Breaking Down the DNA Plan

Things Designers and Consultants Need to Know
Background

FIRST LOOK STUDIES

PRELIMINARY SCOPING STUDIES

PRE-DESIGN SCOPING STUDIES

DNA Scoping Studies
Background

• Data Needs Analysis (DNA) Scoping Study
  – Document Project Background
  – Better Define the Scope
  – Identify the Needs of the Project
  – Develop a Draft Purpose and Need Statement
  – Identify Potential Impacts (Environmental, Utility, Right of Way)
  – Develop Potential Alternatives and Preliminary Cost Estimates
  – Compare Preliminary Estimates with Funding in Highway Plan
Background

• The first DNAs written by C.O. Planning after a project team meeting and site visit with the district project development staff and others as needed.

• Originally, a DNA was to be completed on all projects prior to the Design phase.

• The recommended format closely followed the format of the previous First Look Studies.

• Expected time to complete – 10 working days
Maybe we should take another look at the First Look, I mean DNA format?
New DNA Format

• Approx. 8 pages
• Includes most of the information in previous DNA format (summarized)
• Provides a more consistent format
New DNA Format

Programming Information

I. PRELIMINARY PROJECT INFORMATION

County: Daviess
Route Number(s): KY 54
Program No.: 85000 01D
Federal Project No.: 85000 01D

Item No.: 02-8888.00
Road Name: Owensboro-Whitesville Rd.
UPN: FD04 30 54 002-005
Type of Work: MAJOR WIDENING

Highway Plan Project Description:
WIDENING KY-54 FROM THE US-60 BYPASS TO WHITESVILLE

Beginning MP: 4.505  Ending MP: 8  Project Length: 3.5
New DNA Format

HIS Data
New DNA Format

Design Guidance

KYTC Guidelines Preliminarily Based on:

<table>
<thead>
<tr>
<th>Roadway Data</th>
<th>EXISTING</th>
<th>PRACTICES*</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Lanes</td>
<td>4</td>
<td>Min. 2</td>
</tr>
<tr>
<td>Lane Width</td>
<td>12</td>
<td>Min. 22 ft</td>
</tr>
<tr>
<td>Shoulder Width</td>
<td>Curbed</td>
<td>Curbed</td>
</tr>
<tr>
<td>Max. Superelevation**</td>
<td>3.80%</td>
<td>6%</td>
</tr>
<tr>
<td>Minimum Radius**</td>
<td>1909.88 ft</td>
<td>1060 ft</td>
</tr>
<tr>
<td>Maximum Grade</td>
<td>3%</td>
<td>6%</td>
</tr>
<tr>
<td>Minimum Sight Dist.</td>
<td>533 ft</td>
<td>495 ft</td>
</tr>
<tr>
<td>Sidewalk Width(urban)</td>
<td>4 ft</td>
<td>Min. 4 ft</td>
</tr>
<tr>
<td>Clear-zone***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project Notes/Design Exceptions?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

55 MPH Proposed Design Speed

*Based on proposed Design Speed, **AASHTO's A Policy on Geometric Design of Highways and Streets, ***AASHTO's Roadside Design Guide

Existing Rdwy. Plans available?

