

Bridge Demolition and Construction Techniques and Best Management Practices

2013 North Dakota Water and Pollution Control Conference
North Dakota Department of Health
Ramada Doublewood, Bismarck ND
March 26, 2013
Dwayne Stenlund, MSc, CPESC
Resource Professionals Alliance

5 SWPPP Trends

1. Manage Sediment
2. Manage Erosion
3. Manage Work
4. Manage Water
5. Manage Communication

How you gather, manage and use information will determine whether you win or lose.
Bill Gates (Microsoft)

Pollution Prevention Planning items

Demolition

- Access
- Diversions/bypass
- Working over water
- Dust control
- Debris management
- Debris recycling/disposal
- Good housekeeping
- Exposed soil stabilization
- Sediment control
- Stockpile management
- Dewatering

Construction

- Access
- Diversions/bypass
- Working over water
- Dust control
- Concrete management
- Debris recycling/disposal
- Good housekeeping
- Exposed soil stabilization
- Sediment control
- Stockpile management
- Dewatering
- Final finishes/textures
- Aquatic organism decontamination

MS4/Maintenance Program

Action Items

- Surface cleaning
- Sediment removals
- Debris removals
- Scour repairs

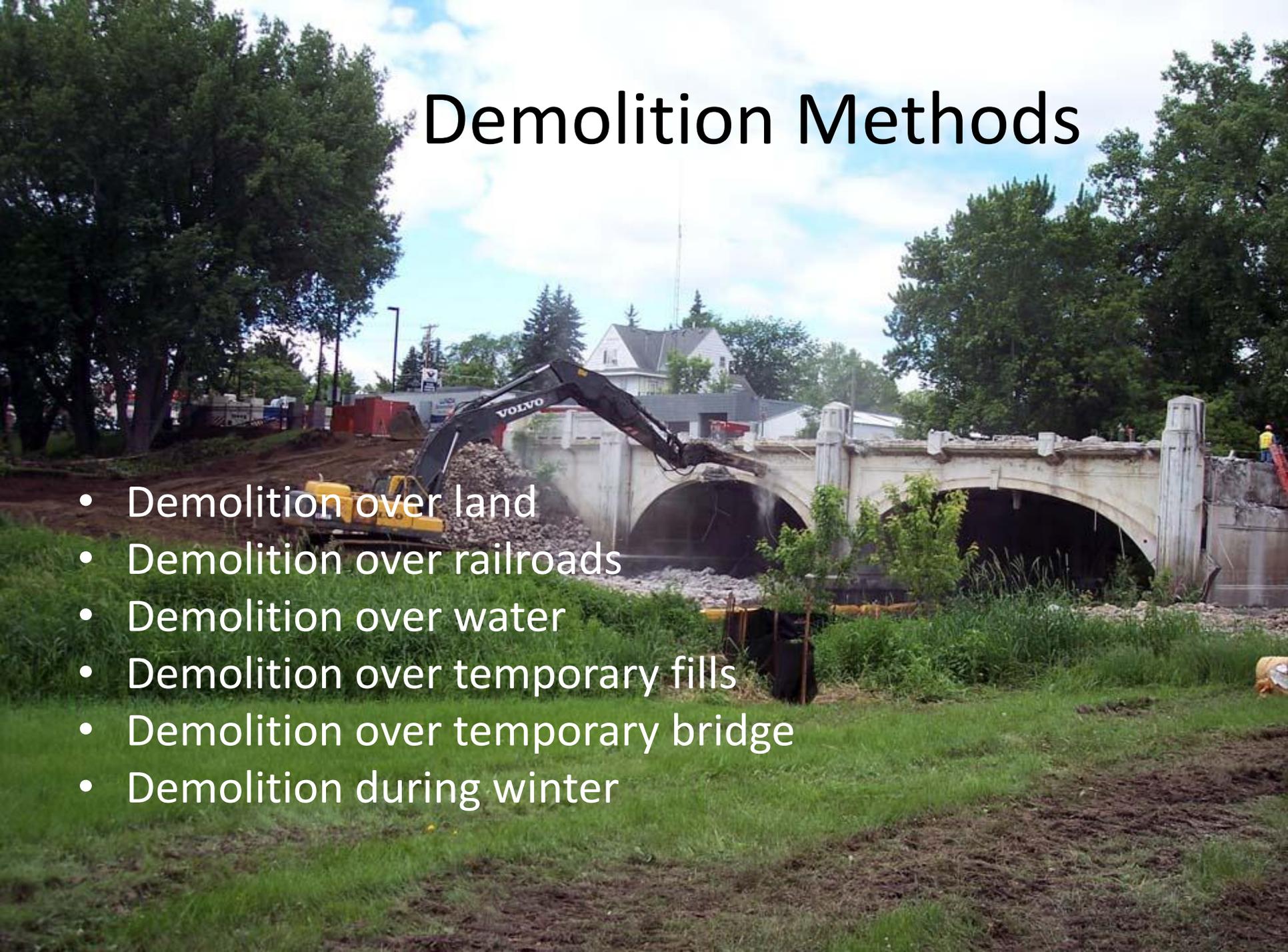
Multiple Plan Layers

Prepare to amend the plan



Demolition Methods

- Demolition over land
- Demolition over railroads
- Demolition over water
- Demolition over temporary fills
- Demolition over temporary bridge
- Demolition during winter



Materials/Equipment On Hand

- Geotextiles
- Plastic
- Rolled erosion control products (blankets)
- J-barriers
- Vac truck
- Pressure washer
- Skid mounted sweeper



BMPs over land

- Remove hazardous materials
- Defend the inlets
- Protect the road surface
- Control dusts
- Limit trackout
- Divert runoff around the project
- Stabilize the exposed slopes





Know the ultimate drainage and receiving waters

Planned Access







Planned Street Cleaning



Wheel Washoff Systems





Nesting Bird Issues



Hazardous Material Handling







Locate and defend the storm drain inlets

- Types
 - Urban: curb and gutter
 - Rural: field inlets
 - Bridge deck

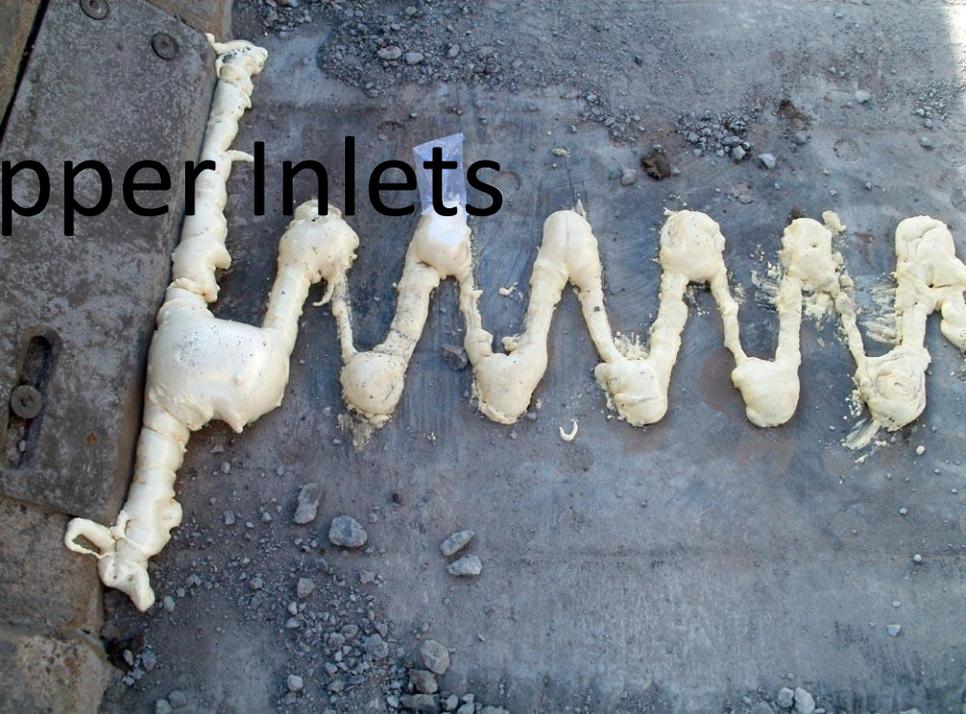




Inlet Seal



Bridge Scupper Inlets







Inlets can take a beating,
must be maintained and
kept in a functional
condition



Prepare for drainage conveyance











Defend the perimeter





Dust Control

- Cutting, pecking, hammering, grinding, blasting, hauling, crushing









DUST BOSS
www.dustboss.com









Good Housekeeping

Erosion and Sediment Control. Always.





