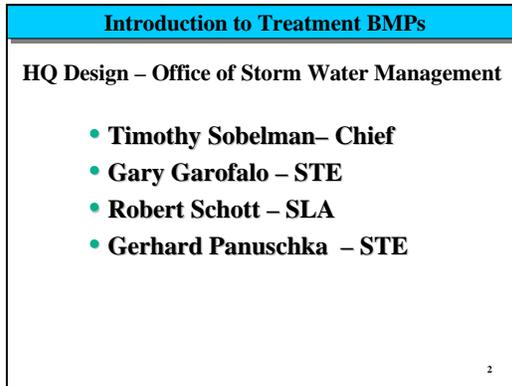
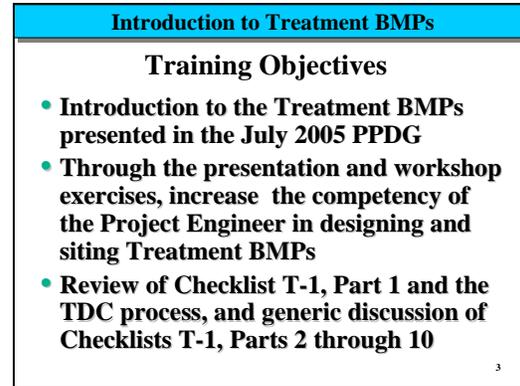




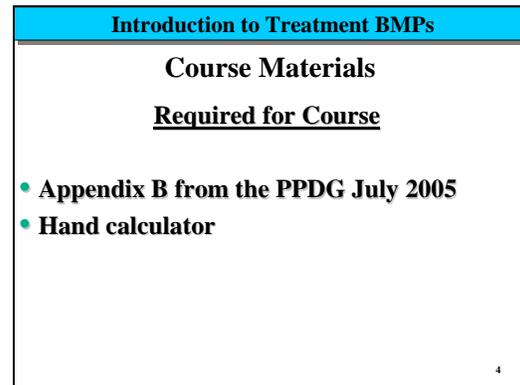
Slide 1: This training will present the Treatment BMPs as described in the **July 2005 Project Planning and Design Guide**, Section 2 and Appendix B.



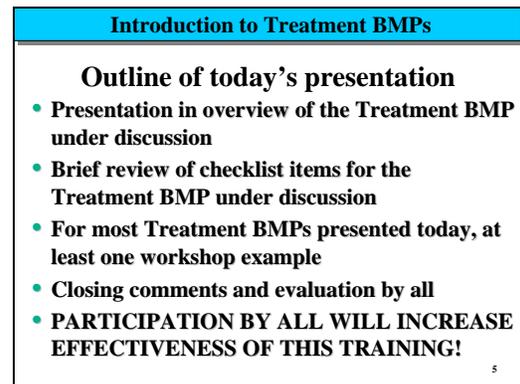
Slide 2: In Caltrans Headquarters several functional units have specific units assigned to the Storm Water Program: This training was developed by the **HQ Design Office of Storm Water Management**, which is staffed by these people. Within this unit there are many years of experience in storm water issues, and the staff collectively also has extensive background in landscape architecture, geotechnical engineering, water resource and hydraulic engineering, specification writing, and Caltrans project development procedures. The Storm Water program, itself, however, is headed by the **Caltrans Division of Environmental Analysis**.



Slide 3: Refer to text on the slide.



Slide 4: [Other modules will require a hand calculator, not this Introduction module.]



Slide 5: Refer to text on the slide.

Introduction to Treatment BMPs

Treatment BMPs in Sept. 2002 PPDG

- Biofiltration strips and swales
- Infiltration basins
- Detention basins
- Dry weather flow diversion
- Gross Solids Removal Devices (GSRDs)
- Traction Sand Traps

6

Slide 6: We will briefly list all the previously-approved **Treatment BMPs**, and how T-BMPs are incorporated into the contract plans. While we will concentrate today on the recently-approved Treatment BMPs, we should first briefly refresh your memory about the ‘older’ Treatment BMPs. In a few minutes we also will discuss when you would consider approved Treatment BMPs for your project.

Biofiltration strips and swales: functions by filtration, sedimentation, and adsorption of pollutants onto soil particles; design using the WQF; layout on contract plan sheets: done by the District, similar to earthwork feature, check with HQ OSWM as some detail sheets may have been developed.

Infiltration basins: functions by infiltrating runoff; water usually must meet certain Basin Plan standards; design using the WQV; layout on contract plan sheets: design by the District, similar to earthwork feature, using detail sheets from HQ OSWM

Detention Basins: functions by sedimentation and some infiltration may occur; design using the WQF; layout on contract plan sheets, as an earthen basin: design by the District, similar to earthwork feature, using detail sheets from HQ OSWM

Dry Weather Flow Diversion: Functions by diverting low flows to a POTW (publicly owned treatment works, i.e., a sewage treatment plant, where various treatments occur. Design using the low flow volume. Dry weather flows are a different from other Treatment BMP devices, in that they target non-storm water runoff. If the contaminated flow is generated within the right of way by Caltrans activities, and is anticipated to be persistent, and if the local POTW is willing to accept the flow, it is very effective. DWFD is handled by Step 1 of the checklist T-1, Part 1, separately from the TDC process. * Note that reductions are observed for dry weather flow only. DWFDs are usually configured as a

junction structure with an overflow weir feature; sometimes the agency to which the diverted flow will be directed will have its own detail sheets. Check with QH OSWM and/or HQ Hydraulics to see if detail sheets are available. HQ OSWM has a Task Order to develop detail sheets for these structures, which could also serve as an upstream flow-splitter to a Treatment BMP (meaning the storms with WQV depths would go the treatment device, and larger storms would be bypassed).