- [ ] Yes
- [x] No

Year of Plans: 1987, 1958

Traffic Forecast Requested
- [x] Yes

Date Requested: 1/1/2012

Mapping Requested
- [x] Yes

Date Requested: 1/1/2012

Type: Lidar
New DNA Format

Bridge Information

<table>
<thead>
<tr>
<th>Bridge No.*:</th>
<th>030B00017N</th>
<th>030B00018N</th>
<th>Existing Geotech data available?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sufficiency Rating</td>
<td>66</td>
<td>66</td>
<td>No</td>
</tr>
<tr>
<td>Total Length</td>
<td>99.1 ft</td>
<td>84 ft</td>
<td></td>
</tr>
<tr>
<td>Width, curb to curb</td>
<td>25.9 ft</td>
<td>27.9 ft</td>
<td></td>
</tr>
<tr>
<td>Span Lengths</td>
<td>30 ft, 39.1 ft, 30 ft</td>
<td>22 ft, 40 ft, 22 ft</td>
<td>No</td>
</tr>
<tr>
<td>Year Built</td>
<td>1954</td>
<td>1960</td>
<td></td>
</tr>
<tr>
<td>Posted Weight Limit</td>
<td>Open, no restriction</td>
<td>Open, no restriction</td>
<td></td>
</tr>
<tr>
<td>Structurally Deficient?</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Functionally Obsolete?</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>

*If more than two bridges are located on the project, include additions sheets.
New DNA Format

Project Purpose and Need

NEPA’s 9 Elements of Purpose & Need:

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Transportation Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Project Status</th>
<th>Capacity</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System Linkage</th>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Modal Interrelationships</th>
<th>Roadway Deficiencies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Demands &amp; Economic Development</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
New DNA Format

Project Purpose and Need (cont.)

Draft Purpose and Need Statement:

Needs: KY 54 near the interchange with US 60 is congested during peak traffic periods. Growth along this corridor is expected to continue. There are also collision patterns at intersections with KY 54 and a CRF of 1.10 on the more developed section of KY 54. KY 54 connects the communities of Whitesville and Owensboro.

Purpose: The purpose of this study is to address the congestion of KY 54 during peak periods and to improve the safety, mobility, and connectivity between Owensboro and Whitesville.
New DNA Format

Preliminary Environmental Overview

If the anticipated environmental document is a CE3, EA/FONSI or EIS, then DEA will review the draft.
New DNA Format

- Possible Alternatives
  - Include No Build
  - Alternatives need to address the draft purpose and need of the project
  - Discuss negative impacts of possible alternatives
New DNA Format

• Summary
  – Draft Purpose and Need Statement
  – Preliminary cost estimates should be compared to $ allocated in Highway Plan
New DNA Format

• Supporting Documentation
  – Project location map and crash location and tables are usually included in the DNA
New DNA Format

• Supporting Documentation
  – All other supporting documentation can be placed in Projectwise and given to the selected consultant at the Pre-Design Conference if considered useful by the Project Manager
    • Archived roadway plans
    • Crash Data
    • Traffic Forecast (if available)
    • Utility info
DESIGN PERSPECTIVES

• KYTC Has Published at Least 65 DNA Studies Statewide

• Comments Gathered From District Design Staffs Queried About Experiences Using DNA Studies
Advantages

• Encourages Multidisciplinary Team Decision Making

• Improve Understanding of Project Scope and Potential Challenges

• Potential Time and Cost Savings from Early Defined Scope
Advantages

• Clarify Legislative Intent

• Possible Early Public Involvement Where Appropriate
Disadvantages

- Potential Large Time Investment for Multiple Departments
- Perceived Limitation on Innovation and Creativity on Larger Projects
Draft DNA Policy

• DNA shall be completed on all projects with little or no previous planning activity and that will be designed utilizing consultant services.
• DNAs will be completed in-house.
• Project Team meetings are encouraged.
• A draft DNA study shall be sent to the Project Team for comments.
C.O. Planning will review all reports for continuity and consistency.

Ultimate approval of the study and its content lies with the District’s Project Development Branch Manager.

The final draft shall be sent to C.O. Planning to post to the Division’s web page.
“DNA’s are a Planning Effort...”

The DNA documentation is usually completed by a District or C.O. Planner, but the development of the draft Purpose and Need and the scope of the project is a Project Development Team process, and should be a multidisciplinary effort.
DNA - Fact, Myth or Misunderstanding

“Including alternatives in DNAs limits the consultants’ ability to develop innovative approaches...”