LIT 43A
Lexington
Ave
1/2 mi.

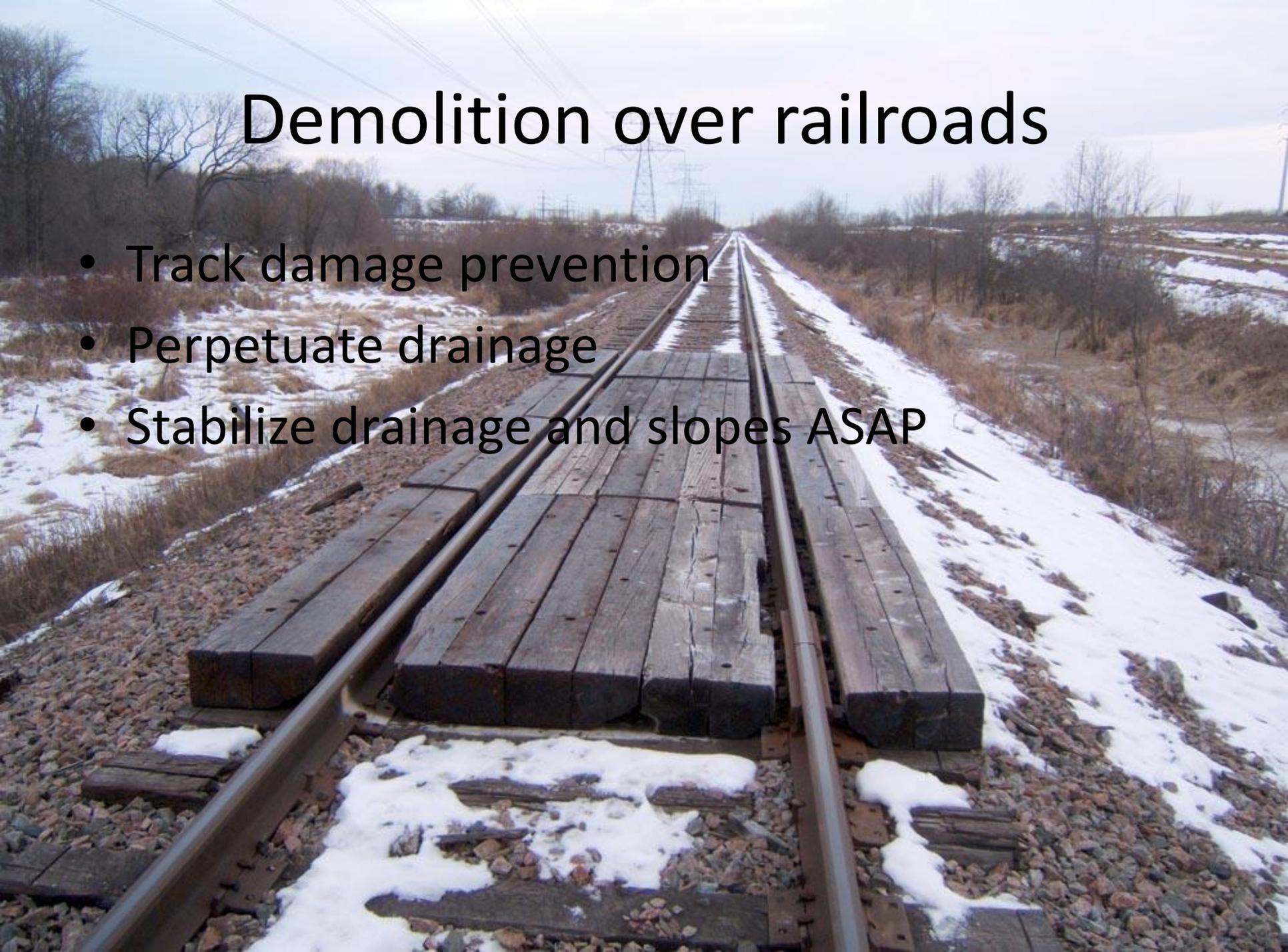
TEREX

Worker in safety gear

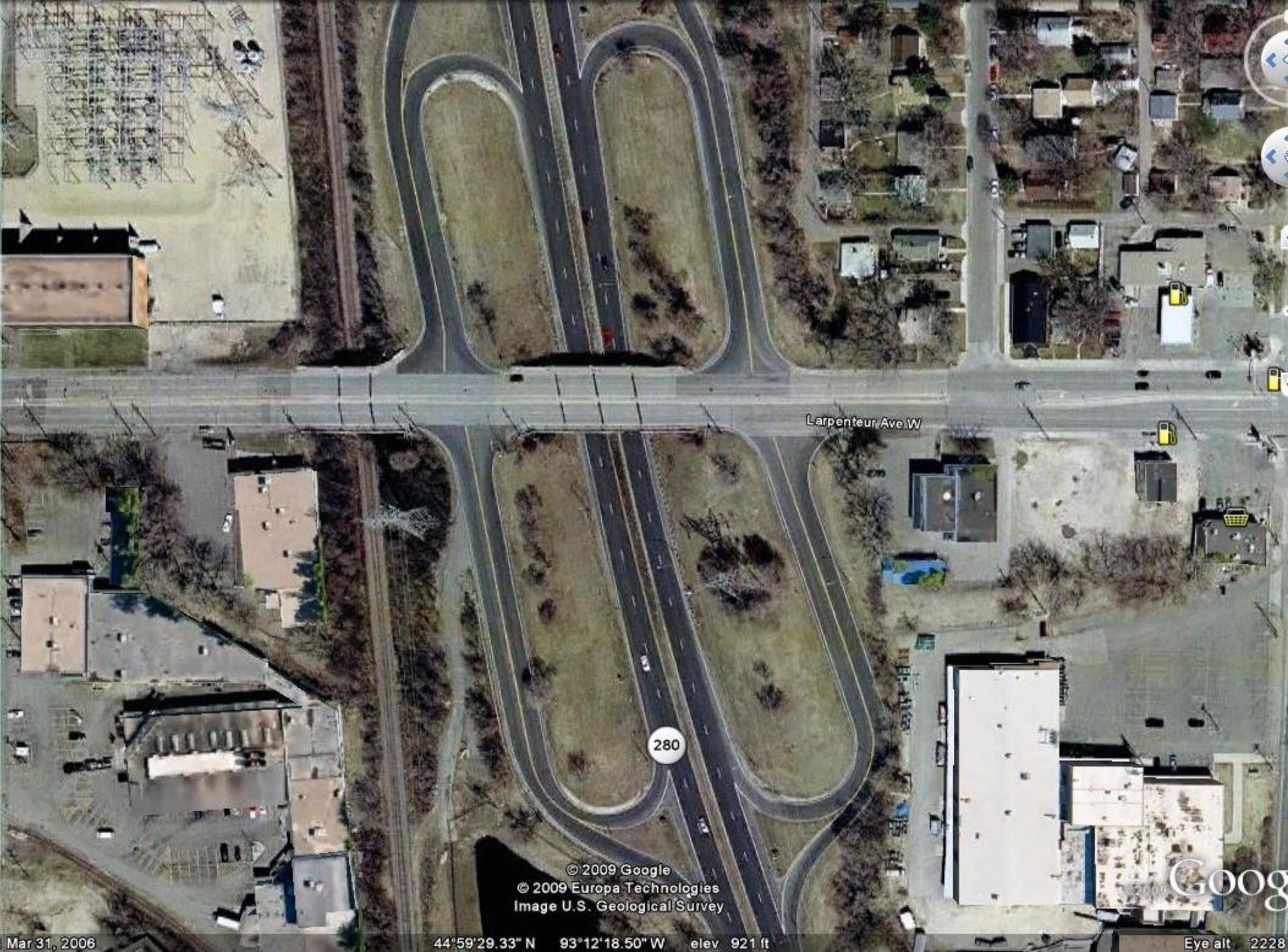


Demolition over railroads

- Track damage prevention
- Perpetuate drainage
- Stabilize drainage and slopes ASAP







Larpentur Ave W

280

© 2009 Google
© 2009 Europa Technologies
Image U.S. Geological Survey

Google





LOOK UP!
STAY ALIVE!

PPASK
= 555
SUNT
HBY

ST
Green graffiti tag

Red graffiti tag
Orange graffiti tag

RAPT
**INSTANT
PRINTING**

WESTERN
REMODELERS
M W









ROAD DRAIN PUMP





Temporary Blanket





A photograph of a concrete bridge over a river. The bridge has several arches and a metal railing. A large section of the bridge deck is missing, showing the concrete structure underneath. The river is partially frozen, and there are some trees and bushes in the background. The sky is clear and blue.

Demolition over water

- Hazardous material removals
 - Time of year
- Isolation of water
- Debris trapping



