

## *Managing Scope, Schedule, & Budget*



**The New INDOT**





## Who is responsible?

- The **Project Manager** is the “point”
- He/she is always responsible
- Must effectively manage **Scope, Schedule and Budget**
  - ✓ *Deliver the project to the customer on time, within budget and within scope from conception to close*
- Meet the RFC date and get the project to Let on schedule



## Meet your Team Early and Often!

- |                            |   |
|----------------------------|---|
| ➤ Design Consultant        | ➤ Coordinator                                   |
| ➤ Program Funds Manager    | ➤ Traffic                                       |
| ➤ Area Engineer            | ➤ Pavement Design                               |
| ➤ Scoping                  | ➤ Utility / R&R Coordination                    |
| ➤ Survey                   | ➤ Right of Way                                  |
| ➤ Environmental            | ➤ Permits                                       |
| ➤ Hydrology / Geotechnical | ➤ Construction                                  |
| ➤ Hearing Coordination     | ➤ Public Information                            |
| ➤ Maintenance              | ➤ Local agency, community representatives, etc. |



## “Begin with an End in Mind”

According to:  
Stephen R. Covey, *The Seven Habits of Highly Effective People*



## What does Success Look Like?

- **Managing Project Scope** =
  - ✓ All work performed according to specifications (within original parameters)
- **Managing Project Schedule** =
  - ✓ Work Tasks and Project completed by established dates
  - ✓ “X by Y”
- **Managing Project Budget** =
  - ✓ Project completed within approved budget



## Project Management is Dynamic

- Anticipate issues / problems
  - ✓ *Look for what might derail project*
- Expect change
- Make necessary adjustments
- The “Fun is in the Fight” to succeed
- It’s a constant learning process
- Be Proactive



## Has to be a way to achieve goal/success

- Be resourceful, flexible and relentless in achieving Project Schedule Mileposts / Deliverables
  - ✓ **Keyword “relentless”**
- Follow Up, follow up, follow up with all stakeholders....



## Use Risk Management Tools in MIP

- Use Real Time Letting Fiscal Year Review Tool
- Late Report – Des Details for Active Projects (Dat4)
  - ✓ Shows which Project Mileposts are late
- Late Report – Late Activity Counts by Responsible Person
- Des with Missing Past Due CN Estimates (CGI8), etc.



## Know Your Project

- Know Engineers Assessment/Report
- Know Consultant Contract
- Know Project Schedule
- Attend Field Checks / Call Meetings
- Know Environmental Document
- Know Deliverables
- Know Project Cost Estimate and Update



# Don't Keep SPMS Schedule Secret

DATE: 3/13/2009 08:54:01 AM INDOT FULL PROJECT LISTING

COUNTY: 000701 LEAD: Y  
 RIN # 204 PROGRAM CLASS: 3 Major Motor Project  
 CONTRACT # R 3097 UNBUNDLED AREA: Not Applicable

SPONSORED BY: Indiana Department of Transportation LOCATION: From SCL of Roubidou to I 42 mile N of N on SR 227121 at Whitewater River  
 DESIGNED BY: Crawford District NORTH BENCHMARK: 03.21  
 FIRM A CONTRACT #: 710 WORK CATEGORY: Major Permanent Project (MPP)  
 DESIGNED METRIC: No FEDERAL PROJECT CODE: Subtotal  
 SPECIAL FUND CATEGORY: WORK TYPE: Permanent Improvement LAND ACQUISITION INFORMATION  
 CONGRESSIONAL DISTRICT(S) FROM: R 19-24 TO: R 21-45 ESTABLISHMENT RCD: TRD # OF PARCELS: 60  
 DISTRICT: Crowsville-3A COUNTY: Wayne LENGTH: 3.5 miles AUTHORIZED PROGRAM YEAR: 2013  
 PROJECT NAME: Gregory A. Griffin PROGRAM MGR: Tom Singley

