Appendix

J

Offsite Alternative Compliance Requirements and Guidance

Effective January 1, 2019

Appendix J Offsite Alternative Compliance Requirements and Guidance

J.1 Background

The 2013 MS4 Permit lowers the minimum threshold necessary to trigger classification of projects as Priority Development Projects (PDPs) and sets forth more stringent onsite requirements for stormwater pollutant control and hydromodification management. It also allows the County and other Copermittees to establish programs under which project applicants may satisfy applicable PDP requirements through the completion of offsite Alternative Compliance Projects (ACPs).

The MS4 Permit provides two potential pathways in which participation in an offsite alternative compliance program may be determined necessary or allowable. The first pathway is when an applicant has determined that the PDP cannot meet all of the onsite pollutant control obligations via retention and/or biofiltration. This pathway requires performing feasibility analyses for retention and biofiltration BMPs prior to participation in an offsite alternative compliance program. The County may also allow for an applicant to proceed directly to an offsite alternative compliance project without demonstrating infeasibility of retention and/or biofiltration BMPs onsite.

The County Watershed Protection Ordinance (WPO) incorporates the MS4 Permit requirements and provides the policies for implementation with the unincorporated county.

- Section 67.811(b)(4)(C) establishes the requirements for the flow-thru treatment control BMPs to be implemented onsite by the PDP; and
- Section 67.811(b)(6) establishes the ability to utilize offsite alternative compliance projects in lieu of complying with pollutant control and hydromodification BMP performance requirements onsite.
- Offsite ACPs are considered an extension of the PDPs to which they correspond. They must be designed, constructed and maintained consistent with all applicable requirements of Provision E.3.e of the 2013 MS4 Permit and WPO Section 67.812.

This Appendix introduces the types and varieties of ACPs that may potentially be allowed by the County, conditions and restrictions applicable to them, and requirements for obtaining approvals and implementing offsite ACPs in the unincorporated County of San Diego.

J.2 Key Concepts

IMPLEMENTATION SCENARIOS

In accordance with the 2013 MS4 Permit, the December 2015 *Water Quality Equivalency (WQE) Guidance for Region 9* (WQE Guidance) establishes two ACP implementation scenarios that may be included in Copermittee programs, (1) Applicant-implemented ACPs, and (2) Independent ACPs.

- **Applicant-implemented ACPs** are those for which a project applicant owns or proposes to construct an ACP that will be functional[12] prior to the final release of the proposed PDP. The defining feature of Applicant-implemented ACPs is that the same party is legally responsible for ensuring that all applicable requirements (e.g., design, construction, operation and long term maintenance) are satisfied for both the ACP and the PDP. Because only a single applicant is involved, ACPs can be approved in the absence of a Credit System to track and trade associated Water Quality Impacts and Water Quality Benefits.
- **Independent ACPs** are projects initiated independently of specific PDP impacts. In most instances, they are owned, constructed, or otherwise under the control of a party other than the PDP applicant. Because the completion and approval of Independent ACPs involves more than one legally responsible party, these projects can only be used to mitigate for PDPs within a RWQCB-approved credit system.

At this time, Independent ACPs cannot be approved in the unincorporated County of San Diego. Until such time as the County establishes an in lieu fee structure and/or RWQCB-accepted credit system, Independent ACPs are not allowed under the MS4 Permit. However, please note that Applicant-implemented ACPs providing treatment control or hydromodification benefits in excess of impacts associated with a corresponding PDP may be able to "bank" this additional capacity for future use in the event that a qualifying credit system is established. Applicants are therefore encouraged to fully document excess benefits for potential future application.

ACP TYPES

There are two primary types of ACP: Structural BMPs and Natural System Management Practices (NSMPs). **Structural BMPs** are a subset of BMPs which detain, retain, filter, remove, or prevent the release of pollutants to surface waters from development projects in perpetuity, after construction of the project is completed. These can be further subdivided according to the following project categories:

[12] For ACPs implemented under an in lieu fee structure, a 4-year time frame for completion of the ACP is allowable. However, applicable treatment or hydromodification performance standards must be met through temporal mitigation of the PDP impacts until the final ACP controls are fully functional.