DANGER LEAD HAZARD

Winter Work









Floating Decks





Material Capture Decking



07.22.2007









Solid Waste Debris Management



Causeways

- Use pre-washed riprap







Demolition in Reverse of Original Construction

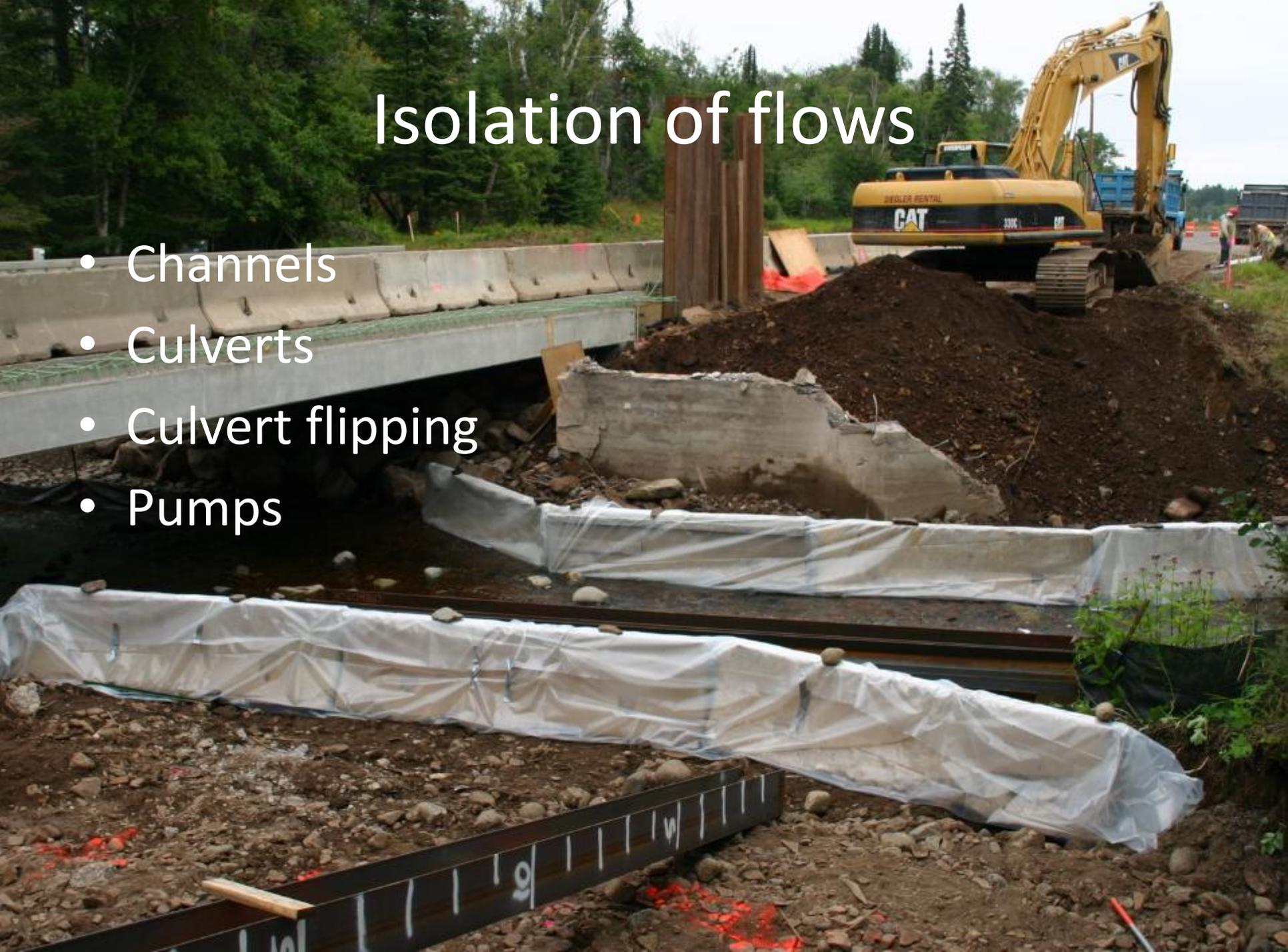






Isolation of flows

- Channels
- Culverts
- Culvert flipping
- Pumps





Channel Bypass



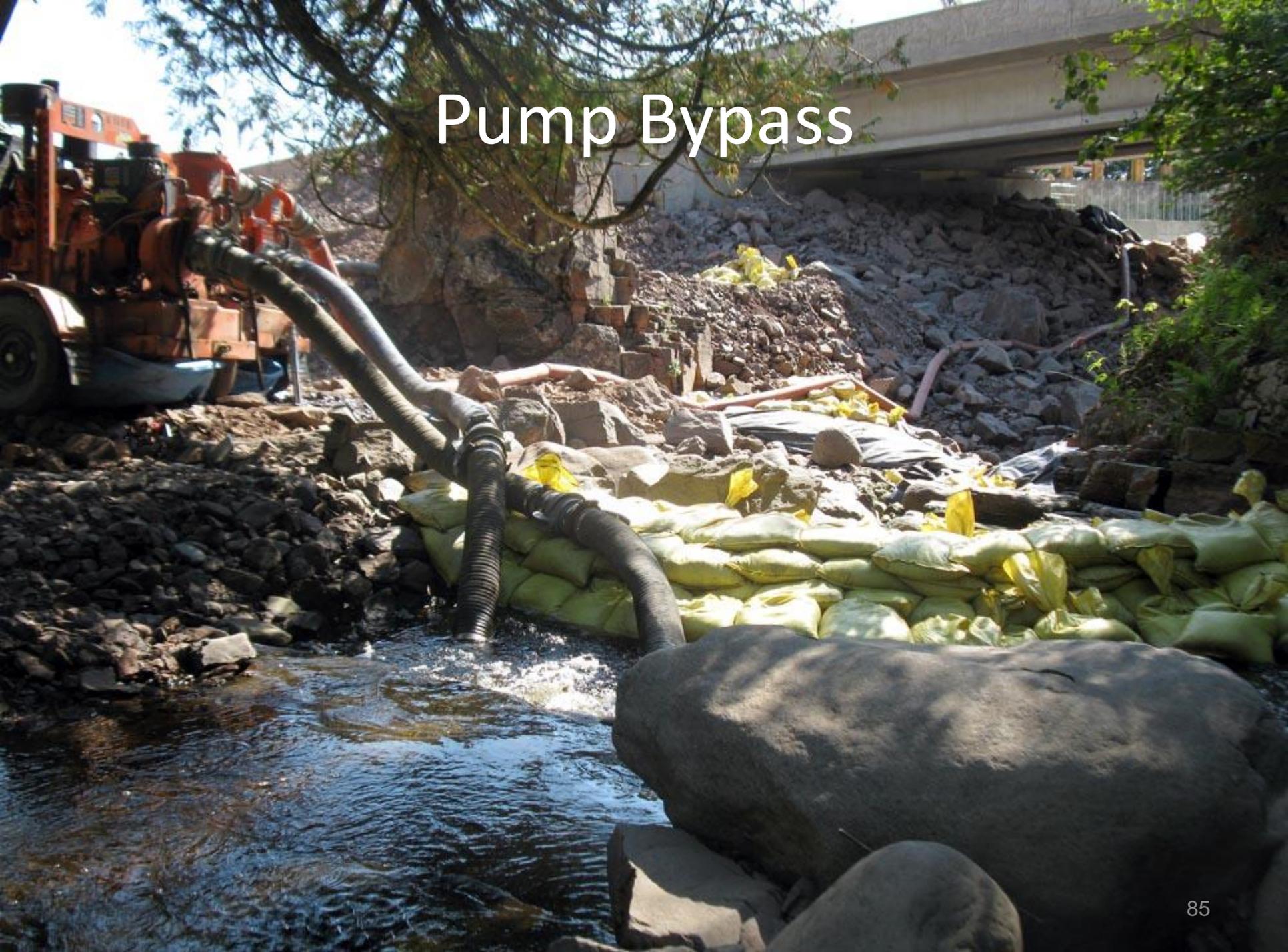








Pump Bypass













Culvert Flipping Bypass

Pollution Prevention Planning items

Demolition

- Access
- Diversions/bypass
- Working over water
- Dust control
- Debris management
- Debris recycling/disposal
- Good housekeeping
- Exposed soil stabilization
- Sediment control
- Stockpile management
- Dewatering

Construction

- Access
- Diversions/bypass
- Working over water
- Dust control
- Concrete management
- Debris recycling/disposal
- Good housekeeping
- Exposed soil stabilization
- Sediment control
- Stockpile management
- Dewatering
- Final finishes/textures
- Aquatic organism decontamination

Prepared Site Management Plans



Essential Path Scheduling

C Erosion and Sediment Control Schedule

The Contractor shall prepare and submit a weekly schedule of proposed erosion and sediment control activities including the following:

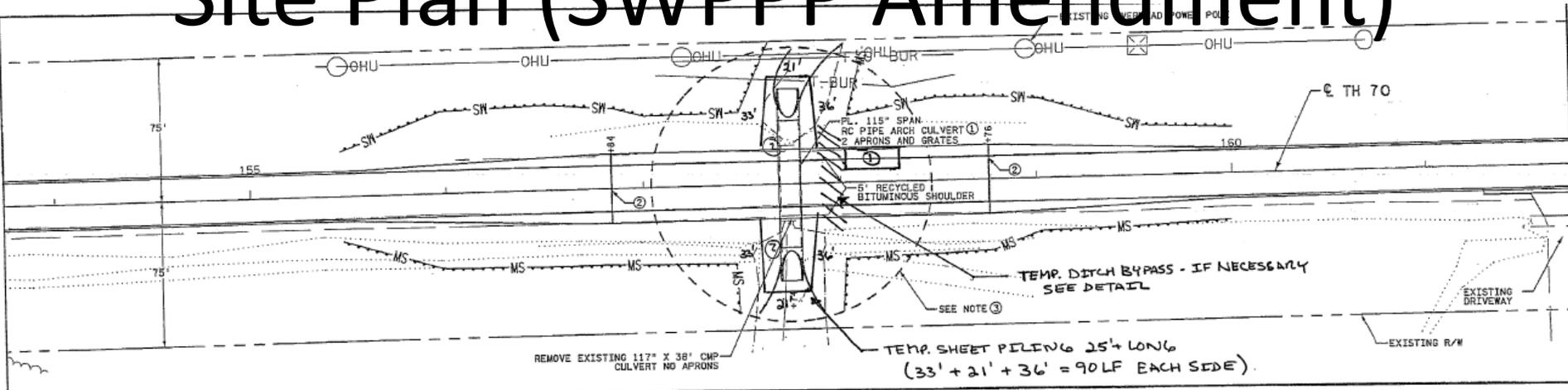
- (1) Proposed erosion and sediment control installations and the installation time,
- (2) Areas ready for permanent turf establishment and the work time frame,
- (3) Grading operations and how the Contractor will incorporate the erosion control into the Work,

- (4) Findings of erosion and sediment control inspections with recommended repair or maintenance required on erosion or sediment control BMPs and completion date, and
- (5) Proposed erosion control measures during work suspensions.

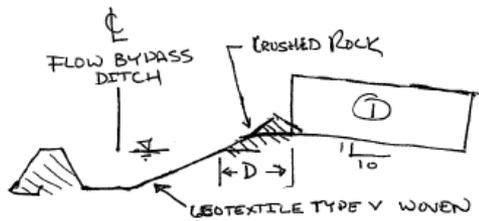
Working out the details



Site Plan (SWPPP Amendment)



PUMP DISCHARGE LOCATION



- GENERAL CONSTRUCTION NOTES:
1. RESHAPE CREEK CHANNEL TO ADJUST TO NEWLY CONSTRUCTED ARCH-PIPE APRONS. THIS WORK SHALL BE INCIDENTAL AND AS DIRECTED BY THE ENGINEER.
 2. DEWATERING AND ALL OTHER CONSTRUCTION ACTIVITIES SHALL BE ACCOMPLISHED IN A MANNER THAT IS IN COMPLIANCE WITH THE NPDES PERMIT.

- NOTES:
- ① FOR CULVERT PLACEMENT DETAILS SEE SHEET 41
 - ② LIMITS OF SELECTED GRANULAR BORROW MODIFIED TO 7% PASSING #200 SIEVE SEE SHEET 18 FOR TYPICAL SECTION
 - ③ WATERTIGHT PERIMETER CONTROL. LIMITS TO BE DETERMINED BY CONTRACTOR. SEE SPECIAL PROVISIONS.