PROJECT MILEPOST	ESTIMATE START *	ESTIMATE FINISH *	PERSON RESPONSIBLE	PHONE	UPDATES DATE	UPDATES USER		
Project Authorized	08/15/2004	C	09/15/2004	C	Erin Decker, Planning & Production	317232137	01/22/2009	EXISTING
Authority Funds For PE	01/29/2007	C	03/29/2007	C	Sharon Swanson, Project Accounting	317232201	02/27/2007	PENDING
Engineering Assessment	03/14/2006	C	03/14/2007	C	F.R.B. Eckstein, American Infrastructure, Inc.	317474586	03/21/2007	PENDING
Final Environment Document Approval	12/26/2007	C	04/01/2009	U	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	07/18/2008	EXISTING
Design Review	06/05/2007	C	03/23/2009	C	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	05/02/2008	EXISTING
Provisionary Plans	12/26/2007	C	05/13/2008	C	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	03/23/2009	EXISTING
Provisionary Field Check	03/22/2008	C	02/12/2009	U	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	03/23/2009	EXISTING
Plans To-Bidding	04/01/2009	R	05/01/2009	R	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	07/18/2008	EXISTING
Hold Public Hearing	05/01/2009	L	06/01/2009	L	Kathleen Pritchard, Environmental Planning, and En-	317232202	07/18/2008	EXISTING
Working Construction	04/01/2009	U	01/01/2010	L	Kathleen Pritchard, Environmental Planning, and En-	317232202	03/22/2009	EXISTING
Soils Investigation	05/12/2008	C	11/01/2008	C	John Hladik, Materials & Test Division	317410721	03/22/2009	EXISTING
Design Approval	03/18/2009	U	03/01/2010	L	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	01/22/2009	EXISTING
Plans To R/W	03/18/2009	U	02/18/2009	L	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	01/22/2009	EXISTING
R/W Abandoning	03/18/2009	C	04/01/2009	U	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	03/23/2009	EXISTING
R/W Engineering	04/01/2009	L	01/01/2010	L	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	03/23/2009	EXISTING
R/W Assessment	03/01/2010	L	02/15/2011	L	Robert Swanson, Accounting	317232203	03/23/2009	EXISTING
R/W Negotiation	03/01/2010	R	04/01/2011	R	Robert Swanson, Accounting	317232203	03/23/2009	EXISTING
R/W Close	04/01/2011	U	04/01/2011	L	Alan B. Covert, Land Acquisition Division	317232204	07/16/2008	EXISTING
Final Field Check (R/W)	05/01/2010	U	11/25/2010	L	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	03/23/2009	EXISTING
Permits Approval	11/01/2010	U	07/12/2011	L	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	03/23/2009	EXISTING
Plan Issue	11/01/2011	R	12/01/2011	R	MARK MURPHY, Design Division	317232205	04/14/2008	EXISTING
Utility Coordination	09/15/2010	R	06/15/2011	R	Jim Lovin, Farris, Gentry & Associates, LLC	317898137	03/12/2008	OGRRFIN

Page 1 of 2

Railroad Coordination	12/12/2010	R	06/15/2011	R	Michelle Lovell, Crawford District	317407418	05/16/2008	EXISTING
Ready For Contracts	02/12/2009	R	08/12/2011	R	Larry Yeager, Crawford District - (New)	317407413	04/14/2008	EXISTING
Letting	*****	R	*****	R	April L. Schleming, Planning & Production	317232206	08/12/2008	EXISTING
Contract Award	*****	U	*****	L	Tom McCaughey, Project Accounting	317232141	04/14/2008	EXISTING
Final Evaluation	*****	U	*****	L	April L. Schleming, Planning & Production	317232206	04/14/2008	EXISTING



# Designing To A Budget

Shakeel Baig, PE, MBA  
 Director of Production  
 INDOT, Crawfordsville District

Contact: 765.361.5242  
 sbaig@indot.in.gov



## Designing To A Budget

### ➤ What is a Budget?

- ✓ List of all planned *expenses* and *revenues*
- ✓ Definition

– A budget is a financial tool that provides detailed ***tracking*** and ***monitoring*** of expenses. Expenses are capped to avoid spending more money than is available and/or to provide *better utilization* of available funds