- A **Retrofit BMP** adds or modifies structural BMPs in areas of existing development where practices do not already exist, are ineffective, or can be significantly enhanced.
- A **Regional BMP** treats stormwater from a tributary consisting of more than one development. Its primary purpose is to improve water quality, protect downstream channels, reduce flooding, or to meet other specific jurisdictional water quality objectives.
- A **Water Supply BMP** captures stormwater and infiltrates, pumps, or otherwise replenishes groundwater, surface water reservoirs, or other water supply systems.

NSMPs are practices that are implemented to restore and/or preserve predevelopment watershed functions in lieu of providing direct management of stormwater pollutant control and hydromodification flow control. NSMPs include projects that either reduce the release of pollutants through the reduction of runoff volume (e.g.; removal of impervious surfaces) or provide hydromodification management through the restoration of a sensitive stream segment to address impacts caused by the PDP and legacy impacts. They can include structural or engineered elements as part of the system, but non-engineered elements also provide some level of pollutant control and/or hydromodification management benefits. NSMPs include the following project categories:

- **Land Restoration** permanently restores currently developed land back to a stabilized, predevelopment condition. Land Restoration may provide quantifiable stormwater pollutant control and hydromodification flow control benefits by restoring the predevelopment stormwater runoff volumes, peak flows, and pollutant concentrations of a tributary.
- **Land Preservation** permanently preserves undeveloped land in its current state. In limited scenarios, Land Preservation may provide quantifiable stormwater pollutant control and hydromodification flow control benefits by preventing increases in stormwater runoff volumes, peak flows, and pollutant concentrations associated with the future built out condition of a tributary.
- **Stream Rehabilitation** restores a stream to a natural, stabilized condition that can accommodate both legacy and future hydromodification impacts. Stream Rehabilitation may provide quantifiable hydromodification flow control benefits through permanent stabilization of streams. In limited scenarios, Stream Rehabilitation may also provide quantifiable stormwater pollutant control benefits by reducing impervious channel surfaces.

POTENTIAL ACP BENEFITS

Water quality equivalency for stormwater pollutant control is demonstrated when the stormwater pollutant control benefits provided by the ACP are greater than or equal to the stormwater pollutant control impacts generated by the PDP. These benefits may include either of the following:

- **Stormwater Pollutant Control (pollutant or volume reduction), and**
- **Hydromodification Flow Control**

Both structural BMPs and NSMPs can provide pollutant control or hydromodification management benefits, or a combination of both. Regardless of the proposed implementation scenario, applicant options will vary depending both on the ACP type and benefit under consideration. Figure J.2-1 summarizes the current availability of different ACP type-benefit combinations. The availability of specific options is largely dependent on the current state of science regarding the demonstration of each benefit type. Because the availability of options is likely to change over time, applicants are advised to consult with staff to make sure they are fully aware of their current availability.

Figure J.2-1: Current Availability ACP Options by Type and Benefit (Source: *Water Quality Equivalency Guidance for Region 9*)

ACP Category	Stormwater Pollutant Control Benefits				Hydromod Flow Control Benefits
	Pollutant Reduction			Volume Reduction	
	Retention	Biofiltration	Flow-Thru		
Retrofit	**Available**	**Available**	Limited Availability	**Available**	**Available**
Regional	**Available**	**Available**	Limited Availability	**Available**	**Available**
Water Supply	**Available**	**Available**	Limited Availability	**Available**	**Available**
Land Restoration	*Not Available*	*Not Available*	*Not Available*	**Available**	**Available**
Land Preservation	*Not Available*	*Not Available*	*Not Available*	Limited Availability	**Available**
Stream Rehabilitation	*Not Available*	*Not Available*	*Not Available*	Limited Availability	**Available**

J.3 Requirements for ACPs in the County of San Diego

The requirements below are applicable if participating in an offsite alternative compliance program. Section 1.8 of the County BMP Design Manual describes policy and procedural requirements for development projects in greater detail. Applicants should also check with County staff for additional information on the availability of, and requirements pertaining to, specific ACP options. As previously noted, all ACP projects are required to utilize the WQE Guidance. This guidance provides additional detail on the general concepts associated with implementing an ACP along with methodologies for calculating the ACP benefits, example calculations and Water Quality Equivalency Worksheets which can be found at Projectcleanwater.org.

