Project Management:
Managing the Paper Process to Project Implementation
Presentation Outline

Ron Leaf PE (SEH): Why TH 101
Bob Rogers (SEH): Environmental Review
Craig Johnson (MnDOT): Cultural Resources
Brent Theroux PE (SEH): Geotechnical Issues
Ron Leaf PE (SEH): Water Resources
Why TH 101?

TH101 & TH41
Flood Mitigation Study - 2010-2011

Ron Leaf, PE
Brad Woznak, PE, CFM
Rachel Pichelmann, EIT, CFM
Project Background
Study Elements

• Traffic forecasting and analysis
• Analysis of historical flooding
• Development of crossing alternatives
• River modeling
  – 2-D modeling Completed by Baird
• Cost-benefit evaluation of alternatives
• Public and Agency involvement
Cost of Closures

• Closed 7 times since 1993 including 4 closures since 2010
• Combined 33,000 ADT
• Alt. Routes: US Hwy 169 & MN Hwy 25
• Cost of TH 101 and TH 41 Closure (travel time and additional miles)*:
  – $670,000 per day (2009)
  – $1,675,000 per day (2030)

* Costs developed using Metropolitan Council’s 2030 Regional Model.
Flooding History – TH101

TH 101 Crossing Historical River Elevations

- Current Closure Elevation (709.4')

Dates:
- 11/7/1932
- 7/17/1946
- 3/25/1960
- 12/2/1973
- 8/11/1987
- 4/19/2001
- 12/27/2014
Spring 2011 Flood – TH41
Looking North Towards Chaska
Spring 2011 Flood – TH101
Looking North Towards Chanhassen
Why Not Just Raise The Road

• Raising the road would cause impacts upstream

• Floodplain regulations do not allow fill in the floodway that will cause the river to rise

• Need “no-rise” solution

• Next step was to model alternatives for achieving the no-rise condition
  • HEC-RAS Model – SEH
  • 2D Model - Baird
2011 Flood Event – TH101
Design Alternatives – TH 41 and TH 101

- Filling to Raise Road Profile
  - Modeling showed increase in 100-Yr WSE
  - Culverts could not mitigate increase

- Use of Upstream Storage
  - Not feasible due to flat river profile

- LOMR to Allow for Some Stage Increase
  - Not practical due to length of upstream impact (30+ miles) … many, many properties

- Land Bridge
Land Bridge Design

• Iterative Process which Involved Varying:
  – Road Elevation
  – Bridge Length
  – Pier Width
  – Pier Spacing
  – Bridge Deck Depth
Preferred Option – TH41
Preferred Option – TH101
Road Closure Duration – TH101

TH 101 Crossing, Summer 1993

- Proposed Closure Elevation (722.0')
- Current Closure Elevation (709.4')
- 23 Days
Evaluation Criteria

- Construction Cost
- Benefit Cost
- Property Impacts and Costs
- Constructability
- Environmental Impacts/Opportunities
- Community Input
Cost Effectiveness

- TH41 Preferred Concept
  - $22.4 Million to Construct & Design
  - Benefit/Cost = 3.06

- TH101 Preferred Concept
  - $33.3 Million to Construct & Design
  - Benefit/Cost = 3.81
TH 101 Selected for Flood Mitigation

- Carries more traffic
- Able to achieve higher crossing
  - Results in more significant reduction in closure frequency and closure duration
- 2015 Project status
  - Currently under construction
CSAH 61/101 Environmental Review

• State & Federal requirements were tracked throughout scoping and alternative analysis

• State Funded Project = State Environmental Review Process
  – Federal COE permit still required compliance with NEPA (e.g. Section 106)

• Identification of a preferred alternative and early agency coordination helped determine that an Environmental Assessment Worksheet (EAW) was the appropriate review & documentation path

• Who should be the RGU?
Environmental Agency Coordination

- 3 multi-agency coordination meetings held during Feasibility Study phase
- 2 additional resource agency meetings held during preliminary design & environmental review phase for CSAH 61
- Numerous individual meetings and contacts made to address specific issues/concerns
- Fairly non-controversial project due to benefits of removing causeway from MN River floodplain.
Key Social, Economic, Environmental Factors

