Summary Report on the Attempted Monitoring of Highway 20 Stormwater MP 1.11-2.31

Compiled by
Matthew A. Mabey
ODOT Research Unit

As part of SPR-335 Water Quality Facility Investigation, an attempt was made to exercise the UIC Stormwater Monitoring Plan developed for Highway 20 from MP 1.11 to 2.31 in eastern Bend, Oregon. The intention was to use ODOT personnel headquartered in Bend to do the monitoring. The reason for trying to use personnel in Bend was two fold. The first reason was that the ~3 hour travel time from Salem to Bend made targeting a precipitation event with Salem personnel unworkable without traveling to Bend in anticipation of storms with the accompanying overnight travel costs and logistics. The second reason was a desire to see how using maintenance or tech center personal would work.

No water samples were collected as part of this effort, and in that regard the effort could be considered a failure. However, in the attempt, a great deal was learned and discovered. These lessons and discoveries will be documented in this report. Many of the ideas that follow were developed through discussions with Gary Farnsworth, Region 4 Tech. Center Manager, Pat Creedican, District 10 Manager, Mike Darling, Region 4 HazMat Coordinator, and Ollie Flick Management Analyst with the City of Bend.

The key lessons learned from the effort are as follows:

- Manholes and outfalls that will need to be accessed for water quality monitoring need to be located and designed with monitoring access in mind.
- There are not any current staff resources available for monitoring.
- Explicit delegation of responsibility for monitoring will have to come from ODOT Headquarters.
- Some sort of automated sample collection must be used for stormwater monitoring.
- Design and Construction must include Maintenance and Monitoring as parameters.
- Outsourcing may be necessary.
- Regulatory requirements must be clear and drive the monitoring plans.

From the first meeting with Bend stationed ODOT personnel it was clear that there were insurmountable logistical obstacles to implementing the monitoring plan as written. The plan identifies 7 monitoring locations spread out over more than a mile of road. Three of these locations are located in the roadway, including in a left-turn pocket. A single two person team would have difficulty traveling between the 7 seven different locations quickly enough to collect all of the specified samples. So nominally at least 2 separate 2 person teams would be required plus traffic control personnel. This would be during a major precipitation event that would likely be creating other maintenance demands in the district. The refuge/turning lanes would need to be closed for 6 hours quite likely including either the morning or evening commute time.

It was agreed resources would only allow sample collection at, at most, three monitoring locations. If the manholes had been located at the edge of the right-of-way instead of in

the middle of the roadway then all of the monitoring locations would have at least been accessible as candidates for one of the three.

Simultaneous with this, Bend Region 4 was trying to work with DEQ to establish an approach to regulations regarding UICs. The staff resources in Region 4 and District 10 were such that ultimately the collection of stormwater samples for a research project was not of sufficiently high priority to be accomplished. Efforts and time diverted from normal activities were focused on a more global strategy to solve the long term UIC issue. The installation of precipitation and flow monitoring equipment was the focus of their attention. (This equipment was to complement similar equipment installed by the City of Bend at some of their facilities.) In this situation the research project was neither someone's job nor anyone's responsibility. Despite good intentions, there weren't enough person-hours available to address the needs of the research project. In addition to these obstacles there were only four days in the period September 1, 2004 to April 27, 2004 that had precipitation totals of at least 0.30 inches at the BLM's AgriMet station BEWO. The days and precipitation totals are as follows:

Date	BLM AgriMet Station BEWO
December 6, 2004	0.67 inches
December 8, 2004	1.30 inches
December 9, 2004	0.34 inches
March 19-26, 2005	Data Missing
April 23, 2005	0.55 inches

If automated sampling equipment had been available there may or may not have been someone with enough time to pick up the samples and transport the samples to the lab following the storm. Whether of not there was space in the manholes to easily install such equipment is not known.

This was only one small section of highway. If ten sites needed similar monitoring then a staff of 20 to 40 water samplers would be needed since storms more or less simultaneous effect broad areas of the state. If the time demands are extrapolated to the entire highway system it becomes clear that monitoring of stormwater quality will require a major effort with carefully planned organizational adjustments and communication of needs and responsibilities. In the case of Bend, partnering with the city government may be a part of the solution.

The design and layout of stormwater facilities can greatly facilitate the monitoring process and should be coordinated with those who will have that responsibility. Likewise, in a manner similar to the evolution of the camera and weather instrument installations, the design and construction of any automated water quality monitoring instrumentation should involve those that have to maintain the equipment.

Further complicating the design and layout of stormwater facilities is that ODOT personnel perceive the regulatory requirements as being undefined and shifting. This is especially true with respect to UICs. The land and space required for many stormwater facilities is such that they are not easily added on to a project. They must be a part of the initial planning and design.

In summary, the attempt to exercise the monitoring plan for Highway 20 MP 1.11-2.31 clearly demonstrated the following:

1. If monitoring of stormwater quality is going to be a common requirement and/or ongoing need at ODOT stormwater facilities, then the facilities must be designed and constructed with automated sampling equipment and easy access to that equipment. The time, staff and logistics of sampling dwarf the process of writing a monitoring plan even without the help of the templates developed as part of this research project.
2. Personnel responsible for maintenance and/or sample retrieval must participate in the establishment of standards and procedures for their design and installation.
3. Current staffing will not be able to support a system wide program of monitoring, even with automated sampling equipment. Additional staff or out-sourcing will be necessary.
4. The responsibility for the maintenance of the automated sampling equipment will need to be explicitly and completely laid out by ODOT headquarters.
5. Regulatory requirements must be quickly and clearly defined or negotiated. This must be done with a clear understanding or the land, human and fiscal resources that are being required and/or committed.
6. Targeted precipitation events seem to be overly rare events.

Eastern end of Highway 20 Project in Bend, Oregon beside Pilot Butte. Large storm water detention and storage pipe is being laid in the center of the roadway along with oil-water separators and dry wells.

Detention ponds for middle section of Highway 20 project in Bend, Oregon beside Pilot Butte.

Rock lined ditch to carry water from middle section of Highway 20 in Bend, Oregon beside Pilot Butte to detention ponds and dry wells.

Drain straight to dry well at west end of Highway 20 project in Bend, Oregon beside Pilot Butte.