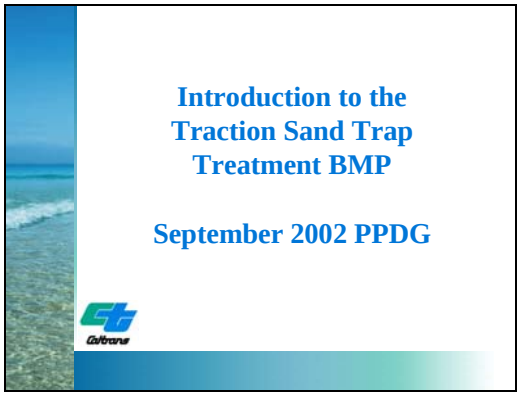
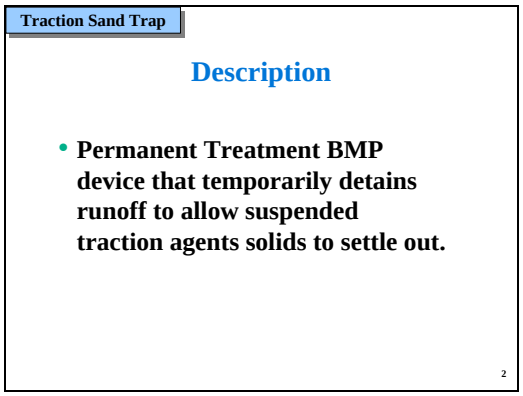
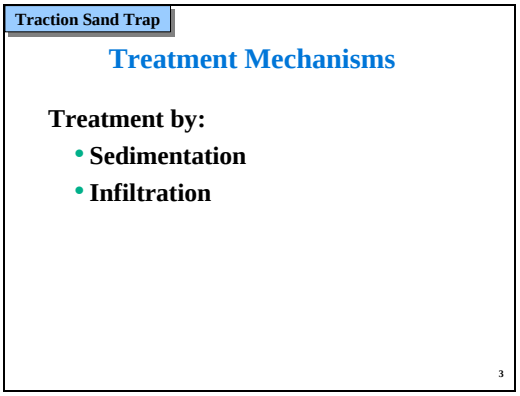


Slide 1: In this module we will review the Traction Sand Trap Treatment BMPs (TSTs).

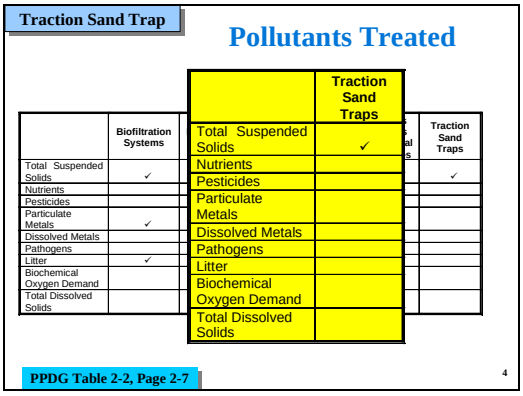


Slide 2: Traction sand traps are permanent treatment devices that temporarily detain sediment-laden runoff from snowy or icy roads on which Maintenance had placed traction sand; during that detention period the larger solids will settle out, thereby reducing the sediment-laden discharge to downstream receiving waters.

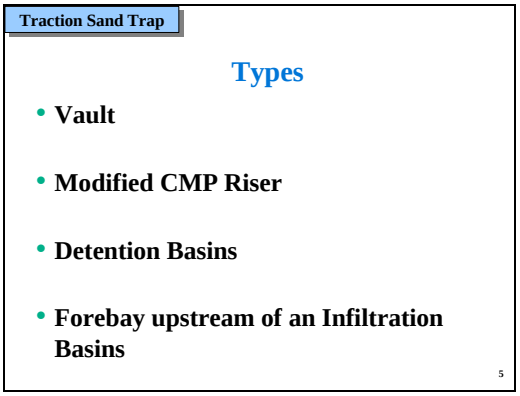
"Traction sand" can refer to sand, cinders, and other abrasives. Traction Sand Traps may take the form of basins, tanks, or vaults. A traction sand trap may be a stand-alone device, or may be incorporated as part of another storm water facility such as a detention basin. Later slides will describe the main types of TSTs.