GSRDs: Gross solids removal devices function by capturing litter above the 5 mm size. Insertable contract plan sheets have been developed by consultants to HQ OSWM, and these can be obtained from our Office. The District is responsible for connections to the devices (e.g., flow line elevations will determine which device can be used, and where within the existing or new drainage system, determining tributary area, and associated annual litter volume, and would select one of three devices based on those items and other site constraints. GSRDs – gross solids removal devices that capture litter. Litter is handled by Step 2 of the checklist T-1, Part 1, separately from the TDC process. These devices generally are only placed in areas where the receiving water body has been placed on a 303(d) listing.

Traction Sand Traps: Function by sedimentation. When not configured as a Treatment BMP Detention Basin, a “CMP riser” style is usually used, although some vaults have been constructed. The CMP riser style devices have been developed independently of HQ by various Districts, although an upcoming consultant Task Order will seek to provide more standardization. These are considered if traction sand or other abrasive materials more than twice a year in mountainous areas during snowfall. Traction sand traps are handled by Step 3 of the checklist T-1, Part 1, separately from the TDC process. Some detail sheets are avail in various districts from previous contracts, no ‘insertable’ contract plan sheets available at this time from HQ.

Introduction to Treatment BMPs

New Treatment BMPs - July 2005 PPDG

These were accepted as part of a lawsuit settlement

- **Infiltration Trench** (now included as one of the two **Infiltration Devices**)
- **Media Filter** (**Austin Sand Filter** (earthen and concrete vault; partial or full) and **Delaware Sand Filter**)
- **MCTT** (**Multi-chamber treatment train**)
- **Wet Basin**

7

Slide 7: These are the recently approved Treatment BMPs. We will be taking about these today.

Infiltration trenches: Function by infiltration, design using the WQV. PS&E by the District, similar to earthwork feature, using detail sheets soon to be available from HQ OSWM, but much of the design detailing is fairly conventional and could be deduced by review of the Project Planning and Design Guide Appendix B.

Media Filters: Function by sedimentation and filtration; designed uses the WQV. Two versions and four styles: 1) the partial Austin Sand Filter in a vault; 2) the full sedimentation Austin Sand Filter in a vault; 3) the Austin Sand Filter as an earthen device; and 4) the Delaware Filter in a vault. PS&E is by the District, using insertable plan sheets from HQ OSWM for the vault styles media filters; PS&E by the district if an earthen style, using detail sheets from HQ OSWM.

MCTTs: Similar to the Media Filter Function by sedimentation and filtration; but with an extra chamber (we will show slides later); designed uses the WQV. Placed in a vault, with the PS&E by the District using insertable plan sheets from HQ OSWM (soon to be developed).

Wet Basins: Function by sedimentation and adsorption to soil particle and uptake by some vegetation; designed using the WQVPS&E by the District, similar to other 'earthwork Treatment BMPs, such as the Infiltration Basin, using some detail sheets (e.g., concrete overflow devices) from HQ OSWM.

These Treatment BMPs would usually be placed in the contract plans on Drainage sheets or on Construction Detail sheets.

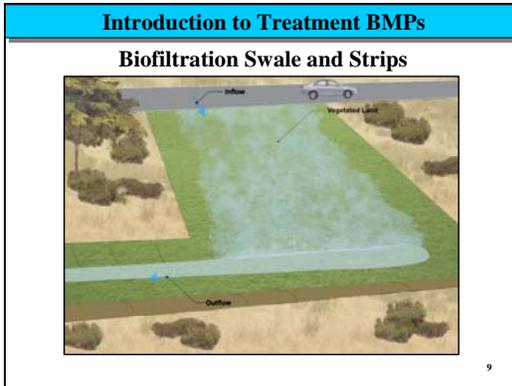
Introduction to Treatment BMPs

Biofiltration Swale and Strips

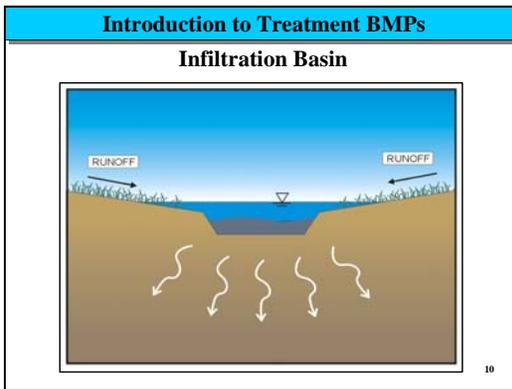
Slide 8: Biofiltration strips are vegetated land areas, over which storm water flows as sheet flow. **Biofiltration swales** are vegetated channels, typically configured as trapezoidal or v-shaped channels that receive and convey storm water flows while meeting water quality criteria and other flow criteria. Pollutants are removed by filtration through the vegetation, sedimentation, adsorption to soil particles, and infiltration through the soil. Strips and swales are effective at trapping litter, Total Suspended Solids (soil particles), and particulate metals.

Strips and swales should be considered wherever site conditions and climate allow vegetation to be established and where flow velocities will not cause scour. Vegetative cover of about 70% is required for treatment to occur. Biofiltration strips and swales should also be considered upstream of Treatment BMPs that would benefit from pretreatment by removing sediment loading, such as Infiltration Devices Detention Devices, and Wet Basins.

This is a schematic drawing Biofiltration Treatment BMPs are comprised of two 'styles', biofiltration strips and biofiltration swales. Bioswales convey and treat concentrated flows, while BioStrips convey and treat shallow, sheet from the roadway. This treatment BMP is designed as a **flow-based device**, using the **Water Quality Flow** rainfall intensity for the more frequent rainfall events which is defined in the Project Planning and Design Guide Chapter 2 as Water Quality Flow.