## Designing To A Budget

### ➤ Budget - a financial tool

- ✓ A tool to manage & track funding
- ✓ Results in a successful fiscal year when coupled with a good plan
- ✓ Identify fiscal limits
- ✓ Helps us make more effective use of our tax payer's money



## Designing To A Budget

- The key to successful budgeting is both flexibility and inflexibility
- Fixed Expenses should be changed to programmable expenses to create a good budget
  - ✓ Should do cash flow on multi year projects
- Fiscal responsibility is to form a sound and workable budget and stick to it



## Designing To A Budget

- History – used to do business
  - ✓ Lack of coordination for scopes
  - ✓ Enough time was not spent in creative thinking
  - ✓ Old thinking - money is always available
  - ✓ Cash Flow method was not widely used
  - ✓ Thinking outside the box was not common





## Designing To A Budget

### ➤ History – used to do business (Cont'd)

#### ✓ Lack of coordination for scopes

- Right people
  - Road/Bridge designers
  - Planners
  - Permitting people
  - Surveyors
  - Utility people
  - Real Estate people
  - Construction
  - Maintenance



## Designing To A Budget

### ➤ History – used to do business (Cont'd)

#### ✓ Old thinking - money is always available

- Projects were moved to outer years without understanding the financial impact
- Scopes were changed/modified on regular basis
- This was resulting in eliminating some other really needed projects



## Designing To A Budget

### ➤ History – used to do business (Cont'd)

#### ✓ Cash Flow method was not widely used

- Projects were funded in one year even if the work was over a number of years



## Designing To A Budget

### ➤ History – used to do business (Cont'd)

#### ✓ Outside the box

- Regular design & construction VS. Design Build
- Using techniques like Microsurfacing, etc
- Letting projects over multiple months
- Publishing 18 month letting list
- Planning and designing projects keeping MOT cost in mind



## Designing To A Budget

- Projects must be delivered on time
- INDOT's program is 'fiscally constrained'
  - ✓ If a project exceeds allocated funding, another project(s) must be moved out or eliminated
- Projects must compete for limited funding



## Designing To A Budget

- Project development is now an iterative process
- Design exceptions should be sought when appropriate
  - ✓ Be especially watchful for design criteria that add significant costs with minimal anticipated benefits
  - ✓ Often, a project cannot be designed to meet all 'desirable' criteria and remain within allocated funding given the rapid rise in construction costs



## Designing To A Budget

- Very important to identify environmental, utility, traffic control, right of way and other issues at the beginning of project development
- These items can add substantial cost and delays to a project and can result in reductions in the project scope of work during the project development process



## Designing To A Budget

- Present way of doing business
  - ✓ Right people for right jobs
    - Since reorganization, people are placed in areas according to their expertise
  - ✓ New way of identifying projects
    - Stakeholders with internal and external customers are involved
  - ✓ Scopes are created per needs and not per wishes
    - Projects are ranked according to real needs



## Designing To A Budget

- Present way of doing business (Cont'd)
  - ✓ All steps are transparent
    - 18 months letting list is published
      - This helps contractors to staff accordingly
      - People and business owners know in advance of their projects
      - Scopes and funding are made known to internal and external customers
  - ✓ Projects are distributed over different months
    - This is helping both INDOT and contractors to keep cost down



## Designing To A Budget

- Present way of doing business (Cont'd)
  - ✓ Project Manager positions are created
    - These people are the links between the various departments and customers
  - ✓ Better communication
    - Creation of communication director's position
    - Thru this position and PMs, there is always a continuous and direct communication between stakeholders, agencies, consultants, contractors and the public
    - Everyone is informed of project's status
    - Regular meetings are held between responsible parties



## Designing To A Budget

- Present way of doing business (Cont'd)
  - ✓ Right and experienced people are involved in scoping of projects
  - ✓ Schedules are set once a project is active
  - ✓ People related to the delivery of project are held responsible for delivery on time
  - ✓ Multiple checks & balances are created to make sure that the project stays on track and within budget