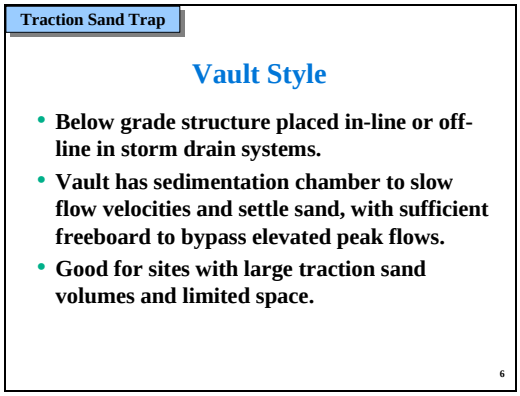
Slide 3: These are the treatment mechanisms for TSTs, with infiltration occurring but due to the limited volume of runoff that is held the TST is not considered as a full Infiltration Device Treatment BMP.



Slide 4: The TSTs are less efficient at removing finer sediments (silts and clays) than the larger sediments.

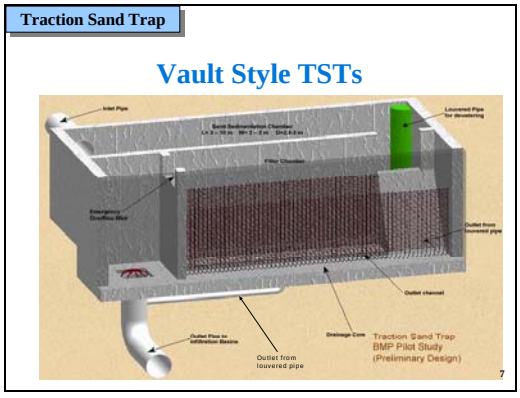


Slide 5: These are the four styles of TSTs.

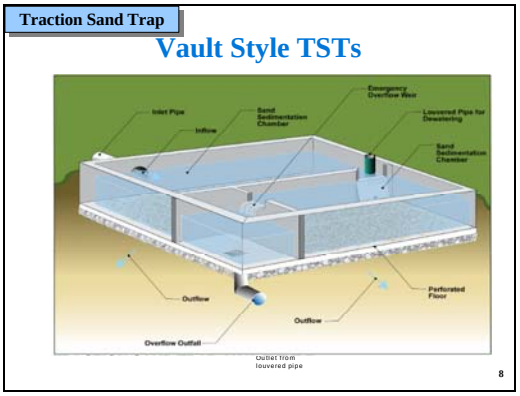


Slide 6: TSTs may be configured as a vault, which is an underground concrete structure designed with a sedimentation chamber and peak flow diversion. Some additional comments about Vault Style TSTs. •Below grade structure placed in-line or off-line in storm drain systems. •Vault has two chambers, with the 1st being sedimentation chamber to slow flow velocities and allow some settlement. This style must have sufficient freeboard to bypass or carry through the peak flows. •Good for sites with large traction sand volumes and limited space.

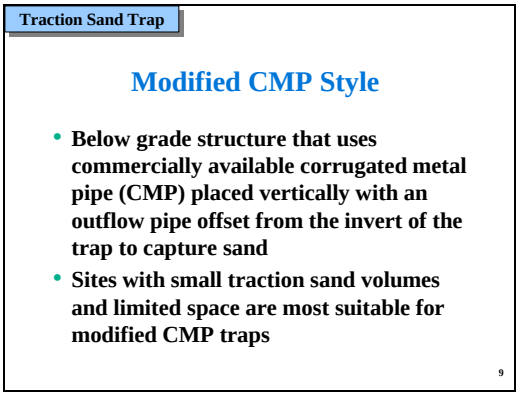
The vault style TST is one of the two most popular TST styles at this time.



Slide 7: This generic vault style is currently being piloted by Headquarters and District 3 for on Brockway Summit (Rt. 267, Lake Tahoe).

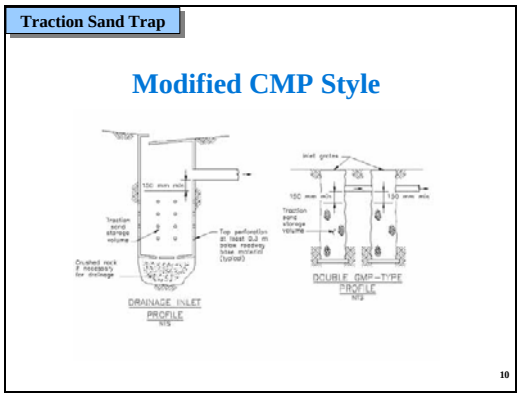


Slide 8: This vault is another version of TST that is under consideration by Headquarters and District 3 for a pilot study on Brockway Summit.