PDP REQUIREMENTS

A PDP wishing to utilize offsite alternative compliance must apply the following requirements to the PDP:

- Determine the portion of the design capture volume or total impervious area not managed on the PDP site;
- Provide onsite flow-thru treatment control BMPs that provide a medium to high pollutant removal efficiency to treat runoff leaving the site consistent with the guidance in Section 5.5.4 of the BMP Design Manual and the methodology for selecting and sizing BMPs described in Appendix J.5; and

- Provide temporal mitigation if the ACP is constructed after the completion of the development project that ensures equivalent or better pollutant removal and/or hydrologic control (as applicable) as compared to the case where the ACP is completed at the same time as the PDP.

ACP REQUIREMENTS

A PDP wishing to utilize offsite alternative compliance must apply the following requirements to the ACP:

- The ACP must demonstrate the water quality benefits generated are greater than or equal to the impact of the PDP that is not treated onsite;
- The benefits generated by ACP must be determined utilizing the water quality equivalency metrics established in the *December 2015 Water Quality Equivalency (WQE) Guidance for Region 9* (WQE Guidance), or any other WQE Guidance Document subsequently accepted by the RWQCB;
- The ACP must be located within the same watershed management area (WMA) as the PDP project;

- The ACP must implement all applicable site design and source control BMPs in accordance with the requirements Section 4 of BMP Design Manual;
- ACPs that are Structural BMPS must be designed in accordance with the requirements in Sections 5 and 6 of the BMP Design Manual;
- ACPs designed to manage hydromodification flow control must meet the location requirements defined in the WQE Guidance; and
- The ACP applicant must ensure effective operation and maintenance in perpetuity consistent with the requirements in Section 7 of the BMP Design Manual.

In addition to the above requirements, any ACP that is partially or wholly located in the County Right-of-way must obtain approval from the Authorized Enforcement Officer.

J.4 Submittal Requirements for Offsite Alternative Compliance Projects

The ACP must be documented in the appropriate attachment of the PDP SWQMP and be consistent with the submittal requirements in Chapter 8. Prior to any design changes to the PDP site layout and/or features that require the PDP SWQMP to be updated; the appropriate attachment in the PDP SWQMP must be reviewed to ensure that the ACP still provides a greater or equal water quality benefit consistent with the requirements of this Manual and the MS4 Permit.

Based on the nature of the project proposal, the County has the discretion to request the submittal of additional information above and beyond the minimum information listed in the PDP SWQMP.

J.5 Flow-Thru Treatment Control BMPs (for use with Alternative Compliance)

The following methodology must be used for selecting and sizing onsite flow-thru treatment control BMPs. These BMPs are to be used only when the project is participating in an alternative compliance program. This methodology consists of three steps:

1) Determine the PDP most significant pollutants of concern (Appendix J.5.1).
2) Select a flow-thru treatment control BMP that treats the PDP most significant pollutants of concern and meets the pollutant control BMP treatment performance standard (Appendix J.5.2).
3) Size the selected flow-thru treatment control BMP (Appendix J.5.3).

