Design Executive Summaries MADE Easy

Agenda

- What is a DES and what it is NOT?
- Filling out the Form
- Purpose and Need
- Preliminary Line and Grade Minutes
- Complex DES
- Guidance Updates
- Quick Links
- Questions

What is a DES?

The Design Executive Summary (DES) is the record of engineering decisions related to the project and contains rationale concerning the identification of the preferred alternative and requested design exceptions.

Updated 12/20/22

DESIGN EXECUTIVE SUMMARY

County:	Young	**Item #:**	1-2345
Route Number(s):	KY 900	**State Program #:**	1234501D
BMP/EMP:	0.16 to 8.57	**Federal Project #:**	STP 1234567
Type of Work:	Major Widening	**State Project #:**	FD52 121 0900 000-009

Highway Plan Project Descriction: Major widening from Bass Street to Fishermans Loop in Youngstown.

EXISTING CONDITIONS

ADT (current): 9,920 (2016)		**Truck Class:** AAA	**Trucks: 12.34%**
Existing Functional Classification:	☐ Urban ☑ Rural — Arterial	**Terrain:** Rolling	**Route is on (check all that apply):** ☐ NHS ☑ NN ☑ Ext Wt ☐ None
Posted Speed Limit: 55 mph "or"		**Statutory Speed Limit:**	☐ 35 mph (urban) ☑ 55 mph (rural)

PROPOSED CONDITIONS

Design Functional Classification:	☐ Urban ☑ Rural — Arterial	Design ADT (2040): 12,000 DHV: 1,800	Access Control: By Permit Min. Spacing:

CONTROLLING CRITERIA:	EXISTING CONDITIONS (Estimated based upon existing geometrics.)	AASHTO Guidance (for design speed)	Recommendation	Design Exception (check if needed for Design Speed)	
Design Speed	55 MPH	Minimum: 50 MPH Selected: 55 MPH	55 MPH	☐	
Note: For any remaining controlling criteria ... are less than AASHTO recommended guidance: If recommended design speed is ≥ 50 mph, exceptions are needed; If recommended design ... is < 50 mph, variances are needed.				Exception (≥ 50 mph)	Variance (< 50 mph)
Lane Width, No. of Lanes	12', 2 lanes	12'	12', 2 lanes	☐	☐
Shoulder Width (Minimum Usable)	Varies: 2' - 10'	*8' typical, 4' where passing lanes added	6' shoulders, 4' paved**	☑ **Left Turn Lanes	☐
Horiz. Curve Radius (Minimum)	1,146'	960'	1,146' (Match existing)	☐	☐
Max. Superelev. Rate (emax= %)	5.25%	8%	5.25% (Match existing)	☐	☐
Stopping Sight Distance (Minimum)	615' (calculated)	495'	615'	☐	☐
Max. Grade (%)	4.00%	5.00%	4.00%	☐	☐
Normal Cross Slope (%)	2.00%	2.00%	2.00%	☐	☐
Vert. Clearance (ft.)	N/A	N/A	N/A	☐	☐
OTHER CRITERIA:				**Design Variance**	
Border Area (urban)	N/A	N/A	N/A	☐	
Sidewalk Width, slope	N/A	N/A	N/A	☐	
Bike Lane Width, slope	N/A	N/A	N/A	☐	
Shared Use Path Width	N/A	N/A	N/A	☐	
Other:	N/A	N/A	N/A	☐	

