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Bed Filter	A structural BMP type: • A flow-through structure that uses granular media (e.g. sand or activated alumina) to actively filter stormwater to remove stormwater pollutants. Filtration is controlled by the flow rate through the media and discharge via an underdrain or outlet. Little to no volume loss occurs. • May be confined space but not always. • Pollutant load reductions achieved by reduced concentrations in effluent. No stormwater volume reduction occurs. • Typically, moderate sized centralized BMPs but can be small decentralized BMPs treating small areas of imperviousness.
Benchmark	The desired and achievable condition of any structural BMP. The benchmark equates to a RAM Score of 5. In most instances, benchmark condition may be observed and measured shortly following construction or immediately following appropriate maintenance actions. The exceptions are desired benchmark characteristics that may take some time after construction and/or maintenance to achieve (e.g., benchmark vegetation cover).
Biofiltration	A structural BMP type: • Vegetated BMP where stormwater is filtered through a specialized soil media and discharged via an underdrain. • BMP may or may not be lined but little to no exfiltration of volumes. • Outlet design requires surface ponding prior to surface outflow typically with a maximum ponding depth of 6 inches. • Site designed biofiltration systems use specialized soil media ideally 18-24 inches in depth to enhance biogeochemical processes to retain and transform pollutants. • Proprietary biofilter designs vary and specialized soil media may or may not be accessible for inspection. • Small to moderate sized decentralized BMP accepting runoff from a single land use drainage area.
Biogeochemical cycling	A stormwater treatment process. Concentration reductions of pollutants in stormwater through interaction with vegetation or biological processes. These processes may include, but are not limited to uptake by vegetation, adsorption, desorption, reduction etc. by vegetation or bacteria. Decomposition of vegetation or native debris within a structural BMP can result in increased concentrations of nutrients, trace metals and other pollutants in outflow volumes.

Bioretention	A structural BMP type: • Vegetated retention structure where the base of the BMP is not lined and must infiltrate volumes and allow exfiltration to unsaturated zone. Designs may or may not include an underdrain to route some fraction of treated waters to stormwater system. • Outlet design requires surface ponding prior to surface outflow typically with a maximum ponding depth of 6 inches. • Outlet design either passive surface outlet (e.g., curb cut) or piped overflow (e.g., overflow inlet and underdrain) used to allow retention and ponding. • Constructed with specialized soil media ideally 18-24 inches in depth to enhance biogeochemical processes to retain and transform pollutants. • May include rock or aggregate subsurface layer under the soil media to enhance storage/infiltration. • Designs may include settling forebay at inlet(s) to remove sediment. • Vegetation types include species that can tolerate stormwater ponding and drought conditions. • Small to moderate sized decentralized BMP accepting runoff from a single land use drainage area.
Bioretention Soil	Soil media mix used recommended in Bioretention and Biofiltration BMP design to ensure adequate drainage, reduce pollutant loads, and support plant growth. Mixture includes sand, clay and silt fines, and organic material.
Bioswale	A structural BMP type: • Flow through areas with dense vegetation coverage (>80%). Flow surface topography allows inundation of adjacent vegetated areas during storm runoff. • Design includes gentle sloped flow paths and dense vegetation to promote primary stormwater surface filtration, adsorption to vegetation and settling. Biological processes include geochemical transformation and plant uptake. Infiltration performance and volume reductions may vary. • Size and application can vary.
BMP RAM	BMP RAM is a standardized and repeatable field observation and data management tool to allow resource managers in inventory, assess and track the performance of structural BMPs over time. The standardized 0-5 scoring and mapped results are used to simply communicate the relative condition of any stormwater structural BMP. The customized online data management system is available at www.bmpram.com. BMP RAM can be used by municipalities to satisfy annual structural BMP inspection and reporting requirements.