J.5.1 PDP Most Significant Pollutants of Concern

The following steps must be followed to identify the PDP most significant pollutants of concern:

1) Compile the following information for the PDP and receiving water:
    a. Receiving water quality (including pollutants for which receiving waters are listed as impaired under the Clean Water Act section 303(d) List; refer to Section 1.9);
    b. Pollutants, stressors, and/or receiving water conditions that cause or contribute to the highest priority water quality conditions identified in the WQIP (refer to Section 1.9);
    c. Land use type(s) proposed by the PDP and the storm water pollutants associated with the PDP land use(s) (see Table J.5–1).
2) From the list of pollutants identified in Step 1 identify the most significant PDP pollutants of concern. A PDP could have multiple most significant pollutants of concerns and must include the highest priority water quality condition identified in the watershed WQIP and pollutants anticipated to be present onsite/generated from land use.

Table J.5–1: Anticipated and Potential Pollutants Generated by Land Use Type

Priority Project Categories	General Pollutant Categories								
	Sediment	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	X	X			X	X	X	X	X
Attached Residential Development	X	X			X	P(1)	P(2)	P	X
Commercial Development >one acre	P(1)	P(1)	X	P(2)	X	P(5)	X	P(3)	P(5)
Heavy Industry	X		X	X	X	X	X		
Automotive Repair Shops			X	X(4)(5)	X		X		
Restaurants					X	X	X	X	P(1)
Hillside Development >5,000 ft2	X	X			X	X	X		X
Parking Lots	P(1)	P(1)	X		X	P(1)	X		P(1)
Retail Gasoline Outlets			X	X	X	X	X		
Streets, Highways & Freeways	X	P(1)	X	X(4)	X	P(5)	X	X	P(1)

X = anticipated
P = potential
(1) A potential pollutant if landscaping exists onsite.
(2) A potential pollutant if the project includes uncovered parking areas.
(3) A potential pollutant if land use involves food or animal waste products.
(4) Including petroleum hydrocarbons.
(5) Including solvents.

J.5.2 Selection of Flow-Thru Treatment Control BMPs

The following steps must be followed to select the appropriate flow-thru treatment control BMPs for the PDP:

1) For each PDP most significant pollutant of concern identify the grouping using Table J.5-2. Table J.5-2 is adopted from the Model SUSMP.

2) Select the flow-thru treatment control BMP based on the grouping of pollutants of concern that are identified to be most significant in Step 1. This section establishes the pollutant control BMP treatment performance standard to be met for each grouping of pollutants in order to meet the standards required by the MS4 permit and how an applicant can select a non-proprietary or a proprietary BMP that meets the established performance standard. The grouping of pollutants of concern are:

    a. Coarse Sediment and Trash (Appendix J.5.2.1)
    b. Pollutants that tend to associate with fine particles during treatment (Appendix J.5.2.2)
    c. Pollutants that tend to be dissolved following treatment (Appendix J.5.2.3)

Table J.5–2: Grouping of Potential Pollutants of Concern

Pollutant	Coarse Sediment and Trash	Suspended Sediment and Particulate-bound Pollutants[1]	Soluble-form Dominated Pollutants[2]
Sediment	X	X	
Nutrients		X	X
Heavy Metals		X	
Organic Compounds		X	
Trash & Debris	X		
Oxygen Demanding		X	
Bacteria		X	
Oil & Grease		X	
Pesticides		X	

[1] Pollutants in this category can be addressed to Medium or High effectiveness by effectively removing suspended sediments and associated particulate-bound pollutants. Some soluble forms of these pollutants will exist, however treatment mechanisms to address soluble pollutants are not necessary to remove these pollutants to a Medium or High effectiveness.

[2] Pollutants in this category are not typically addressed to a Medium or High level of effectiveness with particle and particulate-bound pollutant removal alone.

One flow-thru BMP can be used to satisfy the required pollutant control BMP treatment performance standard for the PDP most significant pollutants of concern. In some situations it might be necessary to implement multiple flow-thru BMPs to satisfy the pollutant control BMP treatment performance

standards. For example, a PDP has trash, nutrients and bacteria as the most significant pollutants of concern. If a vegetated filter strip is selected as a flow-thru BMP then it is anticipated to meet the performance standard in Appendix J.5.2.2 and J.5.2.3 but would need a trash removal BMP to meet the pollutant control BMP treatment performance standard in Appendix J.5.2.1 upstream of the vegetated filter strip. This could be achieved by fitting the inlets and/or outlets with racks or screens on to address trash.

