

# Bridges & Structures Consultant Training May 10, 2018

## Preliminary Bridge



# DESIGN EVENT DATES

- D0 = Concept for Bridge Replacement /Roadway Project
- D2 = Field Exam – Review of Grades, Utilities, Staging, ROW needs, etc.
- D3 = Road Submittal to Bridge – Typical, Cross Sections, Ditch Grades for Preliminary Bridge Layout
- D5 = Road Submittal to ROW – Need lines, Temporary Easements, etc.

# BRIDGE EVENT DATES

B0 – Bridge Repair Concept (overlays, joint repair, etc.)

B1 = T,S&L for Structural Design – Bridges, RCB's, Flumes, Walls, etc.

- Customer is Final Bridge Design

B2 = Culvert Plats, Preliminary Tab Schedule Sheet, Drainage Design

- Customer is Design Office

# BRIDGE EVENT DATES

- B3 = Structural Plans Submitted to Final Bridge – Customer is Contracts/Bridge
- B4 = Structural Plans Submitted to Design - Customer is Design/Contracts
- B5 = Submittal to Corps for Section 408 Levee Approval

# HYDROLOGY

- Use USGS StreamStats Program if DA > 20 square miles
- Use Either StreamStats or USGS 87-4132 Equations for DA < 20 sq. miles – (engineering judgement)
- Use Iowa Runoff Chart for DA < 2 sq. miles.

# HYDRAULICS

- Use HEC-RAS 5.0.4 for Most 1D Bridge Hydraulics (Not recommended for 2D analysis)
- Use either TUFLOW or SRH-2D for 2D Hydraulic Analysis
- Design Velocity Thru Bridge – 6 to 8 ft./s
- No DNR Requirement for Q50 Backwater

# HYDRAULICS CONT...

- No Variance Req'd for Freeboard
- Backwater may Exceed DNR Criteria (low damage and acceptable velocities)
- No Rise for Detailed FIS with High Damage Potential
- Provide for 200-yr. Overtopping LOS for Interstate and NHS Routes

# HIGHWAY CROSSINGS

- 2 Span Preferred over 4 Span
- Note if Pier < 30 ft. of Roadway & No Exemption (BDM 6.6.2.6) – Note Design for Vehicular Collision Force on T,S&L
- Maintain Minimum 14.5 ft. Vertical Clearance to Clear Zone (Pier Cap Skewed
- Provide Extra 5' Beyond Shoulder for 2-Span Bridges – (Maintenance)



# RAILROAD CROSSINGS

- Other RR's Using BNSF & UP Railroad Standards
- 44 inch Barrier in Lieu of Fence
- Not Proposing to Construct Piers Outside of RR ROW
- Berm Set 26' from CL at top of Rail Elevation.
- RR Coordination Through Rail Office

# RIVERINE INFRASTRUCTURE DATA BASE (RIDB)

- What is it?
  - DOT Provide Real-Time Flood Forecasting and Response to Enhance Public Safety
- Deliverables:
  - Frequency/Discharge
  - Rating Curve w/Low Road and Beam
  - Should not Require Additional Survey

# PROJECT DELIVERABLES

- DNR Flood Plain/Sovereign Lands Permit
- Mapped Flood Prone Area – Record of Coordination
- Verify bridge type/size in Concept (e.g., final hydraulics)
- List Project Event Dates
- 104-3 Tab – Pipe Culverts

# PROJECT DELIVERABLES...

- CAD .str file
- Bridge checklist, summary memo
- H&H data, files, scour calcs.
- DNR Permit App.
- RIDB files/format

# PROJECT COST DEVELOPMENT

- iPDWeb Cost Estimating Software
- Documentation on Bridge Manual Web-Site
- Early Stages for Parametric Estimates
- Created Concept and B1 Template
- Calculate Both Methods and Coordinate w/Staff

# QUESTIONS?

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