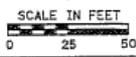
- GENERAL NOTES:
1. FOR CULVERT REPLACEMENT DEWATERING REQUIREMENTS SEE SPECIAL PROVISIONS.
 2. HAY CREEK SITE PLAN SHALL BE SUBMITTED A MINIMUM OF ONE WEEK PRIOR TO BEGINNING CULVERT REPLACEMENT WORK. SEE SPECIAL PROVISIONS.

① EITHER SED. BASIN LINED WITH GEOTEXTILE FABRIC TYPE V WOVEN OR 30 CY ROLL OF FOR DISCHARGE (ENERGY DISSIPATION) & SETTLEMENT.
 PENDING ON PUMP VOLUME REQUIRED FOR DEWATERING - ADDITIONAL MAY BE REQUIRED.

* DISTANCE "D" MAY BE INCREASED TO ALLOW MORE TIME TO DISSIPATE ENERGY & REDUCE SUSPENDED SOLIDS. ADD ROCK CHECKS AS NEEDED

② SUMP PUMPS WILL BE PROVIDED TO DEWATER EXCAVATION TO A DRY CONDITION.

LEGEND	
	MS SILT FENCE, MACHINE SLICED



DATE: 05/12/2010 2:15:10 PM
 PATH: F:\PROJECTS\3310-11-5810-15.dwg
 USER: alex.poletz

NO.	DATE	BY	EXD (APPRO)	REVISION
I HEREBY CERTIFY THAT THIS PLAN SHEET WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MICHIGAN. PRINT NAME: <u>ALEX POLETZ</u> STATE AID PROJECT NO. <u>3310-11, 5810-15 (TH 70)</u> DATE: <u>13 MAY 2010</u> L.I.C. NO. <u>10388</u> CITY PROJECT NO. <u> </u> DRAWN BY: <u>B. JOHNSON</u> DESIGNED BY: <u>S. PARK</u> CHECKED BY: <u>A. POLETZ</u> STATE PROJECT NO. <u>3310-11, 5810-15 (TH 70)</u> COUNTY PROJECT NO. <u> </u>				
STATE PROJ. NO. <u>3310-11, 5810-15 (TH 70)</u> SHEET <u>40</u> OF <u>67</u> SHEETS ARCH PIPE REPLACEMENT CREEK CHANNEL ADJUSTMENT AND INSPECTION NOTES <u>4/9</u>				

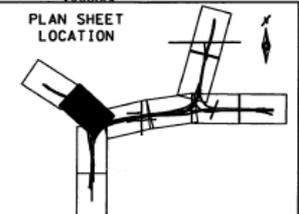
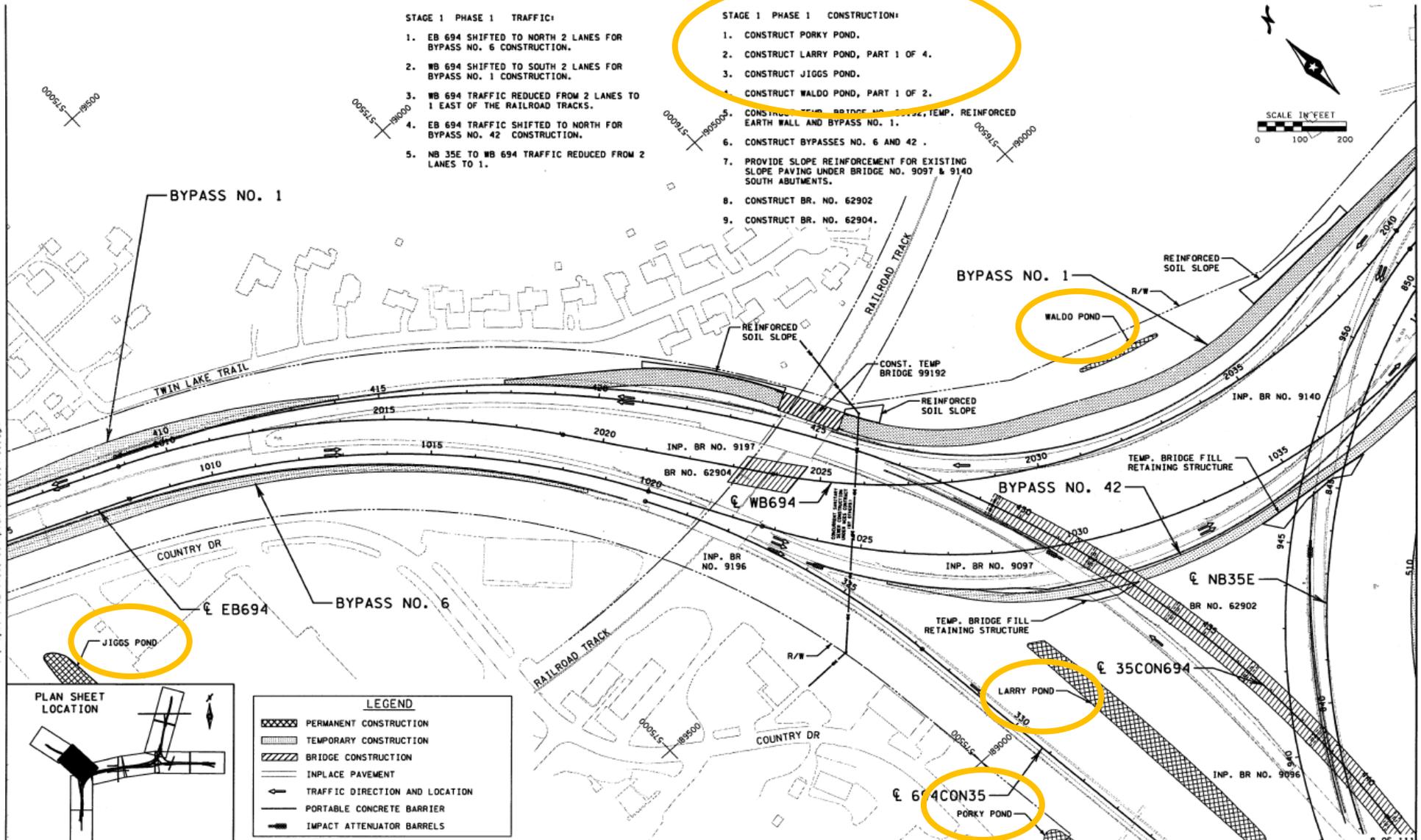
Temporary Pond Staging Plan

STAGE 1 PHASE 1 TRAFFIC:

1. EB 694 SHIFTED TO NORTH 2 LANES FOR BYPASS NO. 6 CONSTRUCTION.
2. WB 694 SHIFTED TO SOUTH 2 LANES FOR BYPASS NO. 1 CONSTRUCTION.
3. WB 694 TRAFFIC REDUCED FROM 2 LANES TO 1 EAST OF THE RAILROAD TRACKS.
4. EB 694 TRAFFIC SHIFTED TO NORTH FOR BYPASS NO. 42 CONSTRUCTION.
5. NB 35E TO WB 694 TRAFFIC REDUCED FROM 2 LANES TO 1.

STAGE 1 PHASE 1 CONSTRUCTION:

1. CONSTRUCT PORKY POND.
2. CONSTRUCT LARRY POND, PART 1 OF 4.
3. CONSTRUCT JIGGS POND.
4. CONSTRUCT WALDO POND, PART 1 OF 2.
5. CONSTRUCT TEMP BRIDGE NO. 99192, TEMP. REINFORCED EARTH WALL AND BYPASS NO. 1.
6. CONSTRUCT BYPASSES NO. 6 AND 42.
7. PROVIDE SLOPE REINFORCEMENT FOR EXISTING SLOPE PAVING UNDER BRIDGE NO. 9097 & 9140 SOUTH ABUTMENTS.
8. CONSTRUCT BR. NO. 62902.
9. CONSTRUCT BR. NO. 62904.