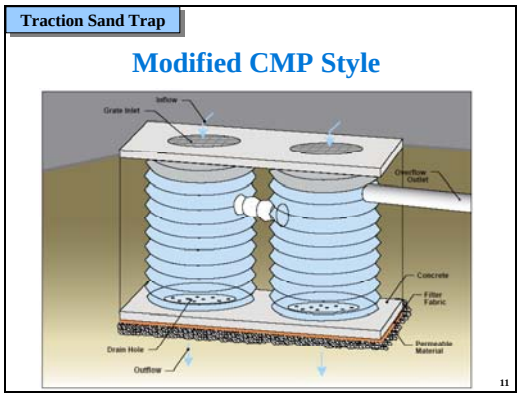


Slide 9: This is also a very popular style of TST: The Modified CMP Riser is an underground vertical CMP that captures traction sand below the invert of the outlet pipe (the outlet pipe invert is above the invert of the vertical CMP, as will be seen on the next slide).
The CMP (Corrugated Metal Pipe) Riser is appropriate for small traction sand volumes. Typical modifications include increasing the depth of the inlet so that there is a settling/storage area below the invert of the outlet pipe, linking multiple inlets for increased storage volume, and weep holes to allow the storage volume to drain. Since water will infiltrate from the device, the local RWQCB should be consulted regarding its proposed placement.

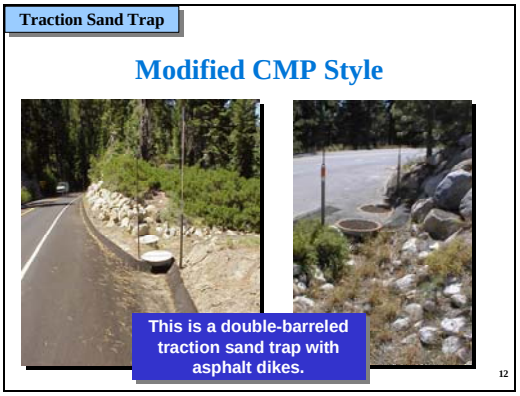
The CMP Riser style TST is the other of the two most popular TST styles at this time.



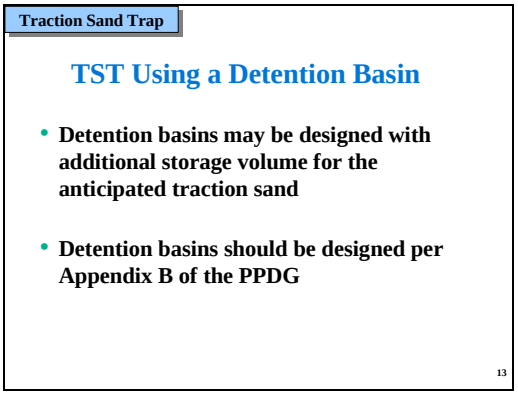
Slide 10: Typically, the Modified CMP Riser is basically a drop inlet whose below-ground portion has been modified to capture and retain traction sand; modifications include increasing the depth of the inlet so that there is a settling/storage area below the invert of the outlet pipe, linking multiple inlets for increased storage volume, and adding weep holes to allow the storage volume to drain.



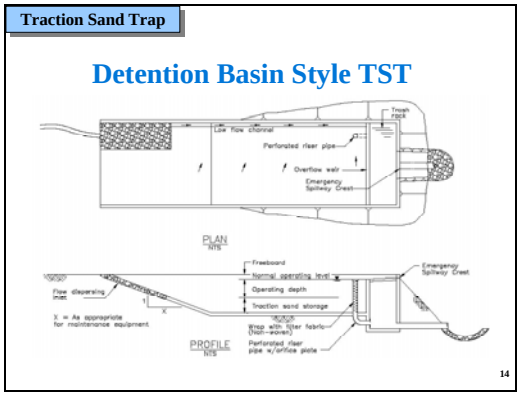
Slide 11: This is a schematic of a double barrel CMP style.