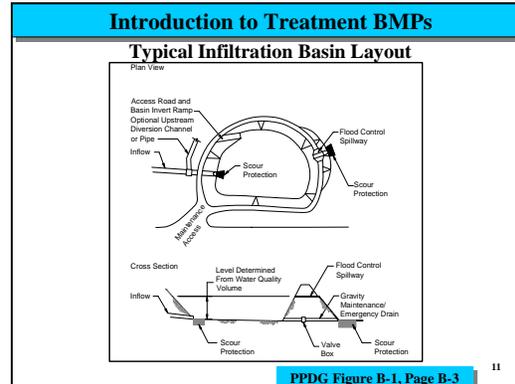


Slide 9: Here is another view, showing more clearly how BioStrips would accept runoff, with the treatment occurring while the water is relatively shallow. A bioswale is pictured at the bottom of the strip.



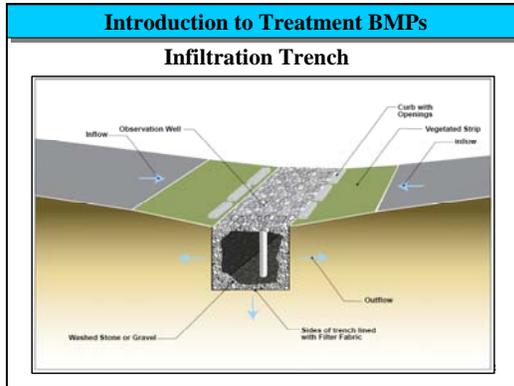
Slide 10: An **Infiltration Device** is designed to remove pollutants from surface discharges by capturing the **Water Quality Volume (WQV)** and infiltrating it directly to the soil rather than discharging it to surface waters. Infiltration devices may be configured as basins or trenches. An infiltration basin may be constructed in any shape to meet right of way restrictions. This is an idealized infiltration basin shown in cross section. We will see in a later plan view slide that an overflow spillway would be provided to allow runoff above the water quality volume be conveyed through the device. The darker blue in the figure represents sediment that will build up over time – infiltration basins will require periodic maintenance, but as we will discuss, they are designed with a Factor of Safety of 2 on the infiltration rate, and if otherwise properly designed (including an upstream forebay or bioswale to capture sediment, should have a reasonable in-service life (say 4 to 8 years) before heavy maintenance is needed. The key design parameter is determining the area of the invert (bottom of the infiltration basin), which is

based on the permeability characteristics of the native soils and the desired drawdown time (usually 40 to 48 hours). In contrast to the Biofiltration Treatment BMPs, this device and most other Treatment BMPs are volume-based devices, using a concept defined in the Project Planning and Design Guide Chapter 2 as the Water Quality Volume.



Slide 11: An **overflow device** is shown, to direct overflow through a design outlet device when runoff from a large storm event enters the Infiltration Basin. Note that a maintenance road is provided around the infiltration basin. At some sites, space may not be available for a road completely around the basin, but discuss this with **District Maintenance**, as a perimeter road along one side to the overflow device may be sufficient, or access to the overflow through the invert of t infiltration basin may also be sufficient. Also, note on the figure the emergency valve. If possible, provide this valve, and provide access to operate the emergency valve by Maintenance. The valve must be operated in the event that the basin has not emptied within the time allowed to prevent vector growth. Generally, the valve provided is a slide gate valve and the operator is supported from the slope. If the valve were installed as shown, water would remain in the pipe between the basin and the valve for several days or weeks. However, infiltration basins have been constructed and operated successfully without this valve.

A **forebay** (small detention basin) is often placed at the uppermost segment of an infiltration basin, if significant sediment load is expected. Infiltration Basins have no shape restriction.

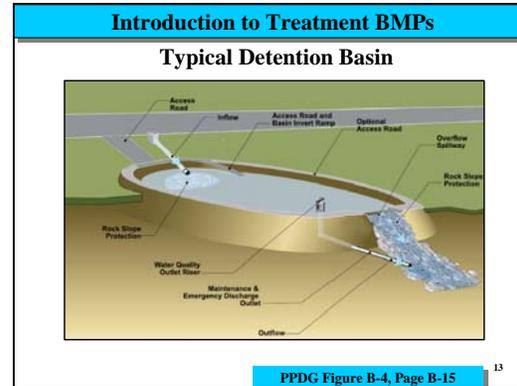


Slide 12: This is an idealized **Infiltration Trench**. By contrast with an Infiltration Basin, an Infiltration Trench stores the WQV below ground prior to infiltration in the void spaces between rocks placed in the trench. Infiltration trenches are often elongated, allowing them to be used in constricted areas, but there is no shape restriction.

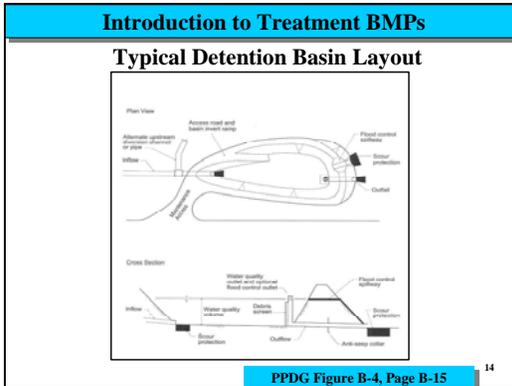
The typical placement would use a filter-fabric lined trench (i.e., the trench is formed against bare earth with a fabric as a separator, and without concrete walls) with a curb or dike at its perimeter at the ground surface; the filter fabric is employed between the “drain rock” and the native ground to prevent soil intrusion into the void space. Note well: The sheet flow and/or the concentrated flow must be allowed to enter the Infiltration Trench, so the curbing may have open areas or cutouts.

The “overflow spillway” that is for the Infiltration Trench will take the form of a surface conveyance system at the downstream end of the device; when the infiltration trench is completely filled during a storm, overflow will continue downstream by passing over the device.