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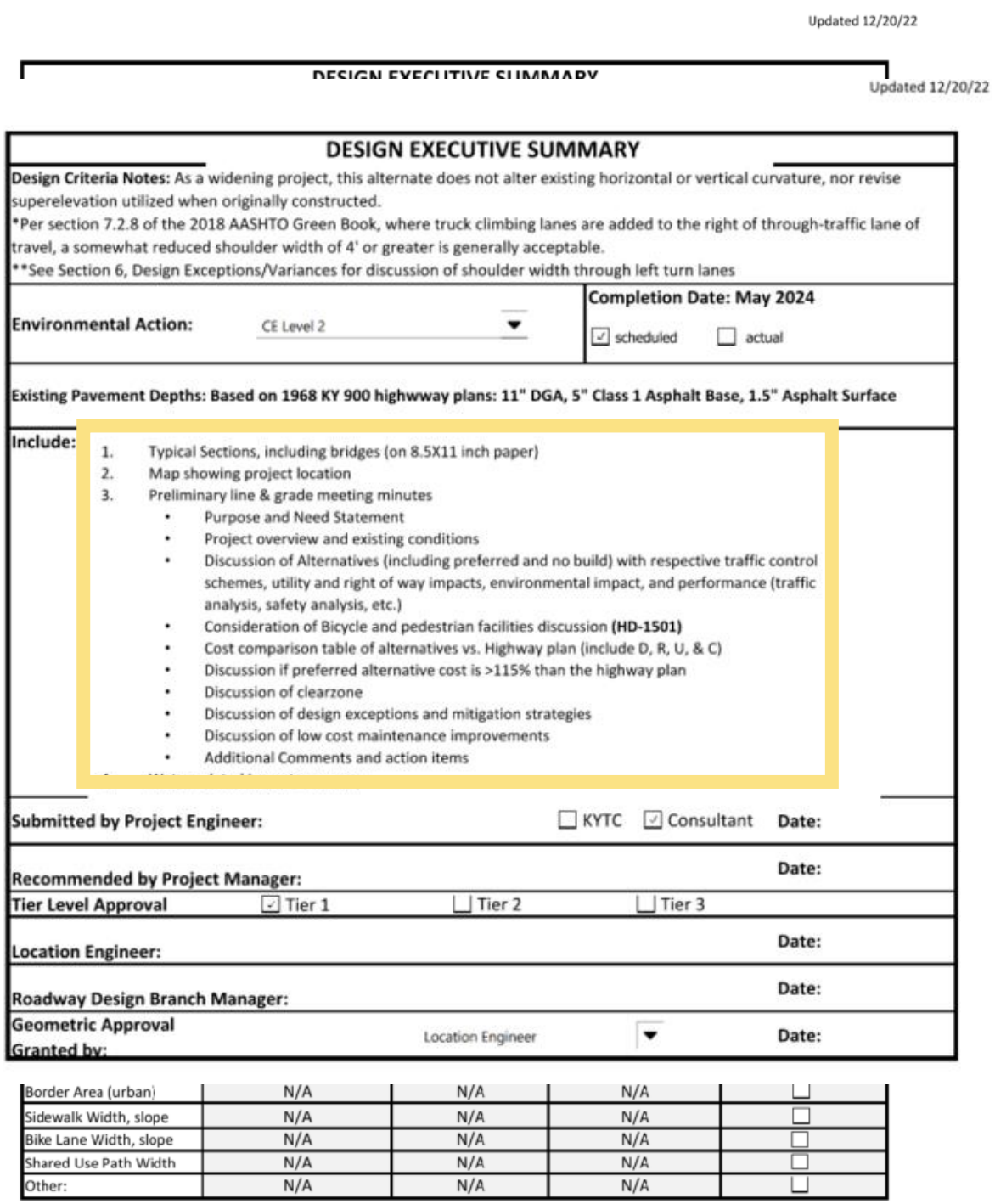
What is a DES?

- Take advantage of the DES Format
- Shouldn't be a thought after PL&G

PL&G Agenda



Updated 12/20/22

DESIGN EXECUTIVE SUMMARY

Updated 12/20/22

DESIGN EXECUTIVE SUMMARY

Design Criteria Notes: As a widening project, this alternate does not alter existing horizontal or vertical curvature, nor revise superelevation utilized when originally constructed.
*Per section 7.2.8 of the 2018 AASHTO Green Book, where truck climbing lanes are added to the right of through-traffic lane of travel, a somewhat reduced shoulder width of 4' or greater is generally acceptable.
**See Section 6, Design Exceptions/Variances for discussion of shoulder width through left turn lanes

Environmental Action: CE Level 2 — **Completion Date: May 2024** ☑ scheduled ☐ actual

Existing Pavement Depths: Based on 1968 KY 900 highwway plans: 11" DGA, 5" Class 1 Asphalt Base, 1.5" Asphalt Surface

Include:

1. Typical Sections, including bridges (on 8.5X11 inch paper)
2. Map showing project location
3. Preliminary line & grade meeting minutes
   - Purpose and Need Statement
   - Project overview and existing conditions
   - Discussion of Alternatives (including preferred and no build) with respective traffic control schemes, utility and right of way impacts, environmental impact, and performance (traffic analysis, safety analysis, etc.)
   - Consideration of Bicycle and pedestrian facilities discussion **(HD-1501)**
   - Cost comparison table of alternatives vs. Highway plan (include D, R, U, & C)
   - Discussion if preferred alternative cost is >115% than the highway plan
   - Discussion of clearzone
   - Discussion of design exceptions and mitigation strategies
   - Discussion of low cost maintenance improvements
   - Additional Comments and action items