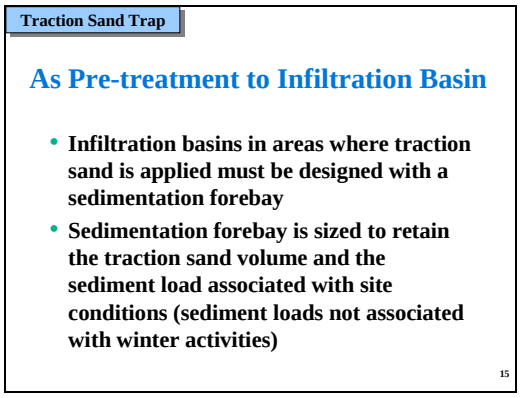
Slide 12: This is a double barrel CMP style shown in the field.



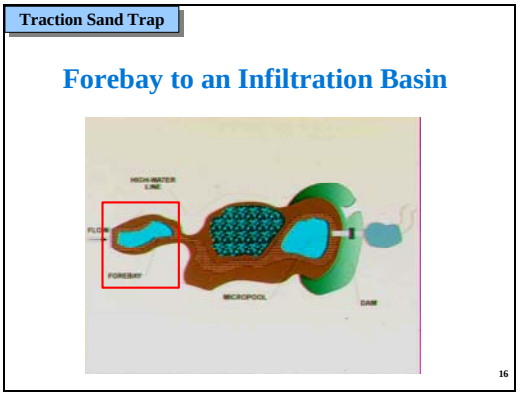
Slide 13: Detention Basin: Detention basins may be sized to accommodate additional traction sand loading. They should be considered as the first choice for the TST, but siting can be difficult where terrain is steep and/or right of way is limited.
Detention basins should be designed per Appendix B.4 of the PPDG with extra volume in the Basin above the WQV to account for the expected annual traction sand loading.



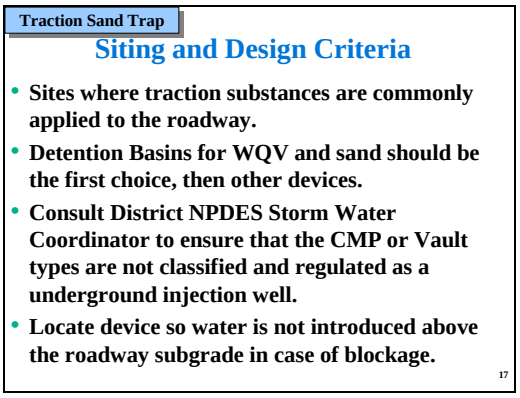
Slide 14: This is a style of a detention basin, having concrete invert and sides, nicknamed the "loading dock"; designs are being developed by HQ Office of Storm Water Management.



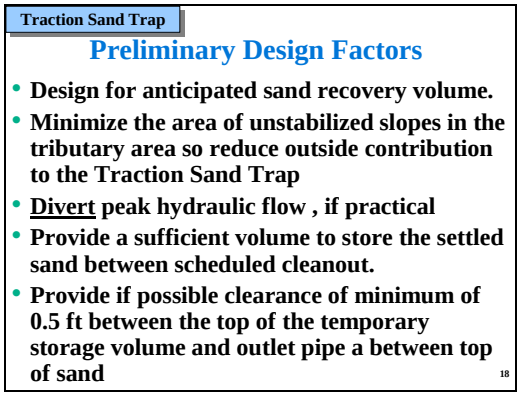
Slide 15: A Forebay to an Infiltration Device: Forebays just upstream of an Infiltration Treatment BMPs can be placed to capture sediment prior to discharging into the Infiltration device. If placed in a non-snowy areas, this would not be considered as a stand-alone Treatment TST. See Appendix B, Section B.3 of the PPDG for additional discussion.



Slide 16: The TST forebay is highlighted by the red box on the left side of the slide.