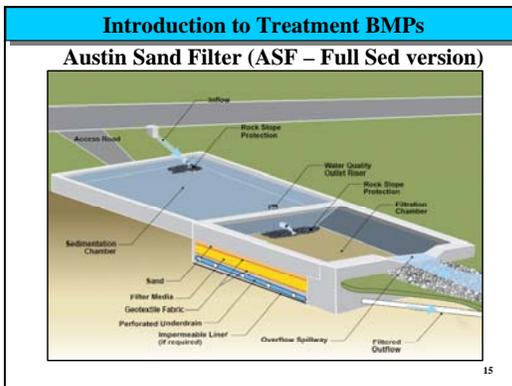
Not shown in the figure, but sediments will build up over time in infiltration trench; sediments will reduce the infiltration ability of any infiltration device, by clogging the native ground with smaller particle. To counter this problem, the design of an infiltration trench is conservative in several aspects so that a longer-life can be more reasonably assured: for example, a Factor of Safety of 2 is employed in the design, and any infiltration through the sides of the trench is usually ignored in the design process.



Slide 13: A **Detention Device** is a permanent treatment BMP designed to reduce the sediment and particulate loading in runoff from the water quality design storm (Water Quality Volume [WQV]). While the WQV is temporarily detained in the device sediment and particulates settle out under the quiescent conditions prior to the runoff being discharged. A detention device is typically configured as a **basin**. Note the similarity between the detention basin and the infiltration basin, in terms of their appearance when full or dry. There are many features common to both, with the notable exception that the runoff does not infiltrate in a detention basin, but instead is released using a water quality outlet, usually a riser pipe having orifices. A low-flow concrete ditch is often provided, to minimize gullying at the invert. Invert slope is 1 to 2%. At some sites, space may not be available for a road around the basin. Provide a road that is sufficient to allow access to the basin for maintenance (mowing and regarding). Also, provide access to operate the emergency valve. The valve must be operated in the event that the basin has not emptied within the time allowed to prevent vector growth. Generally, the valve provided is a slide gate valve and the operator is supported from the slope. If the valve were installed as shown, water would remain in the pipe between the basin and the valve for several days or weeks.

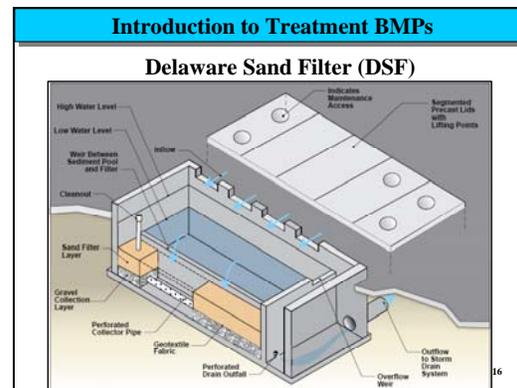


Slide 14: Here is a typical layout for a **Detention Basin**. Note also the elongated shape – a **2:1 length to width ratio** is desired for effective treatment to occur. Discharge should be accomplished through a water quality outlet. The water quality outlet should be designed to empty the device within 24 to 72 hours (also referred to as “drawdown time”). The 24-hour limit is specified to provide adequate settling time; the 72-hour limit is specified to mitigate vector control concerns. The outlet riser would release water through orifices, configured as: (1) a single orifice outlet with or without the protection of a riser pipe, and (2) riser perforated vertically (orifices in multiple rows).

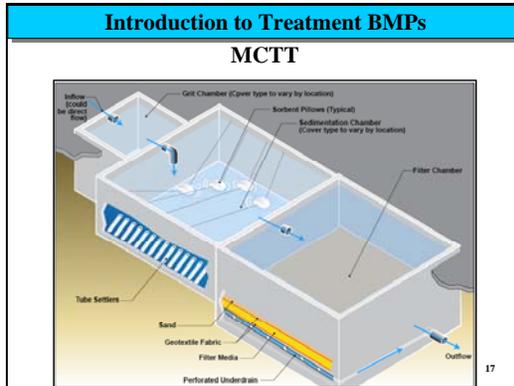


Slide 15: A **Media Filter** is a Treatment BMP device that primarily removes TSS (sediments), particulate and dissolved metals, and litter from runoff by sedimentation and filtration. The filter media typically consists of sand, which is effective for removal of coarse and fine sediments and particulate metals. In all media filters, storm water is directed into the 1st chamber where the larger sediments and particulates settle out, and the partially treated effluent is metered into the 2nd chamber to be filtered through a media. There are two types of approved Media Filter devices: the **Austin Sand Filter** and the **Delaware Filter**. An ‘Austin’

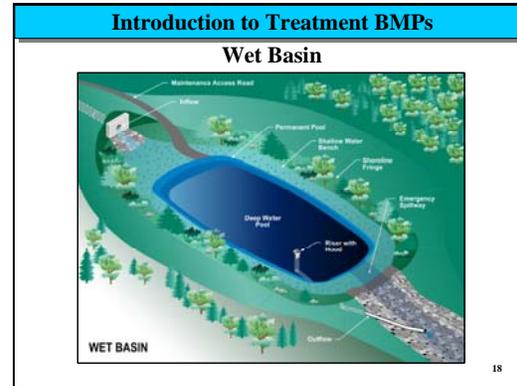
sand filter is usually open and at grade, and has no permanent water pool; a ‘Delaware’ sand filter is always configured with closed chambers and below grade, and has a permanent pool of water. An Austin sand filter may be configured with earthen sides and invert, but usually has chambers made using concrete; a Delaware sand filter is always made using concrete sides and invert. In the Austin sand filter, the 1st chamber may be sized for the entire WQV (‘full sedimentation’) (see Figure B-13, page B-48) or as a ‘partial sedimentation’ chamber, holding only about 20% of the WQV (see Figure B-14, page B-49). Inflow into the Media Filter is via: a) a culvert, b) by overland flow into the 1st chamber configured as a drop inlet, or c) both.