www.bmpram.com	The customized web-based data management and reporting asset management system that stores and manages all information necessary to implement, track and maintain BMP RAM inventory and results over time. The mobile application allows users to assess BMPs in the field and enter the observations directly into the database, eliminating the time and QA/QC challenges with using field datasheets.
BMP RAM Score	The BMP RAM score is a 0-5 (± 0.1) value that represents the structural BMP condition at the time of observations. The BMP RAM score is a weighted integration of field observation results based on structural BMP type. A BMP RAM score of 5 is the achievable benchmark. A BMP RAM score of 2 is a trigger that maintenance or other actions are required to restore performance of the structural BMP to an acceptable condition.
Bypass Outlet	The outlet of a large scale centralized BMP at which stormwater exits the BMP when the storage capacity of the BMP is exceeded. BMP RAM conveyance observations are made at all bypass outlets of a structural BMP.
Catch Basin	A structural BMP Type: • A small decentralized BMP designed to capture and retain sediment, leaf litter, trash, coarse particles and/or other stormwater pollutants. • Capture of material may occur through variable flow modifications or passive settling, but result is vertical accumulation of material at base of BMP reservoir with regular material cleanout required. • Minimal to no stormwater volume reduction occurs. • Water quality improvement downgradient expected as result of concentration reduction due to material capture within BMP. • Typically accepts runoff from road or a single land use parking lot.
Catchment	A contiguous planning unit that represents the hydrologic routing of urban lands within the MS4.
Centralized BMP	One of two structural BMP categories: • Designed to reduce urban stormwater volumes and/or pollutant concentrations from a concentrated stormwater flow path draining a mixed land use catchment. • Contributing drainage areas typically exceed 1 acre of impervious area. • More typically publically installed and maintained but can be privately owned. • Few may be needed to measurably reduce catchment loading Large scale centralized BMPs include Dry Basins, Detention Basins, Wet Basins, Infiltration Basins, Treatment Vaults, Media Filters, and Bed Filters.

Confined Space Observation	BMP RAM observation to evaluate the condition of Cartridge Filters. The confined space observations include qualitative visual observations to simply infer if there is evidence to suggest the confined structural BMP may not be operating properly. The BMP RAM results of confined space observations will merely indicate that additional observations, requiring access and testing of the structural BMP is warranted and the manufacturer may need to be contacted.
Constant Head Permeameter (CHP)	BMP RAM observation to measure the infiltration rate in inches per hour (in/hr) of a surface soil substrate in Dry Basins and Infiltration Basins. This simple instrument has been developed by the NRCS and is well-accepted in the Lake Tahoe Basin as one method to measure the infiltration capability of soils.
Conveyance	Conveyance is the physical process that transports stormwater downgradient in a manner that mitigates, and does not induce, localized flooding. All structural BMPs must be able to convey stormwater both in and out, but conveyance alone provides no water quality benefit. Clear evidence of operating inflow and outflow must be present for structural BMPs to function as designed.
Decentralized BMP	One of two structural BMP categories: • Designed to reduce urban stormwater volumes and/or pollutant concentrations generated from a single land use. • The contributing drainage areas are typically less than 1 acre of impervious surface. • Installed on private parcels or on public property (typically roads). • Typically, structural BMPs that meet design requirements of treating the 85th or 95th percentile 24-hour storm event. Small scale decentralized BMPs include Infiltration Features, Bioretention, Bioswales, Biofiltration, Porous Pavement, and Catch Basins.
Detention Basin	A structural BMP type: • A flow through basin with discrete inlets and outlets designed to detain stormwater runoff for some minimum time to reduce peak flows. Design treatment capacity and draw down time will vary across specific BMPs. • One or more outflow offices may exist but there is at least one at base of basin to allow complete draining between storms. Increased draw down times can increase particle capture via settling within the basin. • Little to no volume loss via infiltration either due to impervious or highly impermeable base. • Vegetation may or may not be present. • Moderate to large sized centralized BMPs that accept runoff from mixed land use drainage areas.

