Predicting Highway Construction Impacts on a Community

Minnesota Department of Transportation
Making the Best Decisions in the Face of Conflicting Values

What does this mean?
- Roadway elevation
- Noise Berms or Noise Walls
- Selective clearing or Clear cutting
- Retaining wall type
- More or Less Right of Way
- Budget
- Flexibility
- Community Expectations
TH 212 & TH 52
Overviews

TH 212
- 11.8 miles
- 31 bridges
- $238 million
- Approximately 134 parcels
- $90+ million in R/W

TH 52
- 11+ miles
- 24 bridges
- $232 million
- Approximately 290 parcels
- $50+ million in R/W
TH 212 & TH 52
Construction Challenges

TH 212
- Unsuitable Matls
- Construction Access
- Environmentally Sensitive Areas
- Payment Curve
- Illegal dump sites
- Noise Mitigation
  - Walls vs. Berms

TH 52
- Contaminated Properties
- Maintenance of Traffic
- Walls
- Utility Conflicts
- Matl Availability
Management of Expectations

- TH 212 Expectations
- Out of Sight, Out of Mind
  - Cities supported this because they believed it minimized impacts to the communities
- Elevation of Roadway impacted other project details
  - Cost, drainage, excess material, noise, aesthetics, etc.
  - Caused 15+ million yards of excavation
  - Noise walls vs. Noise Berms
  - Impacts to the landscape (trees, visual,
  - Caused drainage and groundwater concerns
Management of Expectation

- Design Modification Highlights
  - Open ditches to curb and gutter along TH 212 mainline
  - Noise walls to Noise berms
  - Shifting roadway along project away from many homes
    - Allows for construction of larger berms
  - Raised roadway to eliminate excess excavation and earthwork
Management of Expectations
Management of Expectation

- Design Modification Highlights
  - Reduced Construction Schedule
  - More Effective for noise mitigation
    - Berms vs. Hard Walls, Berms and Walls closer to noise source
  - Improved visual aesthetics
  - Minimize Environmental Impacts
    - Cranberry bog, Bluff Creek, Wetlands
  - Reduced earthwork reduces local system impacts
    - Truck traffic on local roads, construction noise, dust and exhaust
  - Cost Savings
    - Construction Costs, Off-site mitigation
Management of Vegetation

- Clear Cut vs. Selective Clearing
- Inventory trees to identify where impacts occur
  - No longer an arbitrary decision
- Modify construction limits to avoid impacts
  - Steeped slopes, noise wall vs. noise berm, etc.
Management of Unsuitable Soils

- Excavation vs. Lightweight fill vs. Surcharge
  - Lightweight fill
    - Tires, Foam, etc
    - Cost Implications
    - Geotechnical Recommendations
  - Excavation
    - Right of Way Restrictions
      - Variable Depths
    - Geotechnical Recommendations
  - Surcharge
    - Right of Way Impacts (movement of material)
    - Time
    - Geotechnical Recommendations
Management of Unsuitable Soils

Diagram showing the management of unsuitable soils with annotations for limits of muck and wetlands.
Managing Right of Way Constraints

- Retaining walls
  - Prevent impacts to environmentally sensitive areas
  - Used to keep construction limits inside of right of way

- Retaining Wall Options
  - ROC 52 introduced four types of retaining walls
    - Allowed Contractor to Accelerate Construction

- Noise Walls
  - Used on 212 where right of way or environmental constraints exist
    - Berms could not be built
    - Wetlands
    - Streams
Management of Traffic

ROC 52
- Design Modification Highlights
  - Introduced a slight curve into the alignment
    - Allowed the elimination of temporary bridge
  - Built mainline bridge off-line while traffic was maintained on existing bridge
  - Reduced Construction costs and time
Management of Traffic
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- How can you achieve this in the Pre-Design Phase
  - Communication
    - Involve Bridge, Construction, Materials, etc. to provide options on how to solve issues with Environmental Constraints
    - Perform constructability reviews early and often
  - Design Build Philosophy
  - Decision Maker Responsibilities
    - Thorough project scoping
    - Ask yourself, “How will this be built?”
    - Do not unnecessarily eliminate flexibility in the future
      - If environmental constraints do not exist why eliminate options
    - If a rigid design is needed get enough detail to ensure success
      - No solution drives scope creep
Questions?

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