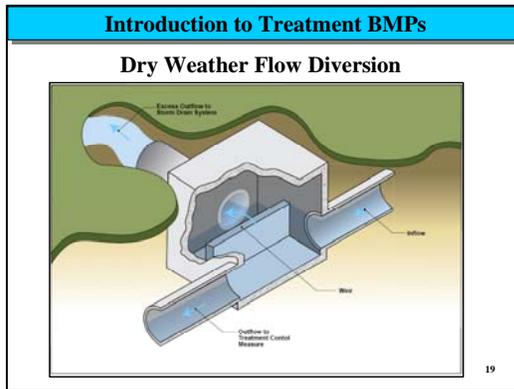
Slide 16: As the **Delaware Sand Filter** has **permanent pool** in the 1st chamber (and some designs also have a permanent pool in the 2nd chamber), be sure to discuss the design and proposed location with the local Vector Control agency. All media Filters will require periodic maintenance, but if otherwise properly designed should have a reasonable in-service life before heavy maintenance is needed. Remove the top 50 mm of sand and dispose of sediment if facility drain time exceeds 72 hours. Restore media depth to 450 mm (18 inches) when overall media depth drops to 300 mm (12 inches) as “heavy maintenance”. Remove accumulated sediment in the sedimentation basin every 10 years or when the sediment occupies 10 percent of the basin volume, whichever occurs first.



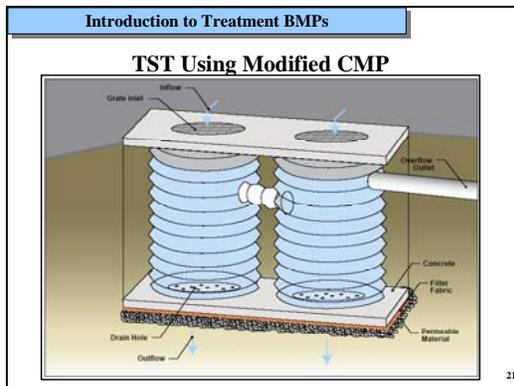
Slide 17: MCTTs are a vaulted treatment system comprised of three separate units: The 1st chamber, also called a ‘grit’ chamber, captures the larger sized sediments; this may be configured as a catch basin with a sump. Some variations are employed in this chamber, such as including a trash rack. The 2nd chamber, also called the main settling chamber, is designed to capture finer sediments; this chamber may also be configured with sorbent pads or plates designed to capture hydrocarbons, and some designs employ aeration in this chamber (forcing air into the ponded water from approximately mid-elevation in the chamber) to lift floatables and litter not captured in the initial chamber. The 3rd chamber, also called the filtering chamber, employs a media filter often configured as a combination of sand and peat moss; it removes even finer sized particles than were captured in the previous chambers, and acts as a sorption area for some dissolved constituents. Other media can be placed in certain circumstances if unusual constituents are present in the runoff (but consult with District NPDES and the HQ – OSWM in that situation). All or most of the MCTT is placed below ground, with flow entering through culverts or sheet flow, and leaving as confined open channel flow, usually in culverts.



Slide 18: A **Wet Basin** is a Caltrans-approved Treatment BMP system comprised of a permanent pool of water, a temporary storage volume above the permanent pool that hold the Water Quality Volume that will be treated. Treatment is by sedimentation, and the uptake from the vegetation that exists along the shoreline zone. In addition to the water quality benefits, a Wet Basins can also provide an aesthetic appeal within the right of way. Wet basins are placed in locations where naturally occurring wetlands do not exist. Little or no infiltration is assumed to occur through the basin bottom (“invert”) because a permanent pool of water is needed for treatment, and for the survival of the plants and biota in the basin, thus infiltration is not desired from the Wet Basin. The water level of the permanent pool must be maintained year-round to support the plant community in the wet basin; this water level is maintained by connecting the wet basin to a stream channel, by seepage from springs, by placing the invert below the groundwater table, or by water from some other source. Placing below the GW table or use of ‘recycled’ water requires approval by the REWQCB. Placing below the GW table also increases the difficulty in construction.

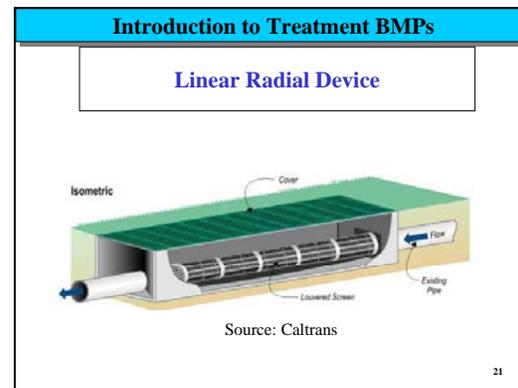


Slide 19: Another Caltrans-approved Treatment BMP is the **Dry Weather Flow Diversion** device. Dry weather diversion flow devices provide permanent treatment by directing non-storm water flow through a pipe or channel to a local municipal sanitary sewer system (publicly owned treatment works [POTWs]) during dry season or weather. This flow must be generated by Caltrans activities or from Caltrans facilities. Dry weather flow diversion should only be considered when all of the following conditions apply: Dry weather flow is persistent (i.e., present over a significant length of time at a relatively consistent flow rate, or having significant quantities that are periodically developed on-site), and contains pollutants; An opportunity for connecting to a sanitary sewer is reasonably close and would not involve extraordinary plumbing to implement (e.g., jacking under a freeway); The POTW is willing to accept the flow during the dry season or weather. An example of dry weather flow that could be considered for diversion is the runoff from a Caltrans tunnel generated during cleaning using water spray and scrubbing, since the wash water typically will contain soot.