Drawdown Time	A BMP RAM inventory field: • Time it takes for the treatment capacity volume to completely drain through the treatment outlet without consideration of the infiltration rate. • Entered as hours (hrs) for Dry Basins, Detention Basins, and Wet Basins.
Drop Inlet	A structural BMP type: • Stormwater feature placed strictly to collect and convey stormwater. • A drop inlet that includes a sump to capture particulate pollutants is termed a Catch Basin. • Typically conveying water from a roadway, parking lot or other impervious surface to a culvert or storm drain and provides no water quality benefit downgradient.
Dry Basin	A structural BMP type: • A flow through basin with discrete inlets and outlets designed to detain stormwater runoff for some minimum time to reduce peak flows. Design treatment capacity and draw down time will vary across specific BMPs. • One or more outflow offices may exist but there is at least one at base of basin to allow complete draining between storms. Increased draw down times can increase particle capture via settling within the basin. • Footprint is pervious and infiltration capacity of base maintained to consistently infiltrate some fraction of volumes detained to unsaturated zone. • Wetland and riparian vegetation species distribution is minimal to absent. Moderate distribution of grass and/or tree species likely and acceptable. • Moderate to large sized centralized BMPs that accept runoff from mixed land use drainage areas.
Field Observations	Compilation of distinct rapid observations and/or measurements made at structural BMPs over time to evaluate and track condition.
Footprint	A BMP RAM inventory field: • Surface area that will typically be inundated; approximately the area at the average design depth. • Entered as square feet (sq-ft) for Dry Basins, Detention Basins, Wet Basins, Infiltration Basins, Treatment Vaults, Media Filters, Bed Filters, and Settling Basins.
Impervious Area Treated	The impervious area treated is the impervious area a structural BMP was sized and designed to treat and is input by the BMP RAM user.

Infiltration	A stormwater treatment process: The physical process by which water enters the soil or subsurface. Infiltration is used to indicate stormwater volume reductions, although infiltration will also result in soil-water interactions, filtration and other pollutant concentration benefits. While it is assumed that any pollutants contained within infiltrating volumes are introduced to and those hydrophobic are retained within the unsaturated zone. Effective infiltration is measured as a stormwater volume reduction as result of BMP interaction.
Infiltration Basin	A structural BMP type: • A flow through BMP with highly permeable substrate (aggregate or rock) designed to store and infiltrate significant volumes of stormwater into unsaturated zone. • Little to no surface detainment storage. • Vegetation distribution should be minimal and preferably absent. • Moderate to large sized centralized BMP, accepting runoff from a mixed land use drainage area.
Infiltration Feature	A structural BMP type: • A small scale structure designed to retain stormwater from small impervious drainage area and infiltrate into unsaturated zone. Land surface modified to sustain maximum infiltration rates, typically consisting of vertical excavation of native soils and filling with coarse drain rock or other highly permeable material. • Vegetation is absent. • Typically, a small sized decentralized BMP, accepting runoff from a single land use drainage area.
Infiltration Rate	A BMP RAM inventory field: • Characteristic rate of infiltration expected over the life span of the structural BMP while factoring in assumptions for anticipated maintenance. • Entered as inches per hour (in/hr) for Dry Basins and Infiltration Basins.
Infiltrometer	BMP RAM observation to measure the infiltration rate in inches per hour (in/hr) of a pervious surface using a double-ring infiltrometer.
Inventory	The user maps a structural BMP using the drop pin feature in a handheld device with GPS capabilities, such as phone or tablet, via www.bmpram.com. The inventory data for each BMP includes unique ID, lat/long and relevant structural BMP characteristics that vary by BMP type. Data can also be bulk uploaded from another source (such as GIS) into the online application.
Land Use	The land use type where a structural BMP is constructed to treat respective runoff is a BMP RAM inventory field. BMP RAM defines 10 land uses: Industrial (IND), Commercial (COM), Multi-family Residential (MFR), Single Family Residential (SFR), Cultivated (CUL), Other/Open Space (OTH), High Traffic Roads (HTR), Medium Traffic Roads (MTR), Low Traffic Roads (LTR), and Low Traffic Unpaved Roads (rdsUL).