Submitted by Project Engineer: ☐ KYTC ☑ Consultant **Date:**

Recommended by Project Manager: **Date:**

Tier Level Approval ☑ Tier 1 ☐ Tier 2 ☐ Tier 3

Location Engineer: **Date:**

Roadway Design Branch Manager: **Date:**

Geometric Approval Granted by: Location Engineer **Date:**

Border Area (urban)	N/A	N/A	N/A	☐
Sidewalk Width, slope	N/A	N/A	N/A	☐
Bike Lane Width, slope	N/A	N/A	N/A	☐
Shared Use Path Width	N/A	N/A	N/A	☐
Other:	N/A	N/A	N/A	☐

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What a DES is Not?

- The Design Executive Summary (DES) is not a Report
  - Don’t forget what is required. FACTS not fluff!
  - Explain your design decisions
  - Summarize, not the long story
- Appendix Files can be included in the submittal but should not be attached in the file.

“I am not paying per page”
– Larry Kreuger TEBM District 2

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Filling Out the Form: Federal Project

Updated 6/11/24

DESIGN EXECUTIVE SUMMARY				
County:		Item #:		
Route Number(s):		State Program #:	←	
BMP/EMP:		Federal Project #:	←	
Type of Work:		State Project #:	←	
Highway Plan Project Description:				

PROJECT AUTHORIZATION	PACKET ID: N/A

CONTRACT ID	EMARS PROGRAM CODE	AUTHORIZATION NO:
		76140 26

It is hereby ordered that the project herein described be undertaken and accomplished within the funding level authorized.

PROJECT ID	PROJECT ID NUMBER	FEDERAL PROJECT NUMBER	6 YR PLAN ITEM NUMBER	6 YR PLAN ITEM PARENT NUMBER
	056 0064 023-024 106 0064 023-028	NHPPIM0643056	05-00065	5-.-

Communication is Key, not everything is available externally

Federal Number:	0643046 Modifications: 1	SYP-Item No:	5-65.40
Project Type:	Conventional	KYTC File No:	
UEISAM:	MFCBQTH5FFK3	eMARS:	7614001U
Demo ID:		KYTC Phase:	U
Route(s):	106-I -0064-000 (32.300-35.900)	Functional System:	Interstate
Project Length:	3.6	FA System:	Interstate
Bridge No:		On NHS Y/N:	Y
Project Oversight:	Assumed/State Administered	County Name(s):	Shelby
STIP Ref:	FY 19-22 Exh. A-5 pg. 104	Congrl District(s):	4
Urbanized Area:	Shelbyville, KY	Sub-Recipient:	
Rural/Urban:	Rural, Urban		

FOtF: State Project

PM Toolbox is your friend - https://pmtoolbox.kytc.ky.gov/

Funding Source

Route

FD04 089 9001 057-059

County

Begin/End Mile Points

KENTUCKY COUNTY CODES

Also includes codes from other states

COUNTY:		COUNTY:		COUNTY:	
001	ADAIR	041	GRANT	081	MASON
002	ALLEN	042	GRAVES	082	MEADE
003	ANDERSON	043	GRAYSON	083	MENIFEE
004	BALLARD	044	GREEN	084	MERCER
005	BARREN	045	GREENUP	085	METCALFE
006	BATH	046	HANCOCK	086	MONROE
007	BELL	047	HARDIN	087	MONTGOMERY
008	BOONE	048	HARLAN	088	MORGAN
009	BOURBON	049	HARRISON	089	MUHLENBERG

PROJECT AUTHORIZATION PACKET ID: PMT-6S0U

CONTRACT ID	EMARS PROGRAM CODE	AUTHORIZATION NO:
	1811101D	18111 0

It is hereby ordered that the project herein described be undertaken and accomplished within the funding level authorized.