LEGEND	
	PERMANENT CONSTRUCTION
	TEMPORARY CONSTRUCTION
	BRIDGE CONSTRUCTION
	INPLACE PAVEMENT
	TRAFFIC DIRECTION AND LOCATION
	PORTABLE CONCRETE BARRIER
	IMPACT ATTENUATOR BARRELS

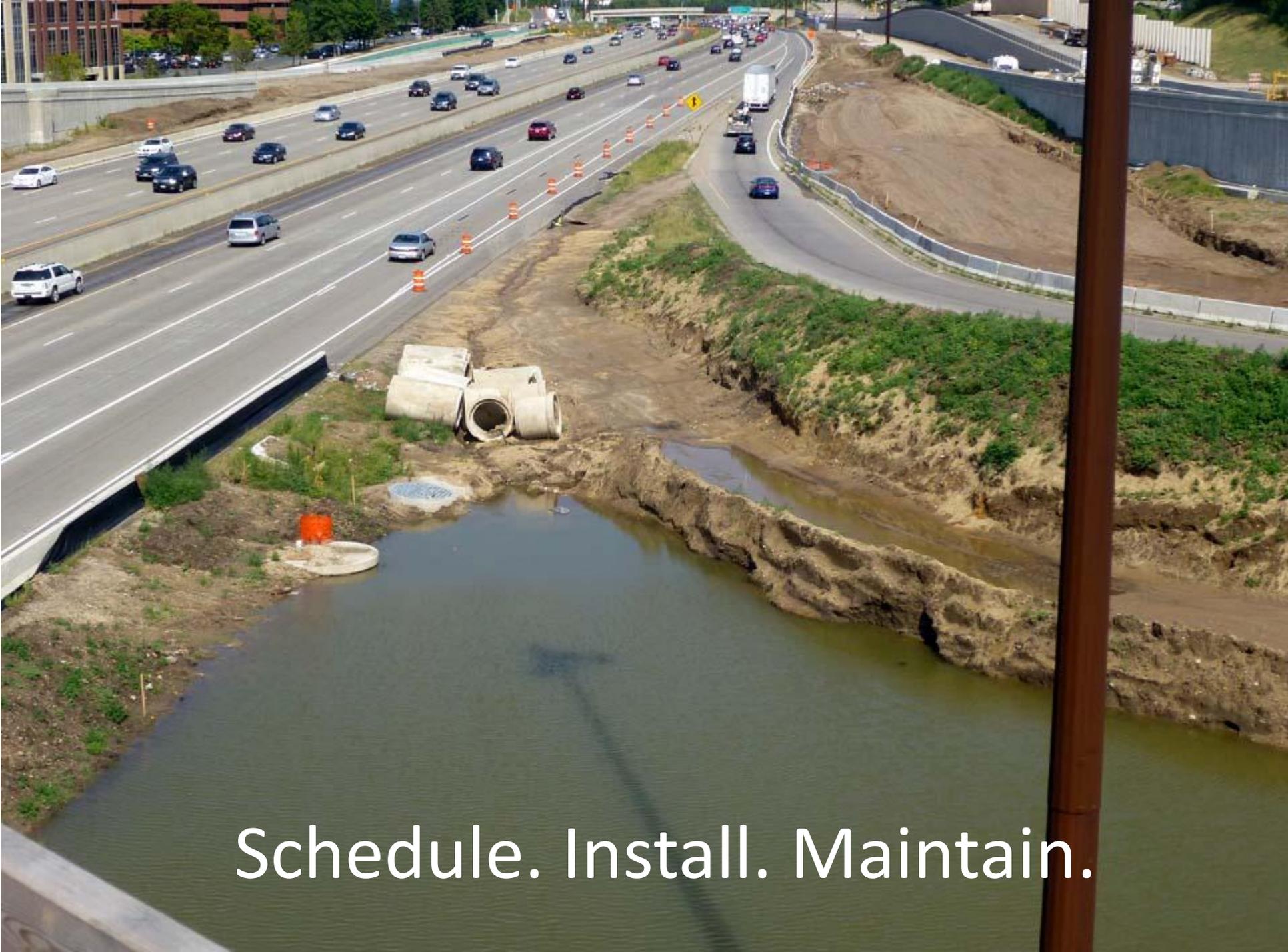
DRAWN BY: JTV
 CHECKED BY: PJM
 I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
 SIGNATURE: *Avedis Tooramadjian*
 PRINTED NAME: AVEDIS TOORAMADJIAN
 DATE: MAY 27 2005 LIC. NO. 40917



MINNESOTA DEPARTMENT OF TRANSPORTATION
 STATE PROJECT NO. 6280-304 (T.H. 35E)



STAGING PLANS
 STAGE 1 PHASE 1
 207
 1992



Schedule. Install. Maintain.



Temporary Sediment Trap

- Used field conditions
- Phased with construction



Total Site Management



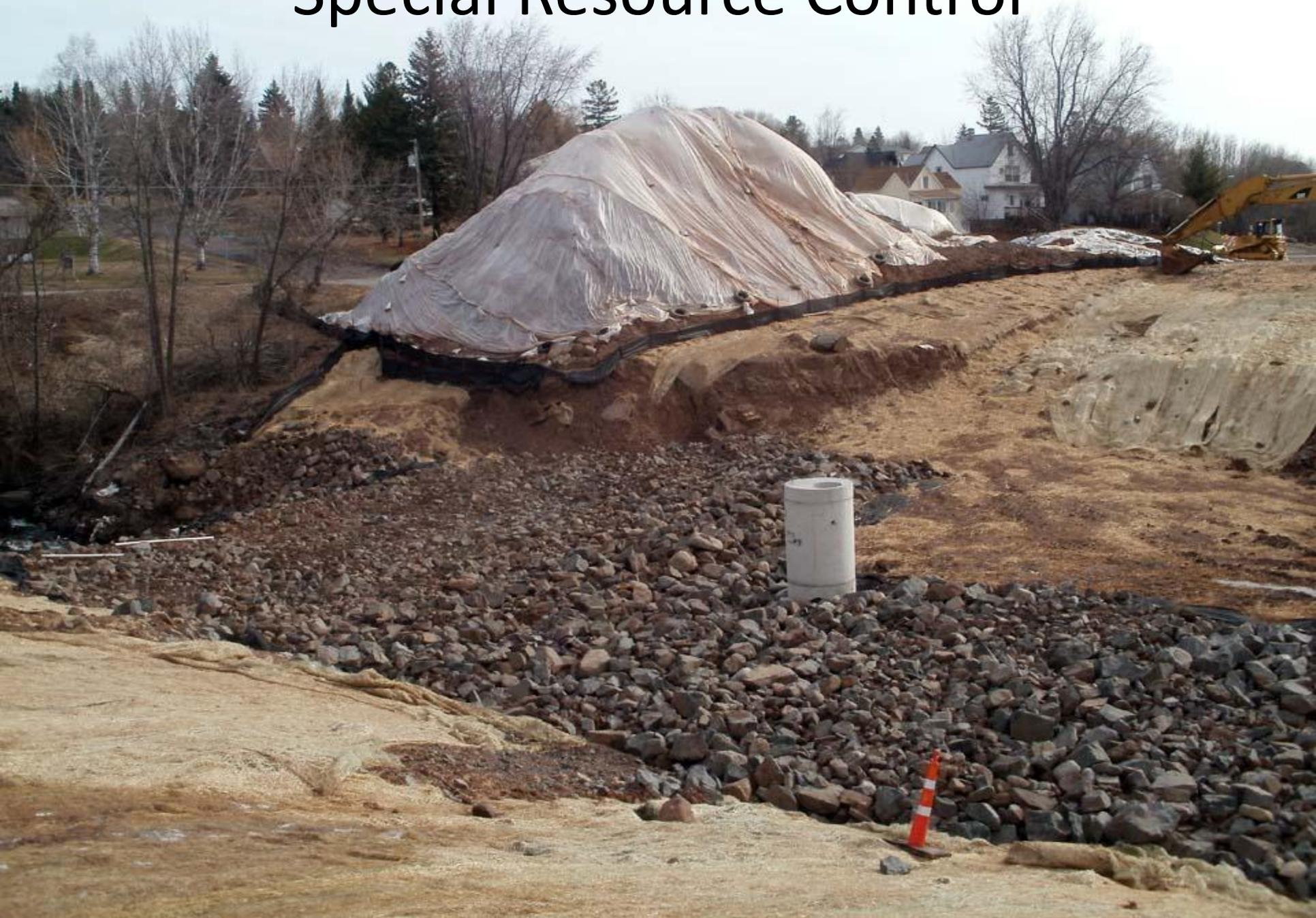
Means Everything.



