



HYDINFRA

The Minnesota Department of Transportation (Mn/DOT) began developing a culvert and storm drain management system in 1996. Mn/DOT District Hydraulics engineers and Bridge Hydraulics engineers came together to develop the inventory and inspection database called “HYDINFRA” (Hydraulic Infrastructure) to manage information on state highway drainage systems. In Minnesota, Pontis is used to inspect culverts larger than 10 feet, so HYDINFRA was developed to “bridge the gap” – inventory and inspect pipes less than 10 foot span.

HYDINFRA manages data for several types of hydraulic features: culvert and storm drain pipes, structures (catchbasins and manholes), special structures (pipe aprons, headwalls, weirs, increaser/reducers, etc). Three new features: Pond, Ditch and SPCD (Structural Pollution Control Device – i.e. water quality devices) and 2 “virtual” features: Illicit Discharge and Outfalls, were added in 2006 to facilitate record keeping for NPDES (National Pollutant Discharge Elimination System) requirements.

HYDINFRA captures:

- Inventory data – location, type, and initial size, shape, material, etc
- Inspection data – condition code, need for repair, need for cleaning, and condition attribute flags (holes, cracks, rusting, misalignment, separation, etc.)
- Maintenance repairs accomplished, and other changes over the life of the feature -- pipe lined, castings replaced, erosion repaired, etc
- Plan data for proposed features – Geopak Drainage data can be loaded directly into HYDINFRA

Inspections and Maintenance Activities are logged by date so that the history of problems or repairs is available for each feature.

HYDINFRA data is used primarily for construction project scoping and to plan maintenance repairs. Survey crews have used HYDINFRA data to locate culverts for more detailed mapping work. Beginning in 2006, HYDINFRA was used to find features requiring maintenance under the new water quality requirements.



HYDINFRA procedure:

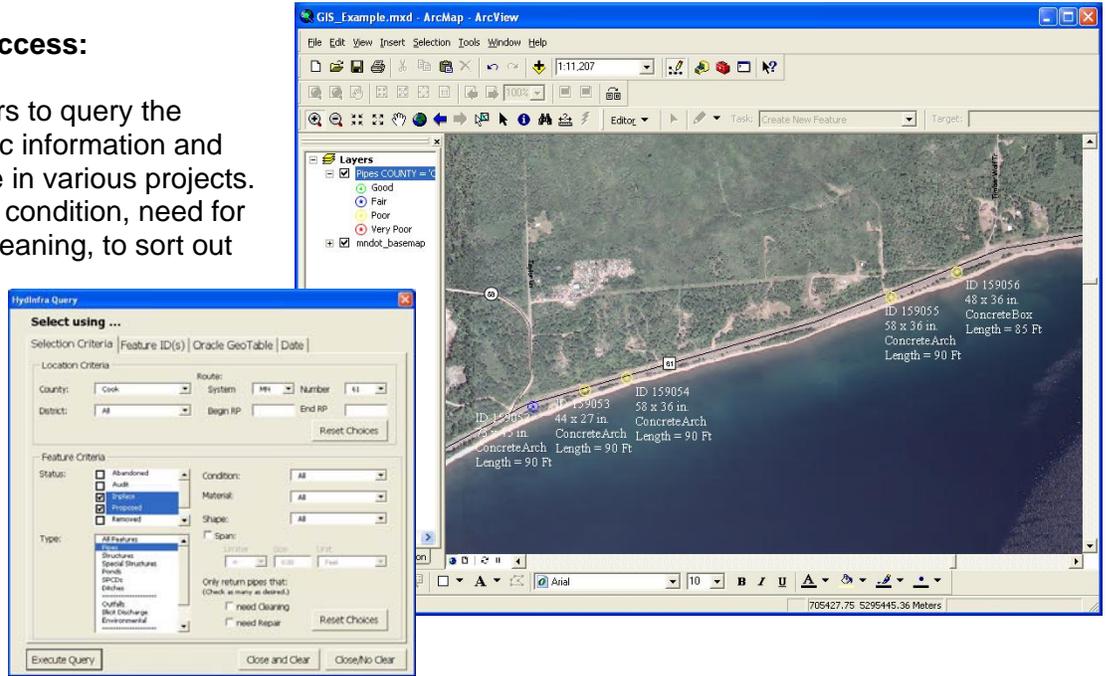
- Field inspectors use GPS to locate, inventory, inspect and record maintenance on hydraulic features.
- The GPS data files are exported to an ASCII format, and uploaded to the HYDINFRA database (Oracle) accessed from an internet web page.
- Mn/DOT users access the data using Oracle Forms, Crystal Reports and ArcGIS. (Data is accessible only to internal Mn/DOT users at this time.)

[HYDINFRA Inspector with GPS at box culvert jpg]

HYDINFRA Data Access:

GIS tools allow users to query the database for specific information and create maps for use in various projects. Users can query by condition, need for repair or need for cleaning, to sort out the hydraulic features that need attention.

[ArcMap jpegs]



Using HYDINFRA **Reports**, a user would typically call up a “Pipe Inventory and Inspection Report” from the internal webpage, and specify the highway, and the beginning and ending milepost for the area of interest. The Report lists information, line by line, about the set of pipes along that stretch of highway. Data includes size, shape, material and location information plus condition rating and detailed attribute flags which note problems in the pipe.

Mn/DOT Hydraulic Infrastructure Pipe Inventory, Inspection, Maintenance on MN210 From MP 178.00 to 210.00 Status: Inplace or Proposed

Pipe ID	MP	Cond	Pipe Shape	Material	Length	Span x Rise	Cover	Maint Clean	Maint Repair	Repair Under Road	Plugged	Deformed	Standing Water	Infiltration	Silt Present	Piping	Cracks	Spalling/Flaking	Pitting/Rusting	Misalignment	Joints Separation	Holes	Inplace/Conv	Road Void	Road Stress	Erosion	Insp Date
588875	182.79	2	Box	Concrete	47.0Feet	72x48 Inches	2 - 6 Feet	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	6/29/2006	
588876	183.82	2	Round	Concrete	72.0Feet	24x24 Inches	2 - 6 Feet	Y	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	6/29/2006	
588877	185.08	2	Box	Concrete	57.0Feet	60x60 Inches	2 - 6 Feet	Y	N	N	N	N	Y	N	Y	N	N	N	N	N	N	N	Y	N	Y	6/29/2006	
588878	185.58	4	Round	Concrete	84.0Feet	24x24 Inches	6 - 10 Feet	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	6/30/2006	
588879	185.83	4	Round	Concrete	75.0Feet	24x24 Inches	6 - 10 Feet	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	6/30/2006	
588880	186.07	4	Round	Concrete	66.0Feet	24x24 Inches	6 - 10 Feet	N	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	6/30/2006
588881	186.96	2	Round	Concrete	98.0Feet	30x30 Inches	10 - 20 Feet	Y	N	N	N	N	N	N	Y	N	N	N	N	N	N	N	N	N	N	6/30/2006	

[Reports jpg]

Oracle **Forms** allow data creation, editing and access. Advanced users use the Batch Review Form to review newly loaded data. Forms also interact with the ArcGIS HYDINFRA tools, allowing data to be selected in GIS and viewed in Forms, and vice versa.

[Forms jpg]