• Water Resource Concerns
  – MN River floodplain, wetlands, stormwater/WQ, Bluff Creek

• Geotechnical Issues
  – Poor muck soils, high groundwater, Seminary Fen located SW of project area

• Cultural Resources (Archeology)

• Important Parks and Recreational Resources
  – Boat launch, archery range, MN Valley Trail, Raguet WMA, MN Valley National Wildlife Refuge

• Utilities
  – Electric, gas, communication service lines

• Cumulative Potential Effects

• Construction Impacts
  – Staging / maintenance of traffic & access to businesses
Parks and Other Recreational Resources

- Boat Launch
- MNDNR / USFWS Land Transfer
Utilities

• Coordination with 8-10 utility providers
• Needed to ensure utilities relocated outside of proposed muck excavation limits
• Need Additional R/W & Temporary Easements
Cumulative Potential Effects
Construction Impacts: Staging & MOT

**Tentative Roadway Schedule**

- **Phase 1:** July 2014 – October 2014
- **Phase 2:** October 2014 – March 2015
- **Phase 3:** April 2015 – May 2015
- **Phase 4:** May 2015 – August 2015
- **Phase 5:** August 2015 – October 2015

**Tentative 101 Bridge Schedule**

- Shoulder Reinforcement: July 2014
- Substructure: September 2014 – April 2015
- Superstructure: March – August 2015
- Remove Embankment: August 2014 – October 2015

**Description of Roadway & Bridge Work by Phases:**

- **Phase 1:** The contractor will prepare the project site for Phase 2 work which includes shoulder work on Highway 101, re-routing the Chief Creek channel, and work on Highway 81.
- **Phase 2:** Work will begin on the substructure (foundation) for the Highway 101 bridge and the construction of the new roundabout area with deep soil corrections.
- **Phase 3:** Construction of the Highway 101 bridge substructure (foundation) continues and work on Highway 61 (Flying Cloud Drive) will extend west to the intersection of State Highway 101 north.
- **Phase 4:** Construction of the Highway 101 bridge will transition to completion of the bridge deck and work on Highway 61 (Flying Cloud Drive) will extend further west past Chief Creek Drive.
- **Phase 5:** Traffic will be shifted to the new Highway 101 bridge and Highway 81 in order to complete the removal of the former Highway 101 roadway and bridge and some work on Highway 61 will be completed under traffic.
Craig – Cultural Resources
Geotechnical Challenges

- Variable organic soils (peat, organic silt)
- High water table
- Artesian potential
- Construction staging and open traffic
Geotechnical Challenges
Ground Conditions
Ground Conditions
Geotechnical Tools

• Muck excavation
• Deep foundations
• Lightweight fill
  – Lightweight aggregate
  – Geofoam
• Surcharge
Structural Foundations

• 18” to 30” steel pipe piles (River Bridge)
• 12” steel pipe piles (Bluff Creek Bridge and retaining walls)
• 16” steel pipe piles (CSAH 101 column supported embankment)
Soil Correction – Muck Excavation

- Depths up to 20+ ft
- Performed “in the wet”
- Progress tracked in real-time with special GIS tracking technology
Soil Correction – Bluff Creek

- Organic soils extend to 30+ ft
  - Might be too deep to completely remove and verify
- Partial muck excavation
- Preload to +2 ft above finished grade
  - Allow 2 to 4 weeks for settlement
- Lightweight aggregate placed in top 6 ft of subgrade to mitigate long-term settlement
Soil Correction – Column Supported Embankment

- Organic soils extend to 30+ ft at River Bridge north abutment
- Support new 15 ft embankment on “load transfer platform” and array of steel piles (~300 piles)
- Ultimately not constructed...contractor was able to muck organics (verified with borings)
Muck Excavation
Smart Muck
Smart Muck
Smart Muck
Smart Muck
Geotechnical
TH 101 - Water Resources Issues
Mitigation Plan

– Overview of Potential Impacts / Regulations
  • Floodplain
    – Removal of existing roadway fill
    – Fill in selected areas
  • Stormwater Management
    – Water Quality, Rate Control
    – Special and Impaired Waters
  • Bluff Creek
    – Channel realignment, Construction staging
  • Wetlands
    – Impacts, Creation / mitigation
  • Permits and Approvals