Rural



Special Resource Control



Snow Storage (melt Issues)



Dredging Plan

- Prevent slop from entering water





Slop Management: Dredge Control

Rapid Stabilization BMPs

- Straw mulch, crimp anchored
- Straw mulch hydromulch anchored
- Hydromulch, seed, fertilizer
- Blanket
- Rock mulch
- Plastic/Geotextile







Conveyance Stabilization





Sweeping Source Control

- Part of every stabilized exit program



Interlock Seals



Coffer Interlock Seepage Control

Cofferdam Sheeting Sealing Methods: The Contractor may need to seal cofferdam sheeting interlocks if water leaks in at a faster rate than can be managed by the dewatering procedures. All methods used to seal sheet pile cofferdams must be accepted by the Project Engineer and meet the 1717 Site Plan Process that amends the SWPPP. There shall be no reduction in water quality as a result of sealing the coffer dam. Directly dumping coal cinders into the water to seal the cofferdam sheeting seams is not acceptable. There are at least three main categories of interlock sealing, some of which are provided below for Contractors to consider in developing their cofferdam plans: 1) Bituminous joint, 2) water-swelling joint, and 3) welding. Options that can be considered include:

1. Preplace approved interlock sealants (Steelant, Wadit PilePro, Roxan, Arcoseal, Pilelock)
2. Bitumin putty
3. Plastic shroud overlay of seam
4. Precision placement of coal cinders by underwater divers
5. Precision placement of bentonite by underwater divers







Water Quality Monitoring



Monitoring Location

- Outfall
- Hourly to start

















A26750T







42200
472



AMERICAN

TEREX

40



Spill Management

- Booms
- Containment





Spill Prevention Program

EMERGENCY PHONE NUMBERS

AMBULANCE	911
DOCTOR	911
HOSPITAL	911
FIRE DEPT	911
POLICE	911
ELECTRIC CO.	911

Spill Kit







Mobil
15W-40
EXXON





Concrete Management

- Equipment washout (Guidance Document)
- Equipment washoff (Guidance Document)
- Saw slurry management
- Diamond Grinding management
- Concrete cleaning, texture and staining



















CO₂ Sparging





Invasive Species Alert

These waters are designated as **INFESTED WATERS** and contain:

Zebra Mussels



Minnesota Department of Natural Resources



HELP STOP AQUATIC HITCHHIKERS!

To avoid spreading aquatic invasive species
BEFORE launching ... BEFORE leaving:

- **Remove** aquatic plants and aquatic animals
- **Drain** lake or river water away from the landing
- **Dispose** of unwanted live bait in the trash

It's the Law ... Do Not:

- Transport aquatic plants, zebra mussels, or other prohibited species on public roads
- Launch a watercraft or place a trailer in the water if it has aquatic plants, zebra mussels, or other prohibited species attached
- Transport water from infested waters

Minnesota Department of Natural Resources

Access

Keep law

The follo

are unl

• Camp

• Shoot

• Buildi

• Cons

beven

Take T

Minnesota Dep

Decontamination Protocols

- Removal all visible plants, seeds, mud, soil
- Pressure wash
- 7 day Dry or use 140 degree hot water
- Document operations
- Shipping manifest
- Check the DNR website for updates (prior to every project, minimum of once per year)

a) Water from designated infested waters may not be diverted to other waters, transported on a public road, or transported or appropriated off property riparian to infested waters without a DNR permit specific for this use (Minnesota Rules, part 6216.0500). See http://files.dnr.state.mn.us/eco/invasives/infested_waters.pdf for a current list of designated infested waters. This General Permit is not valid for appropriations from surface water sources that are designated as infested waters unless accompanied by an Infested Waters permit or written notification



http://www.dnr.state.mn.us/invasives/index_aquatic.ht

Invasive Species in Minneso...



Convert Select

Department of Natural Resources

events | a-z list | newsroom | about DNR | contact us

Recreation | Destinations | Nature | Education / safety | Licenses / permits / regs.

Home > Nature > Invasive species >

SHARE

A fishing trip may last a day,
but **zebra mussels can live**
in a lake forever.



© Engbretson Underwater Photography

Protect Your Waters

Prevent the transport of Zebra Mussels, Eurasian Watermilfoil and other aquatic invasive species (AIS).

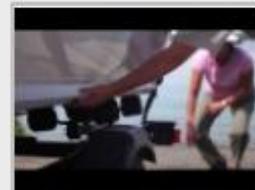
Invasive species are species that are not native to Minnesota and cause economic or environmental harm or harm to human health.

Minnesota waters are threatened by aquatic invasive species. It is illegal to transport any aquatic plants, zebra mussels, New Zealand mudsnails or other prohibited invasive species, or to launch a boat or trailer with these species attached.

[Contact a DNR Invasive Species Expert](#) »

[Designated infested waters list](#) »

Share these
resources
and educate others



PSA: Clean, Drain, Dry
(29 seconds)



Everything Inspected



Travel Manifest

- Documentation of last use
- Documentation of cleaning program, time of drying







Peter Leete DNR









Animal Passage Bench





Natural Netting



Riprap Matrix Grouting



See it, Say it, Get it fixed.