J.5.2.1 Coarse Sediment and Trash

If coarse sediment and/or trash and debris are identified as a pollutant of concern for the PDP, then BMPs must be selected to capture and remove these pollutants from runoff. The BMPs described below can be effective in removing coarse sediment and/or trash. These devices must be sized to treat the flow rate estimated using Worksheet J.5-1. Applicant can only select BMPs that have High or Medium effectiveness.

Trash Racks and Screens [Coarse Sediment: Low effectiveness; Trash: Medium to High effectiveness] are simple devices that can prevent large debris and trash from entering storm drain infrastructure and/or ensure that trash and debris are retained with downstream BMPs. Trash racks and screens can be installed at inlets to the storm drain system, at the inflow line to a BMP, and/or on the outflow structure from the BMP. Trash racks and screens are commercially available in many sizes and configurations or can be designed and fabricated to meet specific project needs.

Hydrodynamic Separation Devices [Coarse Sediment: Medium to High effectiveness; Trash: Medium to High effectiveness] are devices that remove coarse sediment, trash, and other debris from incoming flows through a combination of screening, settlement, and centrifugal forces. The design of hydrodynamic devises varies widely, more specific information can be found by contacting individual vendors. A list of hydrodynamic separator products approved by the Washington State Technology Acceptance Protocol-Ecology protocol can be found at:

http://www.ecy.wa.gov/programs/wq/storm water/newtech/technologies.html.

Systems should be rated for "pretreatment" with a General Use Level Designation or provide results of field-scale testing indicating an equivalent level of performance.

Catch Basin Insert Baskets [Coarse Sediment: Low effectiveness; Trash: Medium effectiveness, if appropriately maintained] are manufactured filters, fabrics, or screens that are placed in inlets to remove trash and debris. The shape and configuration of catch basin inserts varies based on inlet type and configuration. Inserts are prone to clogging and bypass if large trash items are accumulated, and therefore require frequent observation and maintenance to remain effective. Systems with screen size small enough to retain coarse sediment will tend to clog rapidly and should be avoided.

Other Manufactured Particle Filtration Devices [Coarse Sediment: Medium to High effectiveness; Trash: Medium to High effectiveness] include a range of products such as cartridge filters, bag filters, and other configurations that address medium to coarse particles. Systems should be rated for "pretreatment" with a General Use Level Designation under the Technology Acceptance Protocol-Ecology program or provide results of field-scale testing indicating an equivalent level of performance.

Note, any BMP that achieves Medium or High performance for suspended solids (See Section J.5.2.2) is also considered to address coarse sediments. However, some BMPs that address suspended solids do not retain trash (for example, swales and detention basins). These types of BMPs could be fitted with racks or screens on inlets or outlets to address trash.

BMP Selection for Pretreatment:

Devices that address both coarse sediment and trash can be used as pretreatment devices for other BMPs, such as infiltration BMPs. However, it is recommended that BMPs that meet the performance standard in Appendix J.5.2.2 be used. A device with a "pretreatment" rating and General Use Level Designation under Technology Acceptance Protocol-Ecology is required for pretreatment upstream of infiltration basins and underground galleries. Pretreatment may also be provided as presettling basins or forebays as part of a pollutant control BMP instead of implementing a specific pretreatment device for systems where maintenance access to the facility surface is possible (to address clogging), expected sediment load is not high, and appropriate factors of safety are included in design.

J.5.2.2 Suspended Sediment and Particulate-Bound Pollutants

Performance Standard

The pollutant treatment performance standard is shown in Table J.5-3. This performance standard is consistent with the Washington State Technology Acceptance Protocol-Ecology Basic Treatment Level, and is also met by technologies receiving Phosphorus Treatment or Enhanced Treatment certification. This standard is based on pollutant removal performance for total suspended solids. Systems that provide effective TSS treatment also typically address trash, debris, and particulate bound pollutants and can serve as pre-treatment for offsite mitigation projects or for onsite infiltration BMPs.