The design consultant is NOT limited to the alternatives in the DNA. Innovative solutions that address the P&N are encouraged within the scope of the project. However, at a minimum a description of the alternate used to develop the cost estimate should be included.
“DNAs are only used to put together the Bulletin, aren’t they?”

While information on the DNA can be copied to the bulletin, we hope there is other data and information from the DNA process that will be helpful in future project phases.
“We can scope out a project without going through the process of writing a document.”

Documentation is very helpful, especially if there are retirements, turnover in staff, or significant time lapses between phases. However, it may be helpful to be able to “right-fit” the amount of effort that goes into different types of projects...
Right Sizing a DNA

- DNAs are a Planning Level Study utilizing a TEAM Concept
- Know Your Limits
- Different Types of Projects require different types of DNAs
- **K.I.S.S.** Method
DNAs are a Planning Level Study

- They **are not** meant to create a set of Construction Plans
- They **are not** meant to replace the Preliminary Engineering Phase
- They **are not** meant to replace other Planning Studies

PLANNER’S SHOULD PLAN and DESIGNER’S SHOULD DESIGN
Know Your Limits

DNAs SHOULDN'T BE USED FOR:

- New Corridor/Roadway Type Projects
- Alignments Greater than 3 miles
- Shoulder Widening Projects
- Rehabilitation Type Projects
- Projects that would normally be handled with SPR funded Studies (IJS, Feasibility, Programming, SUA, Alternatives)
Different Projects should use Different DNAs

Reconstruction/Major Widening
- Horizontal Alignment Options
- Vertical Alignment Options
- Typical Section Options
- Probably Require Utility Relocations
- Possibly mean Significant R/W involvement

Bridge Replacement
- Minor Horizontal Alignment Options
- Typical Section Options
- May Require Utility Relocations
- Typically Little R/W Involvement
Reconstruction/Major Widening

- More Extensive Projects need More Extensive Information
Reconstruction/Major Widening

- More Extensive Projects need More Extensive Information
- Take someone with you for your field visit
- Try to show the project challenges
- Think of these in terms of Corridor Alignments
Bridge Replacements

• DO NOT OVERTHINK – You are simply replacing a bridge
Bridge Replacements

• DO NOT OVERTHINK – You are simply replacing a bridge
• Use the appropriate design criteria
Bridge Replacements cont’d
Bridge Replacements

• DO NOT OVERTHINK – You are simply replacing a bridge
• Use the appropriate design criteria
• Should only be looking at horizontal alignments
• Never more than 3 alternates for the team to review
• Should narrow to a minimum number of alternates for consultant
The *K.I.S.S.* Method

- **K**eep
- **I**t
- **S**imple
- **S**tupid
The **K.I.S.S.** Method *cont’d*

• Don’t Waste time trying to fill the boxes

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**C. Threatened and Endangered Species**

During a site visit on February 17, 2011, potential habitat was observed for the bat species and several of the mussel species. A biological assessment should be completed prior to construction to assess the potential impact to threatened and endangered species. A link to Daviess Counties threatened and endangered species is below.

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Or Simply

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**C. Threatened and Endangered Species**

*Possibly: Indiana bat, Kentucky Arrow Darter*
The *K.I.S.S.* Method *cont’d*
2-3 Alternates are Plenty

**TOO MANY**

**JUST RIGHT**
The **K.I.S.S.** Method *cont’d*

Create “new” fields to save time.

<table>
<thead>
<tr>
<th>Truck Class.</th>
<th>AAA</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Trucks</td>
<td>3.8</td>
</tr>
<tr>
<td>Terrain</td>
<td>Mountainous</td>
</tr>
<tr>
<td>Detour Length</td>
<td>13.60 miles</td>
</tr>
</tbody>
</table>

### IV. PROJECT CHALLENGES

The Project Teams has identified the following challenges for this project:

1. MOT concerns during construction.
2. Waterline running next to existing road for entire project length.
3. Potential Historic home.
4. Potential Floodplain Impacts.