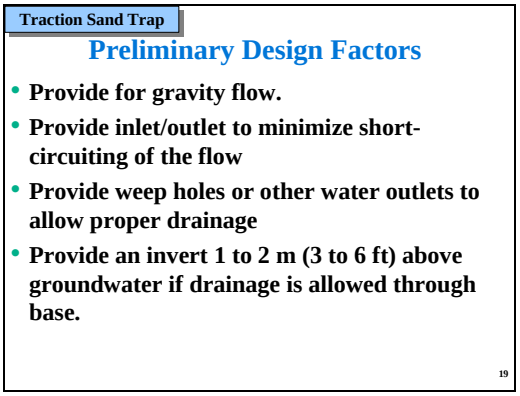
Slide 17: Consider where traction sand is placed more than 2x a year on a regular basis. Regarding the last bullet: as a rule of thumb, Locate device so water is not introduced above the roadway subgrade in case of blockage.
The 3rd bullet references the discussion that should occur if CMP Risers are used.
It can be assumed in the absence of more definitive studies that the 'wetting front' from the base of an open culvert is 2V:1H; if that pattern does not intercept within 5 ft of the pavement structural section, this condition is met.



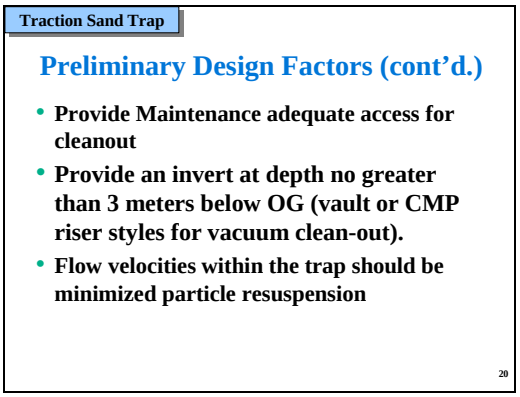
Slide 18: Typical siting measures include locating inlets only on the down-gradient side of the roadway, locating the top inlet drainage hole below the roadway subgrade, and providing additional drainage pathways (such as a leach line) to guide water away from the subgrade. Locating traction sand inlets on the high side of a superelevated section should be avoided. Provisions should be made to divert the peak hydraulic flow (calculated according to Caltrans procedures for flood routing and scour).

Flow velocities should be minimized to initiate settling. Typically, velocities lower than 2 feet per second (0.61 m/s) promote settling; this is a good engineering criteria. Note that "Divert Peak Flow' is indicated in the PPDG. This is not always possible, in which case 'conveying' the peak HDM Design Storm flow will be required.

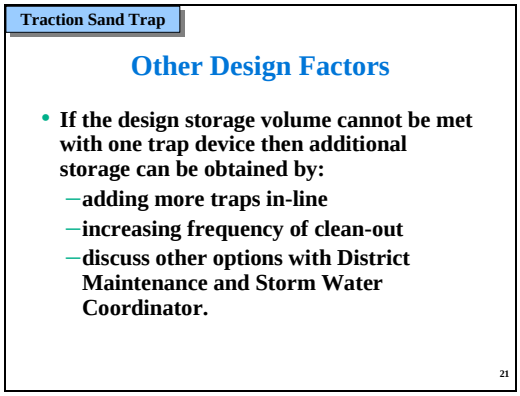
The storage area should start at least 6 inches (0.15 m) below the invert of the inlet's outlet pipe and extend no more than 3 m below the inlet grate (or road surface). If the inlet is any deeper than that, a Vactor truck will have difficulty removing the traction sand from the bottom of the basin.



Slide 19: Additionally, the bottom of the inlet should be at least a few meters above the ground water table. If the required storage volume cannot be met under these criteria, consider using double inlets or non-standard inlets, adding more inlets, using a different treatment control, or supplementing the traction sand inlets with additional downstream controls.



Slide 20: For the CMP Riser design, the design infiltration rate should be limited to 50 percent of that indicated in the soils report (if conducted). This provides a factor of safety and allows for accumulation of fines that, over time, will reduce the infiltration rate. If the surrounding soils do not provide sufficient permeability to draw down the inlet within 48 hours, it may be necessary to select a different treatment control.



Slide 21: Refer to text on the slide.

Slide 22: The clean-out of TSTs, other than the basin style devices, will be done using vacuum trucks. Providing a pullout area for the vacuum truck not only provides an additional measure of safety for the cleaning crew, but may also save time and money by avoiding lane closures. At a minimum, the pullout area should be about 10 m long and 3 m wide and be located so the inlet is near the front of the truck. Consult with District Maintenance staff to see if inlet location markers are required. See Standard Plans for maintenance vehicle pull out.

Slide 23: If the inlet is any deeper than about 3 m a vacuum ("Vactor" is one brand name) truck will have difficulty removing the traction sand from the bottom of the basin.

Slide 24: End of the presentation.