PROJECT ID	PROJECT ID NUMBER	FEDERAL PROJECT NUMBER	6 YR PLAN ITEM NUMBER	6 YR PLAN ITEM PARENT NUMBER
			02-80201	2-.-

PROJECT TYPE	PROJECT LENGTH	NUMBER OF BRIDGES	SYSTEMS
RECONST W/ADD LNS	1.1000 MI		

PROJECT PHASE & RESPONSIBILITY	PLANNING	DESIGN	RIGHT OF WAY	UTILITIES
	CONSTRUCTION	TITLE DEEDED TO:	MAINTENANCE	OTHER

FUNDING & TIME ACCOUNTABILITY	PARTICIPATING AGENCIES							
	FEDERAL		STATE	KYTC	LOCAL		OTHER	

REQUESTED FUNDS FOR THIS AUTHORIZATION

ITEM NUMBER	PHASE	FUND	PROGRAM	FEDERAL FISCAL YEAR	STATE FISCAL YEAR	FEDERAL APPR CODE	CURRENT FUNDING REQUEST
2-80201	D	1100	FD04		2024		$900,000.00
						CURRENT FUNDING REQUEST TOTAL:	$900,000.00

Muhlenberg **WK-9001** From MP 57.400 To 58.500 On NHS YES Description: WESTERN KENTUCKY PKY - RECONSTRUCT INTERCHANGE AT US 431 AT CENTRAL CITY (2022CCN) (2024CCR)

Type of Work: RECONSTRUCTION(O)

Bridge ID:

Item#: 2-80201.00 Parent#: 2-80201.00 Length

Plan Year: 2022 Parent Year: 2022 1.10

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Purpose & Need

- **Not** the highway plan description
- **Not** include a solution
- **Not** an afterthought
- Foundation for successful decision making
- Basis on evaluating alternatives
- Includes
  - Purpose
  - Need
  - Goals/Objectives
- Needs to be stated during:
  - Scoping Meetings
  - Alternative Reviews
  - PL&G

Purpose & Need - Purpose

- The purpose defines the transportation problem that needs to be solved.
- What is the intent for the project? What do we need to fix?

reduce congestion, Improve safety, Improve mobility, Improve Access

Widen to 4 lanes, develop auxiliary turn lane, 2+1, roundabout.

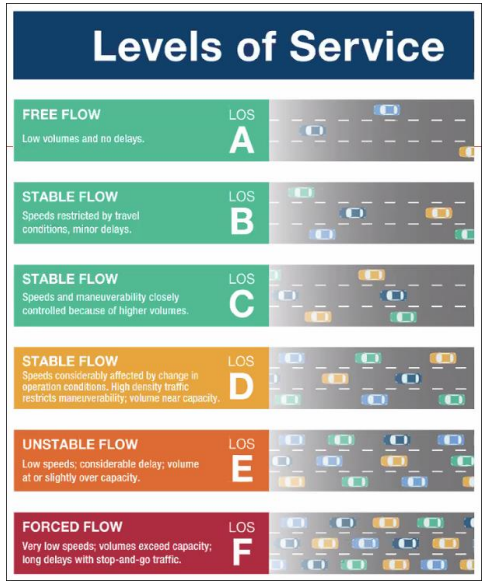
Purpose & Need - Need

- The need provides data to support the transportation problem (purpose).
- Limit the need to the issues or unsatisfactory conditions.

Safety

HSM
Highway Safety Manual
AASHTO

Operation



Congestion Mobility

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Purpose & Need – Goals and Objectives

- The goals and objectives describe other concerns/improvements that may need to be resolved to have a successful solution.
- Not all P&N will have goals and objectives.

Examples

- Avoidance or minimizing impacts to an existing feature.

