

Innovative Approach to Facility Site Plan Development for Storm Water Permit Compliance

Keith Woodburne	TRC
Edward Phillips	BNSF
Carlisle Haworth	TRC
Steve Huvane	TRC
Christian Herencia	TRC

New storm water regulations implemented by the State Water Resources Control Board, effective on July 1, 2015 under the California Industrial General Permit (IGP) required owners/operators of industrial facilities to make significant modifications to their existing Storm Water Pollution Prevention Plans (SWPPPs) and update their facility site plans to include a higher level of detail with regards to delineation of drainage areas and determination of surface water flow direction and discharge points. As the owner and operator of a significant number of large railyards where railroad maintenance is conducted across the State, the potential economic impact of compliance with the IGP to BNSF Railway Company (BNSF) was a consideration. Calculation of both the surface water flow direction and drainage area across a number of large railyards required an innovative and cost effective approach to quickly and accurately map the facilities. This determination is made more challenging on relatively flat railyards where the flow directions are not readily apparent by a field inspector. Therefore, high definition elevation and topographic data was collected and used to model surface water flow direction and drainage areas in great detail.

TRC developed an innovative approach for collecting high definition elevation and topographic data and calculating drainage areas and flow directions. Elevation data for a total of fourteen (14) BNSF facilities across the state was collected using unmanned aerial vehicle (drone) fly-overs. The drone-based data collection provided 3D point clouds which were combined with information from detailed facility inspections to ground-truth important storm water features (e.g., industrial activity areas, drains, culverts, etc.). The 3D point cloud data was classified and cleaned to remove surface features that would not influence surface water flow (e.g., vegetation, train cars, large shipping containers, stored equipment, piles of wood, towers, etc.), essentially custom building a Digital Terrain Model (DTM) for each property. The facility inspection observations and measurements of key features were then digitally incorporated into the DTM to include man-made surface features that would in fact influence or divert surface water flow (e.g., drains, culverts, berms, etc.). TRC automated the data post-processing procedures using a number of commercially available software packages capable of handling the considerable sizes of the point clouds generated for each facility.

For a total of fourteen (14) large railyards, TRC was able to generate high quality, high resolution aerial photo-based facility site plans that defined drainage areas and surface water flow direction lines (or pathways). In addition, the site plans included defined Industrial Activity Areas or IAAs (confirmed by BNSF facility supervisors during the inspections), discharge and sampling points, and other features required for compliance under the new IGP. Finally, an evaluation of drainage areas with respect to the defined IAAs was conducted in order to determine at a subset of facilities where the potential existed for discharge of constituents of concern, develop an plan for segregation of runoff not subject to IGP requirements via the use of berms or other diversions, and model the design storm capacity (water

quality volume) required for treatment and identify the location of the appropriate Best Management Practices (BMPs) that may be required to achieve the treatment goals and compliance with the IGP.