Table J.5-3: Performance Standard for Flow-Thru Treatment Control

Influent Range	Criteria
20 – 100 mg/L TSS	Effluent goal ≤ 20 mg/L TSS
100 – 200 mg/L TSS	≥ 80% TSS removal
>200 mg/L TSS	> 80% TSS removal

Selecting Non-Proprietary BMPs

Table J.5-4 identifies the categories of non-proprietary BMPs that are considered to meet the pollutant treatment performance standard if designed to contemporary design standards[13]. BMP types with an "High" ranking should be considered before those with an "Medium" ranking. Statistical analysis by category from the International Storm Water BMP Database (also presented in Table J.5-4) indicates each of these BMP types (as a categorical group) meets or nearly meets the performance standard. The International Storm Water BMP Database includes historic as well as contemporary BMP studies; contemporary BMP designs in these categories are anticipated to meet or exceed this standard on average.

[13] Contemporary design standards refers to design standards that are reasonably consistent with the current state of practice and are based on desired outcomes that are reasonably consistent with the context of the MS4 Permit and this manual. For example, a detention basin that is designed solely to mitigate peak flow rates would not be considered a contemporary water quality BMP design because it is not consistent with the goal of water quality improvement. Current state of the practice recognizes that a drawdown time of 24 to 72 hours is typically needed to promote settling. For practical purposes, design standards can be considered "contemporary" if they have been published within the last 10 years, preferably in California or Washington State, and are specifically intended for storm water quality management.

Table J.5-4: Flow-Thru Treatment Control BMPs Meeting Performance Standard

List of Acceptable Flow-Thru Treatment Control BMPs	Statistical Analysis of International Storm Water BMP Database				Evaluation of Conformance to Performance Standard		
	Count In/Out	TSS Mean Influent, mg/L	TSS Mean Effluent[1], mg/L	Average Category Volume Reduct.	Volume-Adjusted Effluent Conc[2], mg/L	Volume-Adjusted Removal Efficiency[2]	Level of Attainment of Performance Standard (with rationale)
Vegetated Filter Strip	361/ 282	69	31	38%	19	72%	Medium, effluent < 20 mg/L after volume adjustment
Vegetated Swale	399/ 346	45	33	48%	17	61%	Medium, effluent < 20 mg/L after volume adjustment
Detention Basin	321/ 346	125	42	33%	28	77%	Medium, percent removal near 80% after volume adjustment
Sand Filter/ Media Bed Filter	381/ 358	95	19	NA[3]	19	80%	High, effluent and % removal meet criteria without adjustment
Lined Porous Pavement[4]	356/ 220	229	46	NA[3,4]	46	80%	High, % removal meets criteria without adjustment
Wet Pond	923/ 933	119	31	NA[3]	31	74%	Medium, percent removal near 80%

Source: 2014 BMP Performance Summaries and Statistical Appendices; 2010 Volume Performance Summary; available at: www.bmpdatabase.org

1 - A statistically significant difference between influent and effluent was detected at a p value of 0.05 for all categories.

2 - Estimates were adjusted to account for category-average volume reduction.

3 - Not Applicable as these BMPs are not designed for volume reduction and are anticipated to have very small incidental volume reduction.

4 - The category presented in this table represents a lined system for flow-thru treatment purposes. Porous pavement for retention purposes is an infiltration BMP, not a flow-thru BMP. This table should not be consulted for porous pavement for infiltration.