## Designing To A Budget

- Present way of doing business (Cont'd)
  - ✓ Extra attention is paid to deliver projects within promised time frames...time is money
  - ✓ PMs are responsible to deliver projects within allocated budget
    - In case of unexpected issues, they work with all parties to find common grounds to deliver the project of the same quality and standards
    - If the result is an increase in cost, then projects come under the microscope for further evaluation



## Designing To A Budget

- Present way of doing business (Cont'd)
  - ✓ Special training
    - Project management
    - Tracking tools
    - Customer service
    - Multi-tasking



## Designing To A Budget

- Present way of doing business (Cont'd)
  - ✓ Extra bells and whistles no longer available
  - ✓ Maintaining roads and bridges
  - ✓ Reorganization sent responsibilities to districts
    - Idea was to get closer to the customer base
    - Districts know better the needs of people in that area
    - Successful results



## Designing To A Budget

### ➤ Conclusion

- ✓ Times have changed...revenues are down
- ✓ Need to make sure we design per needs and available funding
- ✓ Stay within budget and scope
- ✓ Evaluate if project can be trimmed
- ✓ Do we need total replacement
- ✓ Will RS take care of the problem



## Designing To A Budget

### ➤ Conclusion (Cont'd)

- ✓ Do we need 4R work
- ✓ Cash Flow
- ✓ Communication
- ✓ Right people
- ✓ Making sure all parties are working towards common goal
- ✓ Ask "What if" Questions
- ✓ Make sure deadlines are met, otherwise cost will go up





## Scheduling Projects Using Primavera and SPMS Project Scheduling Data Interface



### Major Differences Between SPMS and Primavera

<p style="text-align: center;"><b>SPMS</b> (Schedule / Project Management System)</p>	<p style="text-align: center;"><b>Primavera</b> (P6)</p>
<ul style="list-style-type: none"> <li>•Program Management.</li> <li>•Mainly used for Data Browsing.</li> <li>•Future Dates can be entered manually.</li> <li>•<b>Reactive</b> Problem Management Responding to problems, rather than anticipating them.</li> </ul>	<ul style="list-style-type: none"> <li>•Project Management.</li> <li>•Mainly used for Data Analysis and Scheduling using Critical Path Method (CPM).</li> <li>•Future Dates by calculations only using CPM.</li> <li>•<b>Proactive</b> Problem Management Identifying and resolving problems and known errors before Incidents occur.</li> </ul>



	SPMS	Primavera
1. CPM (Critical Path Method)	No	Yes
2. Calculating Total Float, Free Float	No	Yes
3. Ability to determine Driving and Critical Activities	No	Yes
4. Gantt Chart (to help finding errors)	No	Yes
5. Relationship Type: FS: Finish to Start ; FF: Finish to Finish, SS: Start to Start ; SF: Start to Finish	FS only	All
6. Ability to use Lags between Activities	No	Yes
7. Retain the Logic of the Relationship	No	Yes
8. "What If" Analysis?	in MIP	Yes
9. Duration Types	Original	Original, Actual, Remaining and At Complete
10. Ability to determine the activity percent complete	in MIP	Yes
11. Ability to maintain multiple schedule baselines during the life of a project	No	Yes
12. Error Reports such as Out of Sequence Activities	No	Yes
13. Multiple Reports Designed by users	In MIP (templates)	Yes (free designs and templates)



**Update Level From Primavera to SPMS**

If an activity in Primavera is Contains:	Then, the update is on:	SPMS Dates of the Activity will be updated in:
No Contract, No Des Numbers	Corridor Level	All Contracts and Des Numbers in the Corridor
Contract Number	Contract Level	All Des Numbers in the Contract
Contract and Des Numbers	Des Number Level	Only the Des Number



