the remaining land in a natural undisturbed state.	
5. Minimize stormwater runoff by implementing one or more of the following design measures:	
a) Direct roof runoff into cisterns or rain barrels for reuse.	
b) Direct roof runoff onto vegetated areas safely away from building foundations and footings.	
c) Direct runoff from sidewalks, walkways, and/or patios onto vegetated areas safely away from building foundations and footings.	
d) Direct runoff from driveways and/or uncovered parking lots onto vegetated areas safely away from building foundations and footings.	
e) Construct bike lanes, driveways, uncovered parking lots, sidewalks, walkways, and patios with permeable surfaces.	

I, _____, acting as the Project Engineer for _____ project, located at _____, hereby state that the Site Design and Runoff Reductions design strategies initialed above have been incorporated into the design of the project.

Signature

Date

Performance Requirement No. 5

Large Peak Flow Control

All non-exempt new development or redevelopment projects that create or replace more than 2,500 square feet of impervious surfaces are subject to Performance Requirement 5. Exempt projects are those that are located in areas that have no potential for downstream flooding. For example, projects along the west side of the Embarcadero that drain directly to the bay are exempt from flood control requirements.

The Project Engineer shall provide a Stormwater Control Plan (Appendix B) that includes a Hydrology Analysis demonstrating that post-development peak runoff flows are reduced to within 5% of the pre-development flows from the 10, 25, 50 and 100-year rainfall events. For the purposes of runoff flow control, the pre-development condition shall be natural soil and vegetation.

Methods:

- Detention basin design shall include development of a post-construction runoff hydrograph that is routed through the basin. If NRCS TR-20 is used, the following assumptions shall apply:
 - Storm Type: Type 1, 24-hr, San Luis Obispo D, or custom rainfall curve for Morro Bay¹
 - Antecedent Moisture Condition: 2
 - Storm Duration: 24 hours
 - 24-hour rainfall depths: per NOAA Precipitation maps (<http://hdsc.nws.noaa.gov/hdsc/pfds>)
- Detention storage may be surface or subsurface. Parking areas may be used for detention as long as flood depth does not exceed six inches in the 100-year event.
- The detention facility may be designed to satisfy PR.1 by incorporating infiltration capacity or dead storage volume for reuse.
- For other detention basin design standards, refer to the current version of the SLO County Public Improvement Standards.

¹ Some hydrologic modeling programs, such as HydroCAD v.10, have built in Storm Types for San Luis Obispo (taken from the SLO Creek WMP). Such programs also have the ability to create custom storm curves. The analysis may use the standard Type 1 or one of the storm types specific to the site.

Maintenance and Reporting

An Operation and Maintenance Plan (O&M) is required for all projects that utilize Structural Control Measures (SCMs) to satisfy Performance Requirements 1 and 5. A maintenance program is essential to ensure that the stormwater facilities continue to function as designed to maintain treatment, peak flow control and prevent possible flooding and property damage.

A proper maintenance plan must include:

- Site map of all facilities requiring O&M practices to function as designed
- Procedures are provided for each structural control measure including, but not limited to, LID facilities, retention/detention basins, and outlet control structures.
- Short and long term maintenance requirements
- Estimated cost for maintenance

Appendix K in the Main Manual has templates to aid in the development of the O&M Plan.

The O&M plan shall be prepared under the direction of a professional civil engineer registered in the State of California. The plans shall be stamped, signed and include a certifying statement indicating that all stormwater BMPs have been designed to meet the City's stormwater management requirements.

Applicants of regulated projects subject to Performance Requirement 5 are required to demonstrate compliance with these requirements on an annual basis.

APPENDIX A

SFR PERFORMANCE REQUIREMENT DETERMINATION FORM

The following form shall be completed for all SFR development and redevelopment projects. Projects that are exempt from performance requirements are required to complete Section 1 & 2 only.

Section 1: General Information	
Project name	
Project Address	
Assessor's Parcel Number(s)	
Name of Applicant	
Applicant email address:	
Applicant phone:	
Project Type (e.g. single-family residential, commercial, etc.)	
Section 2: Area Information (ft²)	
Total Project Area	
Total Existing impervious surface area	
Proposed Gross Impervious Area (list only the surface areas that are being created or replaced)	
a. Rooftops	
b. Driveways	
c. Patios	
d. Parking Lots	
e. Other	
Total Gross Impervious Area	
If Gross Impervious Area <2,500 ft ² , write "EXEMPT". Otherwise continue to Sec. 3	
Section 3: PR Determination	
Net Impervious Area (from page 7)	
Performance Requirements (from Flow Chart)	

APPENDIX B

STORMWATER CONTROL PLAN CHECKLIST

A Stormwater Control Plan (SWCP) prepared by a Professional Engineer is required for all non-exempt projects. A preliminary SWCP is required for Planning Permit approval and a final SWCP shall be required prior to issuance of a Building Permit. The SWCP shall include the following (check all that apply or mark N/A):

Preliminary SWCP for Planning Permit application	COMPLETED
1. Project Information	
a. Project name	
b. Application number	
c. Address and assessor's parcel number	
d. Name of Applicant	
e. Name of Owner	
f. Project Phase number (if project is being constructed in phases)	
g. Project Type (e.g., commercial, industrial, multi-unit residential, mixed-use, public), and description	
2. Project Areas	
a. Total project site area	
b. Total new impervious surface area	
c. Total replaced impervious surface area	
d. Total new pervious area	
e. Calculation of Net Impervious Area	
3. Acknowledgement of the Performance Requirements that apply:	
a. PR No.1 – Site Design and Runoff Reduction	
b. PR No. 5 – Large Peak Flow Control	
4. Site Assessment Summary	
5. Summary of Site Design and Stormwater Control Measures selected for the project.	
6. Location and general configuration of all SCMs used shown on the plans	

Final SWCP for Building Permit application (all of above plus the following):	COMPLETED
1. List and describe all LID Measures Used	
2. Supporting Calculations used to comply with the Large Peak Flow Control performance requirements	
3. Documentation demonstrating infeasibility where on-site compliance cannot be achieved	
4. Documentation certifying that the selection, sizing, and design of the Stormwater Control Measures meet the applicable full or partial performance requirements.	
5. O&M Plan for all structural SCMs to ensure long-term performance	
6. Statement of Compliance: Statement that Performance Requirements has been met on-site, or, if not achievable:	
a. Documentation of the volume of runoff for which compliance cannot be achieved on-site and the associated off-site compliance requirements.	
b. Statement of intent to comply with Performance Requirements through Alternative Compliance	