- Enhancement opportunities

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PBFS – PBFD

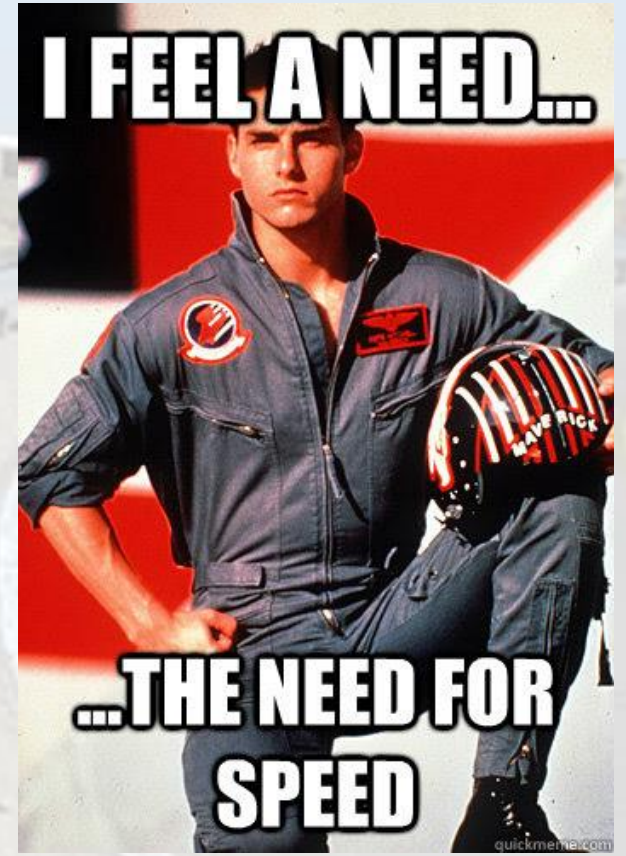
- Proper Scoping
- The majority of project corridors have geometric deficiencies. Make sure there is a need before addressing that deficiency. It could cause other issues.

Memos:

- Context Sensitive Solutions (1990's)
- Practical Solutions (2007)
- Performance Based Flexible Solutions (PBFS) (2016) – "Design Up Approach"

Design Speed

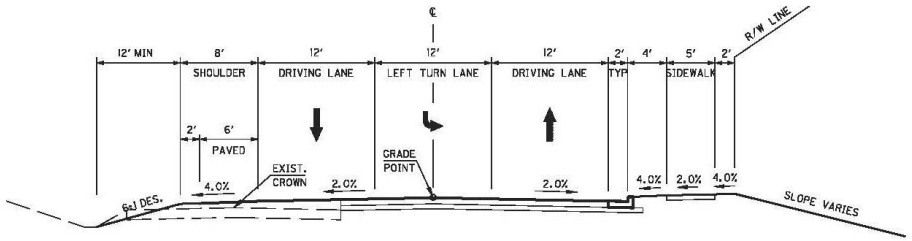
- Operating Speed/Regulatory Speed
- Design Speed
- Target Speed – Ultimate Goal



Typicals

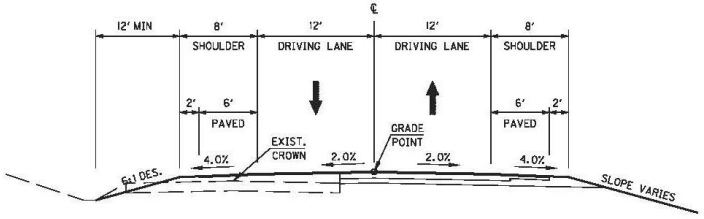
- 8 ½ x 11
- No Pavement Design

TYPICAL SECTIONS



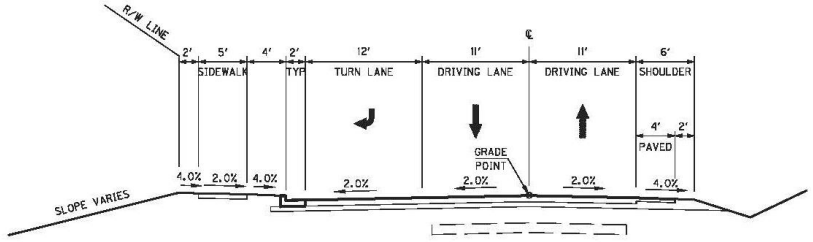
KY 11 / KY 15

– NORMAL HYBRID URBAN & RURAL 2 LANE ROADWAY WITH LEFT TURN LANE –
OVERLAY, WIDEN RIGHT, C&G RIGHT
HOLD EXISTING LEFT DITCH



KY 11 / KY 15

– NORMAL RURAL 2 LANE ROADWAY –
OVERLAY, WIDEN RIGHT



HALLS LANE (KY 2073)

– NORMAL HYBRID URBAN & RURAL 2 LANE ROADWAY WITH RIGHT TURN LANE –
OVERLAY, WIDEN LEFT & RIGHT, C&G LEFT

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Alternative Discussion – PL&G Minutes

- The goal is to include at least 2 alternatives outside of No build.
- Need at least one alternative under the overall budget
- No build can’t be the only alternative that is under budget
- Low-Cost Maintenance Improvements
  - short term quick fixes
  - maintenance projects
- Need to discuss the alternates that were discussed in Alternative Review
- Include comparables
  - ROW/Utility/Environmental Impacts
  - MOT
  - Design Exceptions/Variances
  - How they address the P&N