### Linking Process Between Primavera and SPMS

Primavera Dates					Dates Shown in SPMS						
SPMS Code	Primavera Activity Names	Start	S	Finish	S	SPMS Code	SPMS Description	Start	S	Finish	S
042	Notify Utility to Prepare Relocation Plans	8-Dec-08		12-Dec-08		042	Project Plans sent to Utility	12/8/2008	L	12/12/2008	L

Primavera Dates					Dates Shown in SPMS						
SPMS Code	Primavera Activity Names	Start	S	Finish	S	SPMS Code	SPMS Description	Start	S	Finish	S
035	Publish and Distribute Draft Environmental Document	10-Oct-08	A	11-Nov-08		035	Draft Environment Document Approval	10/10/2008	C	11/11/2008	L

Primavera Dates					Dates Shown in SPMS						
SPMS Code	Primavera Activity Names	Start	S	Finish	S	SPMS Code	SPMS Description	Start	S	Finish	S
155	Appraisal Problem Analysis	1-Feb-10		12-Mar-10		155	R/W Appraising	2/1/2010	L	9/28/2010	L
	Prepare Appraisals/Valuations	15-Mar-10		27-Aug-10							
	Concurrent Review of Appraisals by INDOT	13-Apr-10		28-Sep-10							

Earliest Start Latest Finish



### Linking Process Between Primavera and SPMS

Primavera Dates					Dates Shown in SPMS						
SPMS Code	Primavera Activity Names	Start	S	Finish	S	SPMS Code	SPMS Description	Start	S	Finish	S
026	Monument Reconnaissance	28-Dec-07	A	2-Jan-08	A	026	Ground or Aerial Survey	12/28/2007	C	4/4/2008	C
	Data Collection (Ground) - 2 Crews	31-Dec-07	A	15-Feb-08	A						
	Centerline Review	3-Jan-08	A	10-Jan-08	A						
	Centerline Monumentation / Establishing Benchmarks	3-Jan-08	A	15-Feb-08	A						
	Develop Route Plat	15-Jan-08	A	3-Apr-08	A						
	Survey Book Review	10-Mar-08	A	31-Mar-08	A						
	Electronic Data Review	24-Mar-08	A	2-Apr-08	A						
	Survey Transmittal	4-Apr-08	A	4-Apr-08	A						

Primavera Dates					Dates Shown in SPMS						
SPMS Code	Primavera Activity Names	Start	S	Finish	S	SPMS Code	SPMS Description	Start	S	Finish	S
032	Perform Subsurface Utility Engineering (SUE)	23-Apr-08	A	27-Jun-08	A	032	Geotechnical Subsurface Investigation	4/23/2008	C	6/19/2009	L
	Field Investigation	2-Mar-09		24-Apr-09							
	Laboratory	27-Apr-09		22-May-09							
	Engineering	25-May-09		19-Jun-09							

At least one activity Started Not All activities Finished



### Current Projects in Primavera Linked to SPMS

Project ID	Project Name	Responsible Manager
001	Corridor 001 - West Leg of 465	OPM-C, John Pangallo
002	Corridor 002 - I-465 NE	OPM-M, Shelly Gottschalk
006	Corridor 006 - I-64 Interchange with SR 63,SR 64	OPM-Q, Kevin Hetrick
009	Corridor 009 - I 65 Interchange with SR 58	OPM-P, Eryn Fletcher
036	Corridor 036 - Terre Haute 641 Bypass	OPM-P, Eryn Fletcher
083	Corridor 083 - SR 2	OPM-O, Trevor Mills
157	Corridor 157 - SR 53	OPM-N, Kimberlee Parker
192	Corridor 192 - SR-8 in Dekalb County	OPM-Q, Kevin Hetrick
218	Corridor 218 - Fort to Port (US 24)	OPM-N, Kimberlee Parker
231	Corridor 231 - US 31 Plymouth to South Bend	OPM-G, Trevor Mills
249	Corridor 249 - US 41	OPM-O, Trevor Mills
296	Corridor 296 - US 31 Kokomo Bypass	OPM-B, Tim Muench
320	Corridor 320 - SR 23 in South Bend	OPM-E, Gary Pence
390	Corridor 390 - US 33	OPM-Q, Kevin Hetrick