•
Mitigation Plan - Floodplain

• Anticipated Impacts
  – TH 101 Bridge
    » Piers/Pilings - fill at piling locations
    » Road excavation material
  – CSAH 61
    » Fill at TH 101/CSAH 61 “Y” area
    » Future Fill at – Flying Cloud Drive
  – Total
    » No-rose condition
Mitigation Plan - Floodplain

- Mitigation Measures
  - Project Specific
    » Removal of current TH 101 road fill
    » Approx 11 acres of fill removed
    » Reconnected floodplain
    » Creation of open water wetland
    » Wildlife corridor enhancement
  - Base Flood Elevation (BFE)
    » No modeled change in BFE
  - Improved floodplain function
    » Wetland conditions
    » Wildlife habitat and
Mitigation Plan - Floodplain
Mitigation Plan - Floodplain
Mitigation Plan - Stormwater

• Anticipated Impacts
  – TH 101 Bridge and CSAH 61
    » New impervious surfaces
    » Storm drainage system outlets
    » Temporary/construction impacts
  – Outside project area
    » Assumption Creek area
    » Seminary Fen – to west of project (LMRWD)
  – Future drainage
    » Flying Cloud Drive to the east
    » TH 101 to the north
Mitigation Plan - Stormwater

• Permanent Best Management Practices (Treatment and Rate controls)[1-inch volume over new impervious]
  – TH101 - South Filtration Basin
  – TH 101 – North Sediment Basin
  – CSAH 61 South Filtration Basin

• Construction
  – Erosion and Sediment Control
  – Dewatering
  – Concrete washout
  – Containment
Mitigation Plan - Stormwater
Mitigation Plan - Stormwater
Mitigation Plan - Stormwater
Mitigation Plan – Bluff Creek

• Anticipated Impacts
  – TH 101 Bridge - Removal of four culverts on east leg of TH 101 Y
  – CSAH 61 - Removal of twin box culverts
    » Creek Realignment
    » Potential to cause or contribute to Impairment - 40 CFR 122.4i

• Mitigation Measures
  – Creation of open channel habitat
  – Channel realignment, rehabilitation
  – Opportunity to reduce sediment removal/maintenance needs
TH 101 - Water Resources - Staging
TH 101 - Water Resources - Staging
Mitigation Plan – Bluff Creek
Mitigation Plan - Wetlands

- **Anticipated Impacts**
  - TH 101 Bridge - fill along TH 101 Bridge piers/piling
  - CSAH 61 - fill along CSAH 61
    - Bluff Creek corridor
    - Effects of Bluff Creek realignment (accounting process)

- **Mitigation Measures**
  - Creation of Approx 11 acre wetland from fill removal along existing roadway
  - Reconnected floodplain
  - Wildlife corridor enhancement
Mitigation Plan - Wetlands
TH 101 - Water Resources Issues

Permits and Approvals

• United States Army Corps of Engineers
  – Section 404 for wetland impacts
  – Section 10 for impacts to Minnesota River (confirm)

• United States Coast Guard
  – Section 12 permit for impacts to Minnesota River

• US Fish and Wildlife Service
  – Project Review
  – Special Use Permit – Bluff Creek outlet area temporary impacts
TH 101 - Water Resources Issues
Permits and Approvals

• Minnesota Department of Transportation
  – Minnesota Wetland Conservation Act
    (possibly City of Chanhassen)
• Minnesota Pollution Control Agency
  – NPDES Construction Stormwater Permit
    » Current Permit – Revised Permit
  – 401 Water Quality Certification (if wetland impacts >5 acres)
• Minnesota Department of Natural Resources
  – Public Waters Work Permit
  – Water Appropriations / Dewatering
  – Utility crossings over the river? (could require DNR utility licensing)
TH 101 - Water Resources Issues

Permits and Approvals

• Lower Minnesota River Watershed District
  – Project Review (permit by City of Chanhassen)

• City of Chanhassen
  – Minnesota Wetland Conservation Act (possibly MnDOT)
  – Compliance with Surface Water and Wetland plans

• City of Shakopee
  – Compliance with Surface Water and Wetland plans
TH 101 - Water Resources Issues
Thank You

Questions ?