Questions

Case Study: TH70 Hay Creek















Case Study: TH210 Flood Repair

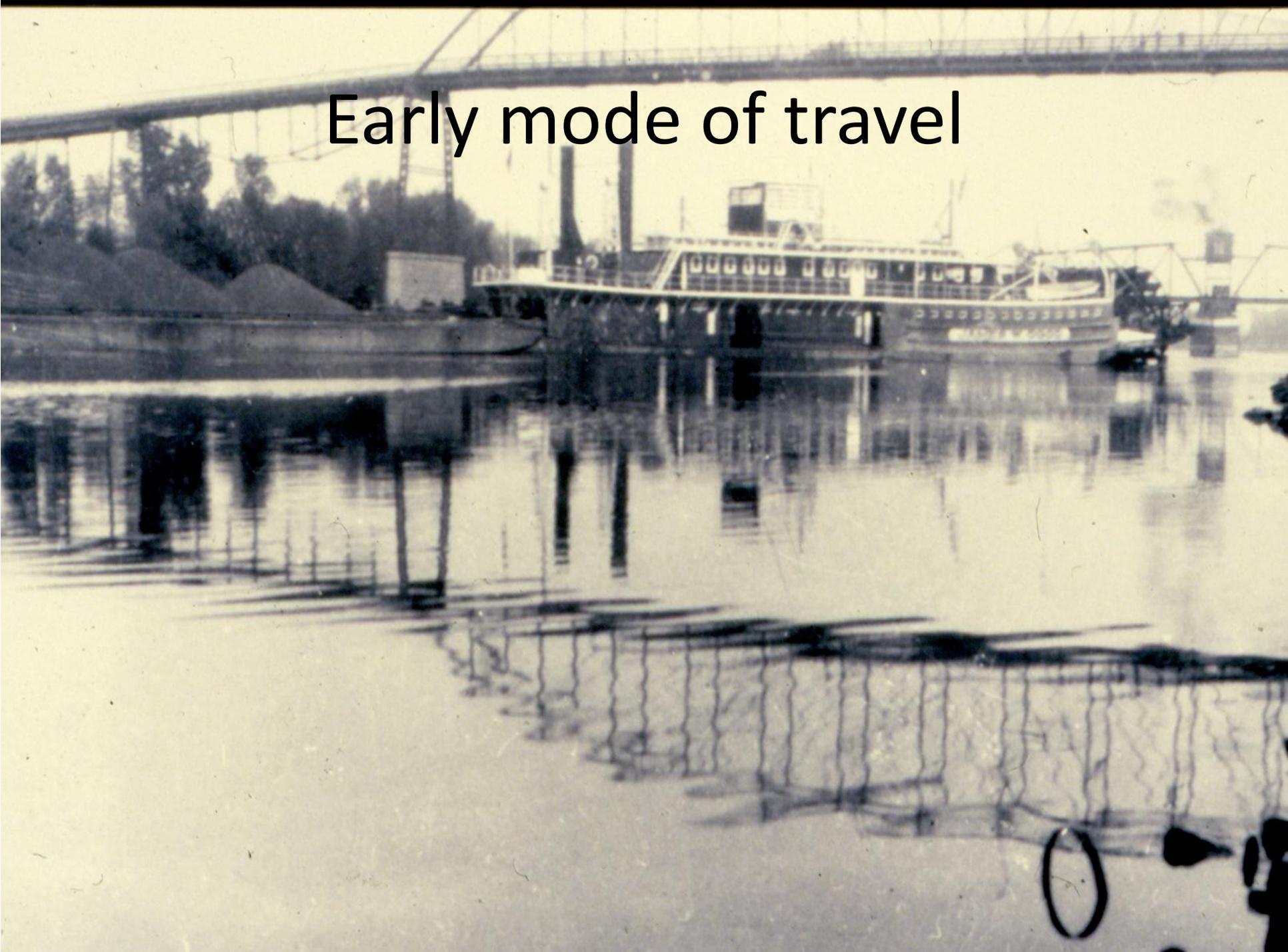








Early mode of travel



TH61 Hastings, MN

1st river bridge crossing

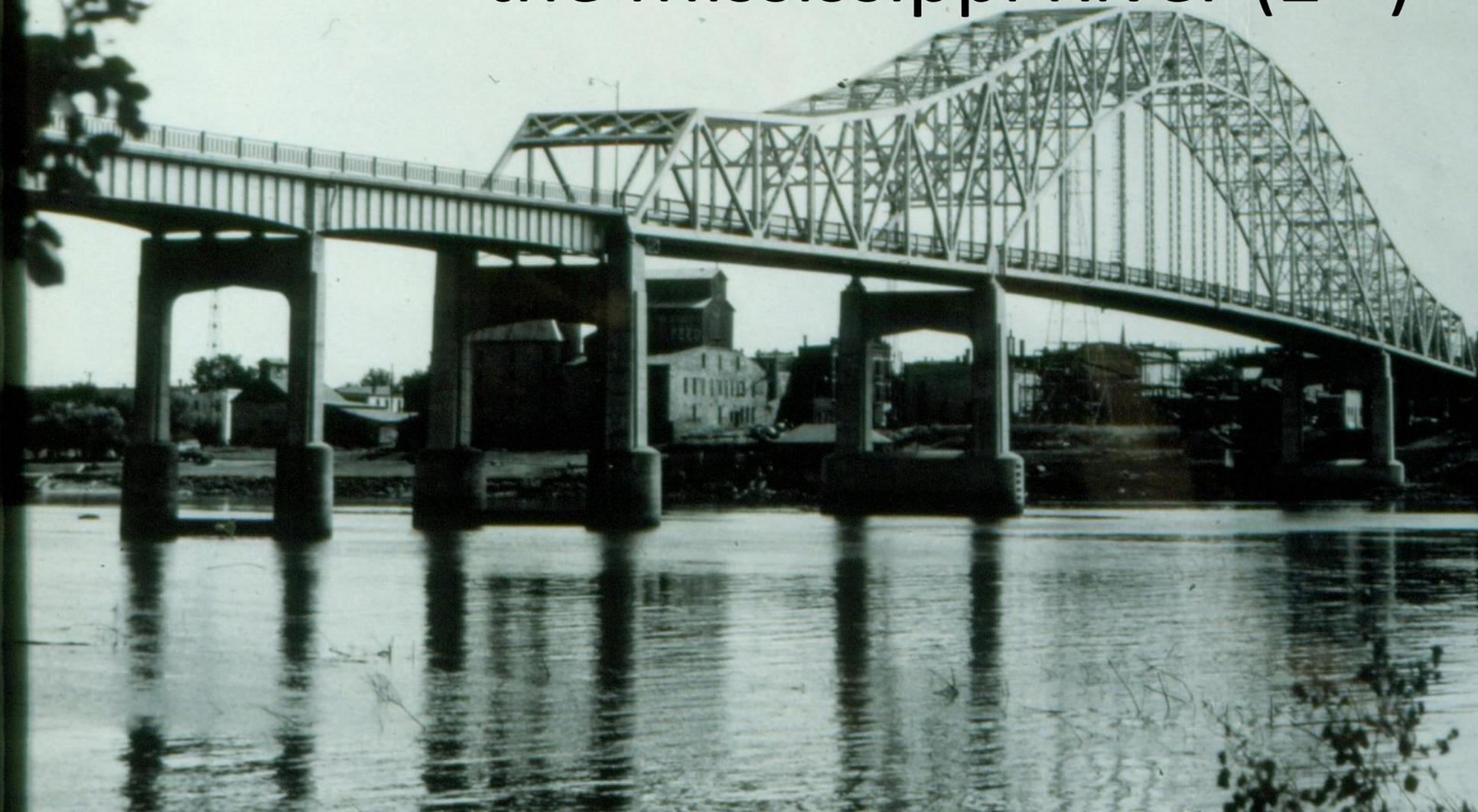


2nd river bridge crossing





Finished bridge over
the Mississippi River (2nd)



3rd river bridge crossing
(2012)





14x132 Gr50

14x132 Gr50

8228















3rd river bridge crossing
(2012)







MOSS KATE

MOSS KATE

MAMMOET











MS4/Maintenance Program

Action Items

- Surface cleaning
- Sediment removals
- Debris removals
- Scour repairs

Enhanced MS4 Operations & Illicit Discharge Prevention