Selecting Proprietary BMPs

Proprietary BMPs can be used if the BMP meets each of the following conditions:

(1) The proposed BMP meets the performance standard in Appendix J.5.2.2 as certified through third-party, field scale evaluation. An active General Use Level Designation for Basic Treatment, Phosphorus Treatment or Enhanced Treatment under the Washington State Technology Acceptance Protocol-Ecology program is the preferred method of demonstrating that the performance standard is met. The list of certified technologies is updated as new technologies are approved (link below). Technologies with Pilot Use Level Designation and Conditional Use Level Designations are not acceptable. Refer to:

http://www.ecy.wa.gov/programs/wq/stormwater/newtech/technologies.html. Alternatively, other field scale verification of 80 percent TSS capture, such as through Technology Acceptance Reciprocity Partnership or New Jersey Corporation for Advance Testing may be acceptable. A list of field-scale verified technologies under Technology Acceptance Reciprocity Partnership Tier II and New Jersey Corporation for Advance Testing can be accessed at: http://www.njcat.org/verification-process/technology-verification-database.html (refer to field verified technologies only).

(2) The proposed BMP is designed and maintained in a manner consistent with its performance certifications (see explanation below). The applicant must demonstrate conclusively that the proposed application of the BMP is consistent with the basis of its certification/verification. Certifications or verifications issued by the Washington Technology Acceptance Protocol-Ecology program and the Technology Acceptance Reciprocity Partnership or New Jersey Corporation for Advance Testing programs are typically accompanied by a set of guidelines regarding appropriate design and maintenance conditions that would be consistent with the certification/verification. It is common for these approvals to specify the specific model of BMP, design capacity for given unit sizes, type of media that is the basis for approval, and/or other parameters.

(3) The proposed BMP is acceptable at the discretion of the County. The applicant may be required to provide additional studies and/or required to meet additional design criteria beyond the scope of this document in order to demonstrate that these criteria are met. While the County has no obligation to accept the use of any proposed proprietary BMP, applicants will be provided a written explanation describing the rationale for the rejection of any proposed devices.

J.5.2.3 Soluble-form dominated Pollutants (Nutrients)

If nutrients are identified as a most significant pollutant of concern for the PDP, then BMPs must be selected to meet the performance standard described in Appendix J.5.2.2 **and** must be selected to provide medium or high level of effectiveness for nutrient treatment as described in this section. The most common nutrient of concern in the San Diego region is nitrogen, therefore total nitrogen (TN) was used as the primary indicator of nutrient performance in storm water BMPs.

Selection of BMPs to address nutrients consists of two steps:

1) Determine if nutrients can be addressed via source control BMPs as described in Appendix E and Chapter 4. After applying source controls, if there are no remaining source areas for soluble nutrients, then this pollutant can be removed from the list of pollutants of concerns for the purpose of selecting flow-thru treatment control BMPs. Particulate nutrients will be addressed by the performance standard in Appendix J.5.2.2.

2) If soluble nutrients cannot be fully addressed with source controls, then select a flow-thru treatment control BMPs that meets the performance criteria in Table J.5-5 or select from the

nutrient-specific menu of treatment control BMPs in Table J.5-6.

a. The performance standard for nitrogen removal (Table J.5-5) has been developed based on evaluation of the relative performance of available categories of non-proprietary BMPs.

b. For proprietary BMPs, submit third party performance data indicating that the criteria in Table J.5-5 are met. The applicant may be required to provide additional studies and/or required to meet additional design criteria beyond the scope of this document in order to demonstrate that these criteria are met. While the County has no obligation to accept the use of any proposed proprietary flow-thru BMP, applicants will be provided a written explanation describing the rationale for the rejection of any proposed devices.

Table J.5-5: Performance Standard for Flow-Thru Treatment Control BMPs for Nutrient Treatment

Basis	Criteria
Treatment Basis	Comparison of mean influent and effluent indicates significant concentration reduction of TN approximately 40 percent or higher based on studies with representative influent concentrations
Combined Treatment and Volume Reduction Basis	Combination of concentration reduction and volume reduction yields TN mass removal of approximately 40 percent or higher based on studies with representative influent concentrations

Table J.5-6: Flow-Thru Treatment Control BMPs Meeting Nutrient Treatment Performance Standard