Slide 20: Traction Sand Traps (TSTs) are sedimentation devices that temporarily detain

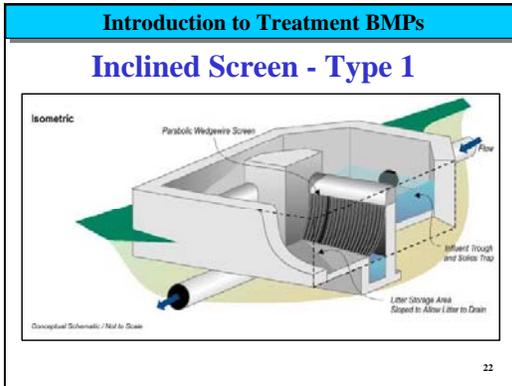
runoff and allow traction sand that was previously applied to snowy or icy roads to settle out. In this handbook, traction sand refers to sand and other abrasives. These traps may take the form of basins, tanks, or vaults, with a special ‘vault’ style being shown on this slide, constructed using CMP (corrugated metal pipe) section stood on end. Traction sand traps should be considered at sites where sand or other traction-enhancing substances are commonly applied to the roadway. If sand is used only rarely (less than twice a year), traction sand traps need not be considered for installation. Vault-style traction sand traps should be considered only where detention basins or basin-style sand traps are infeasible.



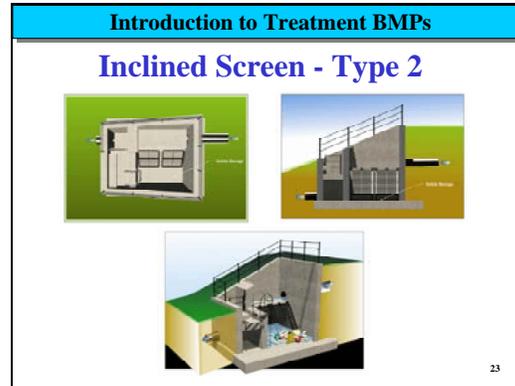
Slide 21: Gross Solids Removal Devices (GSRDs) are Caltrans-approved Treatment BMP devices that use physical methods (filtration through a screen) to remove litter and solids 5 mm (0.125 inch nominal) and larger from the storm water runoff. GSRDs should be considered for projects in watersheds where a TMDL allocation or 303(d) listing for litter has been made. GSRDs should be designed to handle up the HDM Section 800 storm event, typically Q₂₅, unless placed in an off-line configuration. The devices also have an emergency overflow capacity in the event of clogging.

The style shown here is called the Linear Radial device. The Linear Radial Device (Figure B-8, page B-42) utilizes modular well casings, and the device is usually placed in a concrete vault. Flows pass radially through the louvers trapping litter and solids in the casing and passing flows into the vault for discharge via an outlet pipe. The bottom of the casing is smooth to allow trapped litter to move to the downstream end of the well casing. The Linear Radial Device is designed to work in-line with the existing storm drain system or could be placed in an off-line

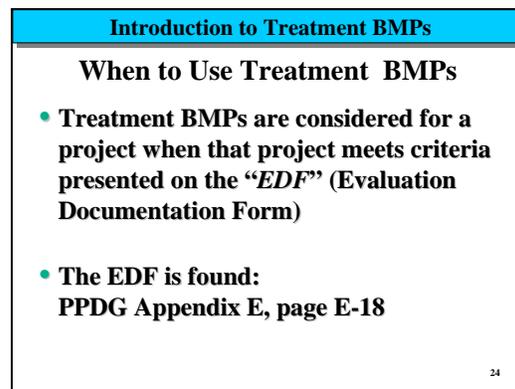
configuration; either placement will incorporate an overflow/bypass that will operate if the unit becomes plugged. The first half-meter of the linear well casing is non-louvered with an open top to allow for influent bypass should the device become clogged with litter. The circular louvered sections have access doors that can be easily opened to facilitate cleaning with a vacuum truck or other equipment if necessary.



Slide 22: Two versions of the **Inclined Screen Device** have been tested. In this version, the **Type 1 Inclined Screen device**, the incoming flow overtops a weir and falls through an inclined bar rack (wedge-wire screen) with a 3-mm (0.125-inch nominal) maximum spacing between the bars, located after the influent trough. After passing through the rack, the flow exits the device via the discharge pipe. A distribution trough is provided to allow influent to be distributed along the length of the Inclined Screen. The litter captured by the bar rack is pushed down toward the litter storage area by the storm water runoff. This version employs a parabolic wedge-wire screen inclined at 60 degrees and 1 m (3 ft) high. The gross solids storage area is sloped and is provided with a drain to prevent standing water. Not shown on this figure, but an opening above the litter storage area is provided to allow for overflow/bypass if the device becomes plugged, with the overflow being directed outside of the vault. The device should be designed for litter and debris storage for a period of one year.



Slide 23: This is the second version of the Inclined Screen Device, the **Type 2 Inclined Screen device**. In this version the incoming flow overtops the screen without the intervention of a weir and falls through a straight screen, sized to capture 5-mm (0.125-inch nominal) litter. After passing through the screen, the flow is collected in a trough, and exits the device via the discharge pipe. As shown on the figure, both this Type 2 and the Type 1 Inclined Screen devices are more suitable when there is a 5-ft or more change in hydraulic head. The gross solids storage area is sloped and is provided with a drain to prevent standing water. A weir opening above the litter storage area is provided to allow for overflow/bypass if the device becomes plugged, with the overflow remaining inside the vault, being directed into the outflow pipe system.



Slide 24: The PE would consider approved Treatment BMPs for the project, and he will do so when, after completing the **EDF – Evaluation Documentation Form**, found on Project Planning and Design Guide Appendix E, page E-18, directs him to consider Treatment BMPs for the project. This form provides the consideration process described in Section 4 of the Project Planning and Design Guide by which

the Project Engineer determines if he must consider an approved Treatment BMP.

Introduction to Treatment BMPs

Storm Water Data Report (SWDR)

The project's SWDR documents various items, especially concerning how the project handles storm water runoff; topics include:

- **DPP (Design Pollution Prevention) BMPs employed: typical hydraulic & landscape features**
- **Treatment BMP selected, or reason for non-use if required to consider treatment (to the MEP level of achievement)**
- **Agreements with RWQCB**

25

Slide 25: Design Pollution Prevention BMPs are permanent water quality controls used to reduce pollutant discharges by preventing erosion. These BMPs are standard technology-based, non-treatment controls selected to reduce pollutant discharges to the **MEP (Maximum Extent Practicable)** requirements. They are applicable to all projects. This category of BMPs includes preservation of existing vegetation; concentrated flow conveyance systems, such as ditches, berms, dikes, swales, overside drains, outlet protection/velocity dissipation devices; and slope/surface protection systems such as vegetated surfaces and hard surfaces.