Low-Cost Maintenance Improvements

- Spot Improvements
- Access Management
- Rehab
- Signage/Striping
- Lane Reconfiguration
- Signal Timing
- Short-term solution

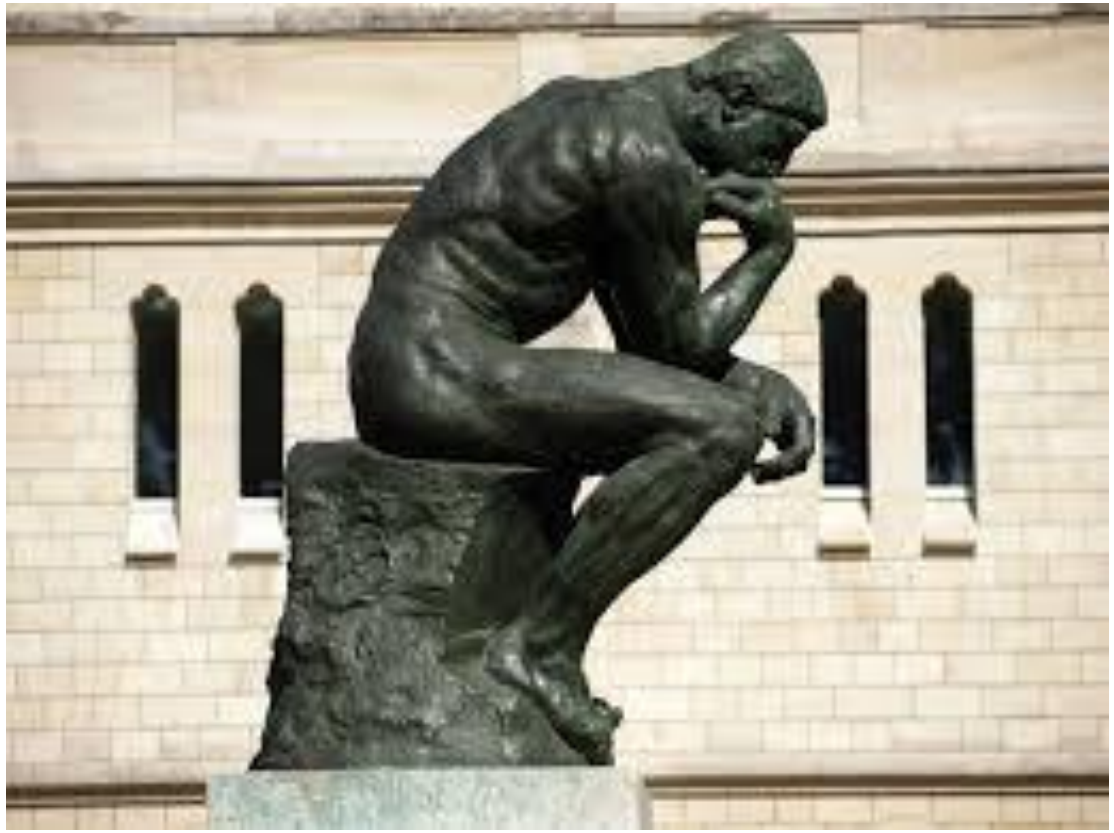
Funding Versus Cost

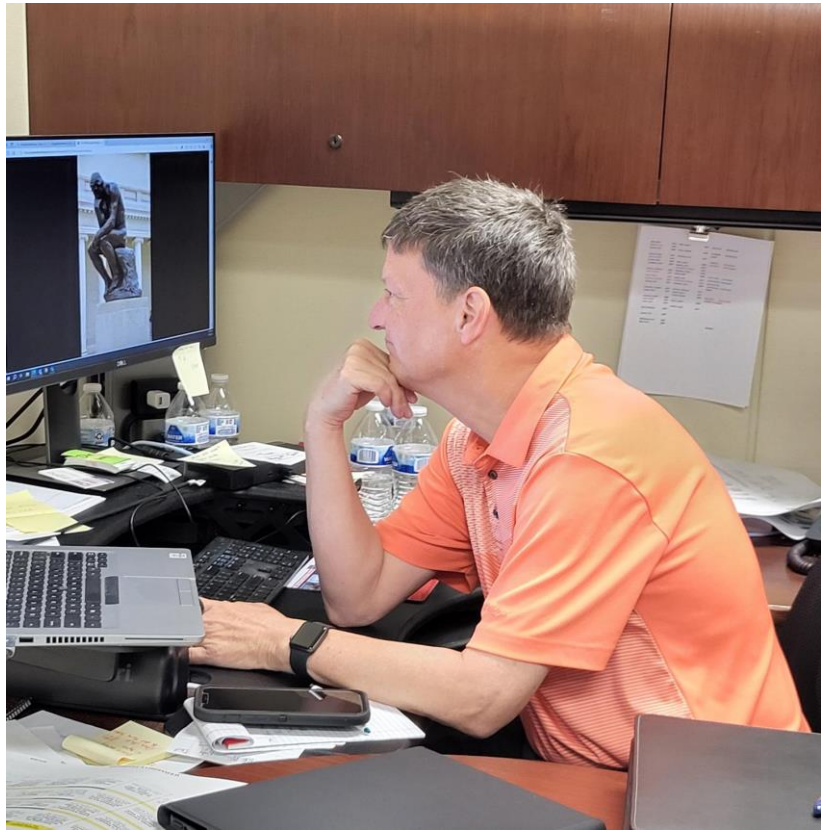
Phase	6-Year Plan	Alternate 1 (Preferred)	Alternate 2
Design	$1,930,000	$1,930,000	$1,930,000
Right of Way	$3,000,000	$1,452,238	$1,625,361
Utilities	$1,500,000	$1,822,468	$1,429,420
Construction	$12,840,000	$15,288,410	$15,703,251
Total	**$19,270,000**	**$20,493,116**	**$20,688,032**

- Contingency
- Environmental in-lieu fees
- Percentage >115%
- Alternate within Funding
- SYP - Year?

Design Exceptions: Good/Bad

"A well thought out design that does not comply with the design criteria is better than a design that merely meets the criteria and is not thoroughly evaluated." – A well-respected Philosopher





FHWA's Design Exception Mitigation Strategies

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Water Related Impact Summary

- Form is available on the KYTC Design Forms website

UPDATED: 7/7/2016

WATER RELATED IMPACTS SUMMARY

County		Route No.		Item No.	
Date		Program #			
Federal Project No.					
State Project No.					
Location Engineer					

Section 1: Impact Checklist

Complete this section for each alternative considered at the conclusion of Phase 1 design.

UPDATED: 7/7/2016

Section 2 : Impact Discussion

Complete this section for the chosen alternative. Discuss the selected alternate's influence on each of the impacts listed above. Discuss any avoidance, minimization and/or mitigation measures included in the project.

- Division of Environmental Analysis
  - Bridge Permits