List of Acceptable Flow-Thru Treatment Control BMPs for Nutrients	Statistical Analysis of International Storm Water BMP Database				Evaluation of Conformance to Performance Standard		
	Count In/Out	TN Mean Influent, mg/L	TN Mean Effluent[1], mg/L	Average Category Volume Reduct.	Volume-Adjusted Effluent Conc[2], mg/L	Volume-Adjusted Removal Efficiency[2]	Level of Attainment of Performance Standard (with rationale)
Vegetated Filter Strip	138/ 122	1.53	1.37	38%	0.85	44%	Medium, if designed to include volume reduction processes
Detention Basin	90/ 89	2.34	2.01	33%	1.35	42%	Medium, if designed to include volume reduction processes
Wet Pond	397/ 425	2.12	1.33	NA	1.33	37%	Medium, best concentration reduction among BMP categories, but limited volume reduction

Source: 2014 BMP Performance Summaries and Statistical Appendices; 2010 Volume Performance Summary; available at: www.bmpdatabase.org

1 - A statistically significant difference between influent and effluent was detected at a p value of 0.05 for all categories included.

2 - Estimates were adjusted to account for category-average volume reduction.

J.5.3 Sizing Flow-Thru Treatment Control BMPs:

Flow-thru treatment control BMPs must be sized to filter or treat the maximum flow rate of runoff produced from a rainfall intensity of 0.2 inch of rainfall per hour, for each hour of every storm event. The required flow-thru treatment rate should be adjusted for the portion of the DCV already retained or biofiltered onsite as described in Worksheet J.5-1. The following hydrologic method must be used to calculate the flow rate to be filtered or treated:

$$Q = C \times i \times A$$

Where:

Q = Design flow rate in cubic feet per second

C = Runoff factor, area-weighted estimate using Table B.1-1.

i = Rainfall intensity of 0.2 in/hr.

A = Tributary area (acres) which includes the total area draining to the BMP, including any offsite or onsite areas that comingle with project runoff and drain to the BMP. Refer to Section 3.3.3 for additional guidance. Street projects consult Section 1.4.3.

Worksheet J.5-1: Flow-Thru Design Flows

Category	#	Description	Value	Units
Flow-Thru BMP Inputs	0	Drainage Basin ID or Name		unitless
	1	Total Tributary Area		sq-ft
	2	Final Adjusted Runoff Factor		unitless
	3	Design Capture Volume		cubic-feet
	4	Volume Effectively Retained and/or Biofiltered		cubic-feet
	5	Deficit of Effectively Treated Stormwater Requiring Flow-Thru Treatment		cubic-feet
	6	Maximum Rated Water Quality Flow Rate of Proposed BMP		CFS
Flow Rate Calculations	7	Adjustment Factor		unitless
	8	Design Rainfall Intensity for Flow-Thru BMPs	0.20	in/hr
	9	Water Quality Flow Rate Requiring Flow-Thru Treatment		CFS
Result	10	Is Flow-Thru BMP Adequately Sized?		unitless

Worksheet J.5-1 General Notes:

A. Applicants may use this worksheet to size flow-thru BMPs. Applicants must provide inputs for yellow shaded cells and calculate appropriate values for unshaded cells. Note that applicants proposing on-site flow-thru BMPs must also implement an offsite alternative compliance project to offset the deficit of effectively treated stormwater volume. An automated version of this worksheet is available for download at the County of San Diego Department of Public Works website.

Worksheet J.5-1 Line Item Notes:

0. Populated per Worksheet B.1-1.
1. Populated per Worksheet B.1-1.
2. Populated per Worksheet B.1-1.
3. Populated per Worksheet B.2-1.
4. Populated per Retention and/or Biofiltration treatment determined in Worksheets B.3-1 through B.5-3.
5. Line 4 - Line 3
6. User input per manufacturer's specification sheet.
7. -Line 5 / Line 3
8. Default value of 0.20 inches per hour
9. (Line 1/43,560) x Line 2 x Line 7 x Line 8
10. If Line 6 ≥ Line 9 then "Yes". If Line 6 < Line 9 then "No".