Treatment BMPs are permanent water quality controls used to remove pollutants from storm water runoff prior to being discharged from Caltrans right-of-way. These controls are used to meet **MEP** requirements and are considered for projects discharging directly or indirectly to receiving waters. This category of BMPs includes: traction sand traps, infiltration basins, detention devices, biofiltration strips/swales, dry weather flow diversion, and GSRDs. Treatment is required to meet MEP standards, with MEP is defined in the Project Planning and Design Guide Glossary as: "The MEP analysis is the process of evaluating the selected BMPs based on legal and institutional constraints, technical feasibility, relative effectiveness, and cost/benefit ratio."

Construction site BMPs are temporary controls used to reduce pollutant discharges during construction. These controls are best conventional technology/best available technology **BCT/BAT** based BMPs that may include soil stabilization, sediment control, wind erosion control, tracking control, non-storm water management and waste management. By contrast the standard required for construction

BMPs are: BCT stands for Best Conventional Pollutant *Control Technology* and applies only to the following pollutants: suspended solids (TSS), biological oxygen demand (BOD), pH, and fecal coliform bacteria. *Best Available Technology Economically Achievable (BAT)* applies to toxic pollutants such as metals and pesticides, as well as "non-conventional pollutants," which includes everything else.

Introduction to Treatment BMPs

Interaction with other Caltrans Units

Design usually lead unit, but usually also involves:

- **Landscape Architecture**
- **Traffic Operations**
- **Geotechnical**
- **Maintenance**
- **District NPDES**
- **Environmental**
- **Hydraulics**

26

Slide 26: The lead group in for the PS&E of Treatment BMPs may vary from District to District, and also may depend upon the which BMP is to be implemented. Since all of the Treatment BMPs are based in hydraulic engineering principles, review/and or design by **District Hydraulics** should be emphasized, and the role of **District Maintenance** cannot be underestimated. Involve all these and any other applicable functional area when attempting to meet water quality guidelines.

Introduction to Treatment BMPs

Other Caltrans Storm Water Training

Division of Environmental Analysis

- *An Introduction to Storm Water Proposed*
- *Storm Water Quality Fundamentals and Monitoring Proposed*
- *Water Quality Assessment Guidance Proposed*
- *Dewatering Activities Proposed*

27

Slide 27: An Introduction to Storm Water: Course Description: This training course will provide an introduction to the Department's storm water program. *Proposed Course Contents:* This course provides an introduction to the storm water regulatory framework. The course content focuses on the following areas:

Treatment BMP Training – Text to the PowerPoint Presentation
Caltrans Headquarters Office of Storm Water Management

Clean Water Act, (2) California Porter-Cologne Water Quality, (3) NPDES Permits, (4) Storm Water Management Plan, (5) General Overview of Location Specific Requirements, and (6) Department Policies and Procedures for storm water

Storm Water Quality Fundamentals and Monitoring Course Description: This training course will provide an introduction to storm water quality fundamentals, including basic water chemistry and monitoring. Course Contents:

Water Quality Assessment [formerly Storm Water Quality Assessment Guidelines]: *Proposed* Course Description: This course will provide Department staff and consultants with the necessary background to prepare and review water quality assessments for construction projects throughout all Department Districts to meet CEQA (California Environmental Quality Act) and NEPA (National Environmental Policy Act), and other regulations, as appropriate. Course Contents: It will discuss storm water and water quality issues, the Department SWMP and contents of the water quality assessment guidance document. (1) Introduction, (2) Screening-level assessment for a Preliminary Environmental Assessment Report (PEAR), (3) Storm water quality assessment for Project Assessment and Environmental Document (PA/ED), and (4) References and Sources of Information.

Dewatering Activities: *Proposed* Course Description: This training course will provide an overview of regulations governing temporary construction dewatering activities and provide guidance on incorporating anticipated dewatering activities and permits throughout the project planning, design, and construction phases of project delivery. Course Contents:

course addresses the principles of erosion and soil stabilization with an emphasis on roadway construction projects. Information on the design and selection of permanent erosion control best management practices (BMPs) is provided. An emphasis is placed upon incorporating permanent erosion control BMPs into project planning and design, including plans, specifications, and estimates (PS&E). A workshop exercise is offered to test skill development. Course Contents:

Temporary Erosion Control Training: Course Description: This one-day course presents and discusses the principles of water pollution control as related to ongoing construction projects. Information on the design and selection of construction site best management practices (BMPs) is given. Emphasis is placed on applying soil stabilization and sediment control BMPs to address storm water concerns. This class has been revised from the 2002 version in order to provide compatibility with the Project Planning and Design Guidance and Construction Guidance. This class provides information to comply with Department policy that requires the incorporation of temporary BMPs into PS&E as of October 2003. Course Contents:

Project Planning and Design Guidance Training: Course Description: This course introduces guidance used for project planning and design. The course provides an overview of the Department’s Storm Water Program plus Best Management Practices (BMP) selection and design. Course Contents: This course includes (1) an introduction to guidance materials, (2) procedure for Best Management Practice Selection, (3) a description of how storm water issues are addressed during the PID, PA/ED, and PS&E processes, (4) a description of storm water considerations during construction, and (5) an outline for documentation.

Water Quality Treatment BMP Design (This course!!): Course Description: This course describes siting and design criteria and methodologies for the approved Treatment BMPs. Course Contents: The following areas are addressed: (1) Introduction to Treatment BMPs; (2) Treatment BMP selection; (3) Treatment BMP Design; (4) Water Quality Volume; and (5) Water Quality Flow Rate.