  - USACE Review

Silo mentality does not make "Cylinders of Excellence"

Complex DES's

- "HSIP type" projects
  - table form
  - MP to MP
- Multiple routes
  - Each sheet has the same design geometrics
- Refer to Reports
  - Roundabout Reports
  - ICE Policy
  - IMR/IJS
- Multiple projects designed together

Guidance Updates

- Design Manual Updates
- Design Memos
  - Project Models – June 2024
  - ICE – June 2024
  - Superelevation in Shoulders – August 2024
- Schedule
- Context Classifications
- Green Book

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Quick Links

- Hwy knowledge portal - https://kp.uky.edu/
- Highway Design Manual - https://transportation.ky.gov/Organizational-Resources/Policy%20Manuals%20Library/Highway%20Design.pdf
- Highway Design Forms - https://transportation.ky.gov/Highway-Design/Pages/HighwayDesignForms.aspx
- FHWA's Design Mitigation Strategies - https://highways.dot.gov/safety/other/designing-safer-roads/design-decision-documentation-and-mitigation-strategies-design
- HIVEi – https://datamart.kytc.ky.gov/edsb_solutions/hisextracts/
- PM Toolbox - https://pmtoolbox.kytc.ky.gov/
- Enacted Highway Plans - https://transportation.ky.gov/Program-Management/Pages/default.aspx

Roadway Design – Location Contacts

- Karl Sawyer
- District 1 & District 5
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- Kenny Carrico
- District 2 & District 3
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- District 8 & District 11
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- Ben Coomes
- District 9 & District 12
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Design Executive Summaries Made Easy 10:00am