Material Accumulation	BMP RAM observation to quantitatively track the relative loss of the structural BMP storage capacity over time in select structural BMP types. A permanent staff plate is installed near the outlet of structural BMP and the lowest visible value is recorded during BMP RAM field observation.
Media Filter	A structural BMP type: • A proprietary subsurface flow-through structure that uses a membrane or other media to actively filter stormwater to remove stormwater pollutants. • Proprietary models include media or membranes that may be selected to target the specific removal of the pollutants of concern, resulting in downgradient stormwater concentration reductions. • May be confined space but not always. • Pollutant load reductions achieved by reduced concentrations in effluent. No stormwater volume reduction occurs. • Typically moderate to large sized centralized BMP, accepting runoff from a mixed land use drainage area.
Media Filtration	A stormwater treatment process: Improvement of stormwater quality through the use engineered flow-through systems. Flow-through systems can be designed to (1) physically trap, separate, and/or sieve particulate matter and/or (2) use active media to treat dissolved constituents as stormwater is transported downgradient.
MS4	**Municipal Separate Storm Sewer System** includes ditches, curbs, gutters, storm sewers, and similar means of collecting or conveying urban derived stormwater runoff that do not connect with a wastewater collection system or treatment plant. An MS4 is typically operated by a public agency such as a city, county, municipal utility district, or state or federal agency.
Observation Score	The BMP RAM Score is determined by the integration of observation scores. Each field observation value is converted to an observation (0-5) score based on the pre-determined benchmark (5) and threshold (2) values set by the user and stored in the online application. The BMP RAM user enters the field observation values per the protocols provided and the data management system internally calculates individual observation scores, as well as the overall BMP RAM Score.
Observation Type	The BMP RAM scoring approach includes 9 distinct observation protocols and each is a rapid proxy for one or more treatment processes performed by a BMP type.
Particle Capture	A stormwater treatment process: The physical process by which particulates, trash, or debris are physically removed from stormwater. Particle capture can occur via flow attenuation, vertical settling, flow separation, or other physical or abiotic processes that result in capture and retention within a BMP. Effective particle capture would be measured as pollutant concentration reductions for particulate pollutants as result of BMP interaction.

Porous Pavement	A structural BMP type: • Use of sustainable materials to create a durable, pervious surface overlaying a crushed stone base that allow stormwater to percolate and infiltrate into the underlying soil. • Porous pavement can include an underlying reservoir to increase infiltration rates. • Local stormwater is typically not routed to a porous pavement surface, but rather constructed to minimize the volume of stormwater generated and routed downgradient from a previously impervious surface. • Footprint of structural BMP type can vary greatly, typically used for parking lots, sidewalks, driveways or other impervious surfaces.
Remaining Capacity	BMP RAM observation to quantitatively track the relative loss of the structural BMP storage capacity over time in a Treatment Vault, Bioretention, Biofiltration, and Catch Basin. A stadia rod is used to measure the remaining distance from top of the accumulated sediment to the invert of the outlet during BMP RAM field observation.
Runoff Observation	BMP RAM observation to quickly evaluate the infiltration capacity of a Bed Filter, Infiltration Feature, Bioretention, Biofiltration, Bioswale or Porous Pavement. A known volume of water is applied to the soil substrate of the structural BMP and a simple observation is made as to whether the water is infiltrated into the soil or not.
Settling Basin	A structural BMP type: • Open flow through structures used to detain stormwater volumes and settle particulate pollutants prior to outflow. • Pollutant load reductions are realized by concentration reductions with no volume reduction via infiltration due to impervious or highly impermeable base. • Size and application of settling basins can vary. • Setting basins are common at the inlet of another structural BMPs to pre-treat inflowing stormwater prior to stormwater entering subsequent structural BMP. If inventory and assessment of the settling basin is desired independent from the next structural BMP in the treatment train, there are two options: o Large scale Settling Basin draining a mixed land use area can be classified and assessed as a Treatment Vault o Smaller sized Settling Basins draining a single land use area can be classified and assessed as a Catch Basin.
Structural BMP	Structural BMPs that accept, attenuate, and treat urban stormwater. Structural BMPs are implemented to reduce pollutant loads in stormwater by either removing pollutants and/or by reducing runoff volumes. The BMP RAM defines 14 distinct structural BMP types by the processes relied upon for water quality improvements. Users of the BMP RAM must define the structural BMP type by these processes, rather than rely on previous naming conventions.