Introduction to Treatment BMPs
<i>Other Caltrans Storm Water Training Division of Design</i>
<ul style="list-style-type: none"> • Permanent Erosion Control Training <i>Existing</i> • Temporary Erosion Control Training <i>Existing</i> • Project Planning Design Guidance (PPDG) Training <i>Under revision</i> • Water Quality Treatment BMPs <i>This class</i>
<small>28</small>

Slide 28: Permanent Erosion Control Training: Course Description: This one-day

Introduction to Treatment BMPs

Other Caltrans Storm Water Training

Division of Construction

- Water Pollution Control Compliance on Construction Sites for Resident Engineers *Existing*
- Storm Water Quality Monitoring and Plan Preparation *Existing*
- Inspecting for Water Pollution Control on Construction Sites *Existing*
- Management of Construction Site Dewatering Operations *Existing*
- Field Erosion Control *Existing*
- Advanced BMP Training *Proposed*
- Construction Management Training *Proposed*

Slide 29: Water Pollution Control Compliance on Construction Sites for Resident Engineers

Course Description: The purpose of this course is to increase familiarity and understanding of water pollution control issues. The course covers RE management responsibilities from project award through project closeout. **Course Contents:** The following topics are covered: (1) Overview of Pre-Construction Conferences with State Personnel, Contractors, and the Regional Water Quality Control Boards; (2) Changes in guidance; (3) BMPs; (4) Storm Water Pollution Prevention Plan (SWPPP) Preparation; (5) SWPPP Approval Process; (6) Responsibilities During Construction; (7) Project Close-out Responsibilities.

Storm Water Quality Monitoring and Plan Preparation: Course Description:

This course covers how to review a Storm Water Quality Sampling and Analysis Plan and proper protocol for storm water quality sample collection. **Course Contents:** The focus of this course is to provide both Resident Engineers and SWPPP Inspectors with detailed instruction on (1) how to review Storm Water Quality Sampling and Analysis Plans for minimum requirements and (2) how to inspect field-sampling activities for minimum requirements.

Inspecting for Water Pollution Control on Construction Sites: Course Description:

The purpose of this class is to train staff about water pollution control inspections on Department construction sites. **Course Contents:** The following topics are discussed: (1) Necessity for Water Pollution Control; (2) Permit Requirements for SWPPPs and Water Pollution Control on Construction Sites; (3) Overview of Regulatory Requirements and Fines; (4) BMP and SWPPP Guidance Documents; (5) BMP Installation; (6) Preparation for and Conduction of Water Pollution Control Inspections; and (7) How to Handle Inspections and Inspection Paperwork.

Management of Construction Site Dewatering Operations: Course Description:

This is a District-specific classroom-training course focusing on Division of Construction responsibilities in meeting regulatory requirements for all construction dewatering operations, including dewatering impounded storm water. **Course Contents:** The focus of this training course includes solving District specific problems utilizing the Department's guidance on dewatering.

Field Erosion Control: Course Description:

This course presents advanced erosion and sediment control BMP principles along with a field display for properly implemented BMPs. The class reviews methods, techniques, and products for erosion and sediment controls, which are commonly used on construction sites throughout the State. **Course Contents:** The class covers (1) Application Rates; (2) Time Requirements; (3) Equipment; and (4) Maintenance of Good Records. The class also evaluates the effectiveness of BMPs and suites of BMPs and their application in site-specific situations.

Advanced BMP Training: Proposed Course Description:

This course will provide additional training for Senior Construction Engineers and RE field staff regarding construction storm water requirements and BMP implementation. **Course Contents:** This course will improve understanding of Construction's Storm Water Program and its requirements.

Construction Management Training: Proposed Course Description:

This course will provide an overview of the Storm Water Construction Program for management personnel. **Course Contents:**

Introduction to Treatment BMPs
Other Caltrans Storm Water Training
Maintenance
• Storm Water Management for Maintenance Activities <i>Existing</i>
Traffic Operations
• Inspection for Water Pollution Control on Construction Sites <i>Existing</i>
• Encroachment Permit Staff Training <i>Proposed</i>
Right Of Way
• Right-of-Way Storm Water Management <i>Existing</i>
• RW Storm Water Inspections for Leased Property <i>Proposed</i>

covers property inspections and utilities relocations.

ROW Storm Water Inspections for Leased Property: *Proposed* The course will cover: (1) ROW Responsibilities pertaining to storm water, (2) Lease Provisions, (3) Property Inspections, (4) BMPs Selection for Lessee, (5) Applicability of Other NPDES Permits, and (6) Reporting of Observed Illegal Connections or Illicit Discharges.

Slide 30: Storm Water Management for Maintenance Activities: Course Description: This training provides an explanation of specific pollutants associated with roadway maintenance activities and maintenance facility activities. The training describes and references the approved Best Management Practices (BMPs) that are shown in detail in the Division of Maintenance Guidance. Course Contents: District Division Chiefs, District Maintenance Managers, and Deputy District Directors receive a “short course” with emphasis on policy-oriented topics, such as program implementation, regulatory agency interaction, budgeting and charging practices, as well as an overview of Maintenance BMPs and the BMP implementation program. All other Maintenance staff classifications receive more activity-based comprehensive BMP implementation training.

Inspection for Water Pollution Control on Construction Sites: Course Description: These training courses are designed to 1) educate Permit Inspectors on BMP implementation and maintenance procedures and 2) prepare Permit Inspectors to ensure that dewatering activities are implemented effectively and in compliance with Permit requirements. Course Contents: These courses focus on pollutants, and activities, and practices of contractors that can be sources of storm water pollution.

Encroachment Permit Staff Training: *Proposed* Course Description: The focus of this training is to provide Encroachment Permit staff awareness of Department storm water policies and procedures, and implementation that ensures encroachment permits contain appropriate storm water requirements.

Encroachment Permit Staff Training: *Proposed* This course covers applicability of the Department NPDES Permit and SWMP to Right-of-Way activities involving clearance, demolition, and weed abatement. It also briefly