### Current Projects in Primavera , Ready to be Linked to SPMS

Project ID	Project Name	Responsible Manager
004	Corridor 004 - I 465 at SR 37 (S jct) Interchange Modification	OPM-K, Jim Earl
007	Corridor 007 - I-64 in Floyd County	OPM-F, Kenny Franklin
021	Corridor 021 - I 69 at SR 67 and SR 32	OPM-B, Tim Muench
062	Corridor 062 - SR 135 in Johnson County	OPM-F, Kenny Franklin
064	Corridor 064 - SR-14 in Allen County	OPM-F, Kenny Franklin
098	Corridor 098 - Hoosier Heartland (SR 25)	OPM-K, Jim Earl
120	Corridor 120 - SR 32	OPM-C, John Pangallo
138	Corridor 138 - SR 39	OPM-O, Trevor Mills
172	Corridor 172 - SR-61 in Warrick County	OPM-F, Kenny Franklin
206	Corridor 206 - US20 in Elkhart County	OPM-F, Kenny Franklin
208	Corridor 208 - US 20 : Ramp from EB US 20 to EB 20/35	OPM-B, Tim Muench
212	Corridor 212 - Huntington/Jasper By-Pass	OPM-P, Eryn Fletcher
259	Corridor 259 - US 50 in North Vernon	OPM-E, Gary Pence
266	Corridor 266 - US 52 in Marion and Hancock Counties	OPM-E, Gary Pence



## Old INDOT Thinking

- The scope said the cost should be \$5 million but our estimate is \$7 million that is ok INDOT will come up with the extra money

**NO!!!!**



## Old INDOT Thinking

- The schedule says the RFC date is May 8, 2009 but we need an extra 3 weeks to get everything; that is ok INDOT will come up with the extra time or they will move it out.

**NO!!!!**



## Old INDOT Thinking

- The scope says we have to do it this way so that is what we will do. We don't have to think or look for better solutions. Engineering isn't in our contract we just suppose to follow the scope.

**NO!!!**



## Old INDOT Thinking

- The scope says the contract should be \$7 million but our latest estimate is only \$4 million; we will keep it at \$7 million so we will look good at letting.

**NO!!!**



## Old INDOT Thinking

- The scope says the contract should be \$7 million but our latest estimate is only \$4 million; we need to call the City/County to see if we can add something else to the project and spend the extra money!

**NO!!!**



## Old INDOT Thinking

- INDOT says they need the added travel lanes for this project but our updated traffic numbers don't show this but we will design them anyway because that is what the scope.

**NO!!!**



## Old INDOT Thinking

- INDOT says they need the added travel lanes for this project but our LOS in design year is a C if we don't do anything it is a D but the scope says design the lanes so we will.

**NO!!!**



## Old INDOT Thinking

- We know and work for the local community and they want us to recommend to INDOT to add some additional landscaping and beatification items to the contract and we have the budget for it so we will just add it and see if INDOT minds.

**NO!!!**





## Old INDOT Thinking

- The Project Manager wants to be updated on this project monthly and wants to know our schedule and latest estimates. We haven't done that in the past and/or when I worked for INDOT a long time ago we didn't want that so we don't need to do it now!

**NO!!!**



## Old INDOT Thinking

- We don't need to include the Project Manager on this; they are too busy we will just do it and they will be ok with it.

**NO!!!**

Please keep us involved we know the big picture for the project and we are the owner!



## INDOT Thinking

- Your company was hired to do the Environmental, R/W, and design; you are responsible for the Environmental, R/W, and design so if you don't like something in Environmental don't call us to complain go talk to your team. Also we gave you a time schedule and you agreed to do it don't come to us and tell us near the end that one of your team can't make it.



## INDOT Thinking

- Your company was hired to do the Environmental, R/W, and design; you are responsible for the Environmental, R/W, and design. So if you have a problem with any of these aspects don't come to us and say we have a problem unless you have a solution as well. We hired you for your expertise use it. We will have our own solutions as well but we expect you to have a few of your own and not just count on us.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- US 40 We designed a new storm sewer for a urban project. We are matching crowns and the sewer is getting very deep.