Structural BMP Condition	The condition is defined as a continuum relative water quality performance capability of a structural BMP using 0-5 scoring range. A structural BMP is considered at benchmark condition following installation and/or after adequate maintenance. As stormwater and pollutant loading to the BMP occurs during subsequent storm events, the condition of a structural BMP gradually declines. At some point, the operational performance of the specific structural BMP falls below the pre-determined acceptable condition (i.e., threshold) and maintenance is required to sustain the intended function of the BMP.
Substrate Type	BMP RAM observation to determine the biogeochemical cycling capacity and infiltration ability of the substrate material of the structural BMP of a Bioretention and Biofiltration BMP. BMP RAM user performs qualitative assessment of the quality, compaction and type of substrate at the base of the structural BMP to assess if the fundamental design characteristics of the BMP soil is appropriate and being maintained.
Threshold	The structural BMP condition that the user has determined to be no longer acceptable from a water quality treatment perspective. The threshold equates to a RAM score of 2. Typically, threshold values for each of the field observations are stored as default values relative to benchmark values based on a universal standard for all BMPs of the same type or a recommended deviation tolerance below which the respective process is no longer adequately functioning. The integration of field observations is calculated by the database to determine the structural BMP RAM score (i.e. condition) at the time of observations.
TELR	The stormwater **Tool to Estimate Load Reductions** (www.swtelr.com) is an urban hydrology and pollutant loading model that quantifies the cumulative pollutant load reductions to receiving waters as a result of structural and non-structural BMP implementation on an urban catchment scale. BMP RAM inventory and condition results are direct inputs into the TELR data management system to estimate load reductions from the implementation and maintenance of centralized and decentralize structural BMPs.
Trash Capture Device (TCD)	Structures placed at the inlet of a drop inlet or structural BMP to capture and detain trash, litter or debris < 5 mm in size to prevent discharge of trash into the stormwater system or the structural BMP.
Treatment Capacity	A BMP RAM inventory field: • Storage capacity below the bypass outlet, designed for water quality treatment • Entered as cubic-feet (cu-ft) for Dry Basins, Detention Basins, Wet Basins, Infiltration Basins, Treatment Vaults, Media Filters, Bed Filters, and Settling Basins.
Treatment Process	Physical, chemical, or biological means employed by a structural BMP to remove/retain the pollutants of concern and/or reduce stormwater volumes that ultimately reach receiving waters. Structural BMPs rely on 4 primary, passive processes to reduce the load of pollutants in stormwater: infiltration, particle settling, media filtration and biogeochemical cycling.

Treatment Rate	A BMP RAM inventory field: • Maximum flow rate through the structural BMP that provides effective treatment. • Entered as cubic feet per second (cfs) for Treatment Vaults, Media Filters, and Bed Filters.
Treatment Vault	A structural BMP type: • A subsurface flow-through structure that physically separates sediment, trash, leaf litter, debris and other particulate pollutants from stormwater via various water separation or settling techniques. • Pollutant load reductions are realized by concentration reductions. No volume reduction occurs due to impervious base. • Many manufactured and proprietary models are available that employ various physical techniques to separate and capture debris and particulate. • Accumulation of material at base of BMP can be observed and measured via manhole access. • Moderate sized centralized structure accepting runoff from either a large single or mixed land use drainage area.
Vegetation Cover	BMP RAM observation to characterize the vegetation types and percent cover within the frequently inundated area of a structural BMP. Vegetation types include: wetland and riparian species, grass species, and terrestrial trees.
Wet Basin	A structural BMP type: • A flow through basin with discrete inlets and outlets designed to retain some volume stormwater runoff in a persistent pool of surface water. Designs may include additional detainment storage of stormwater for some minimum time to reduce peak flows. • Wet pool capacity, treatment capacity and draw down time of treated volumes will vary across specific BMPs. • One or more outflow offices may exist at different elevations. Lowest outlet elevation sets wet pool capacity. • Dense vegetation is common. Dominant vegetation is wetland species and can be supplemented with riparian species with very high densities. • Substrate is typically fine organic matter and silt, making volume reductions via infiltration negligible. Volume reductions occur primarily by evapotranspiration. • Moderate to large sized centralized BMPs that accept runoff from mixed land use drainage areas.
Wet Pool Capacity	A BMP RAM inventory field: • Wet pool water quality volume used for flow through treatment. The wet pool can be depleted through evaporation and is regenerated by incoming flows. • Entered as cubic feet (cu-ft) for Wet Basins.