### New Potential Solution

- Once the storm sewer was over 15' deep, we redesigned the sewer by matching flow lines instead of crowns bringing the sewer up several feet. Saving construction costs and time.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- We are doing a job in a developing urban section but the current scope says our design speed should be 50 mph. This will result in additional R/W and larger clear zones.

### New Potential Solution

- Work the Project Manager and District Traffic to see if the design speed can be reduce if the area is developing or is developed. This will save in R/W, utility relocations and a smaller clear zone



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- We are doing a job in a urban section but the current scope says to use open ditches for stormwater. This will result in additional R/W.

### New Potential Solution

- Work the Project Manager, Office of R/W and Central office Hydraulics to see if would be cheaper to use steeper slopes, walls or enclosed drainage to reduce the R/W.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- We are designing a new alignment road we need to use 84' medians

### New Potential Solution

- We can use narrower medians where we do not have issues with intersections. The medians can be widened out at the intersections to allow for turning trucks but keep the narrower median in less critical areas. We did a study for I-69 and safety was not an issue for the narrow median.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- Scope stated that we need overpasses for RR.

### New Potential Solution

- Looking at number of trains per day and talking to the local community it was determined that at grade crossing would work.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- INDOT policy recommends not to place storm sewers under pavement

### New Potential Solution

- After the storm sewer was designed and it was determined that several major utilities would have to be relocated due to the storm sewer. The project is located in a shallow bed rock area. The relocation of the utilities would increase the project by over \$10 million. It was determined to relocate the storm sewer under pavement to reduce the utility relocations.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- US 35; Scope of the project required added lanes and improved intersections.

### New Potential Solution

- After laying out the proposed project the R/W take was so large it would damage the community; looked at the latest traffic counts, talking to the community and it was determined to reduce the project to intersection improvements.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- We need a wetland or stream mitigation site. INDOT and the consultant would look for a small site and try to design a mitigation site. Success rate was very low and it didn't really help the environment.

### New Potential Solution

- Instead of trying to find a small site for our project mitigation or trying to squeeze in along the road (which creates a maintenance problem) work with either IDNR or local community to build a wetland in their park or buy land next to the park to extend it and add a wetland.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- We are working in an urban area and adding lanes to road we need 5' of R/W which will take parking spots and could make the business not have enough spots to meet ordinance.

### New Potential Solution

- Use small retaining walls to reduce the R/W foot print. Yes walls cost more but if you have to take parking and damage a business you would most likely end up having a total take and thus more money for the project in R/W.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- The County/community requires detention for additional runoff on an added travel lanes project. Buy additional R/W and build a pond or build an underground detention pond.

### New Potential Solution

- Often our additional runoff is small so we should talk to the County/community about providing funds for downstream improvements or working with them to build a regional pond.



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- The project is in a urban section with expensive R/W and you are doing added travel lanes. The current scope says 12' lanes.

### New Potential Solution

- Since it is in a urban section look at reducing some if not all lanes to 11' also look at dual left lane width. Need to keep in mind number of trucks



## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- The original project called out total pavement replacement.

### New Potential Solution

- Looking at the pavement and talking to the district and pavement design; the pavement is in good shape. So instead of replacement look at either micro surface or rehabbing the existing pavement and doing if needed the widening.





## Examples for Keeping a Project On Time and On Budget

### Old Problem and solution

- We need 20' of new R/W. It is easier to take it from both sides of the road. We will have plenty of time for R/W

### New Potential Solution

- Buy R/W from just one side thus reducing the impacts to utilities and cutting in half the number of parcels we have to buy and thus saving time for the R/W process



## NEW INDOT Consultant Thinking

- Review of utility Impacts and existing easements. It is recommended that the utilities provide all recorded easements to the designer before the stage 2 submittal along with any clearance requirements and depth of utilities.



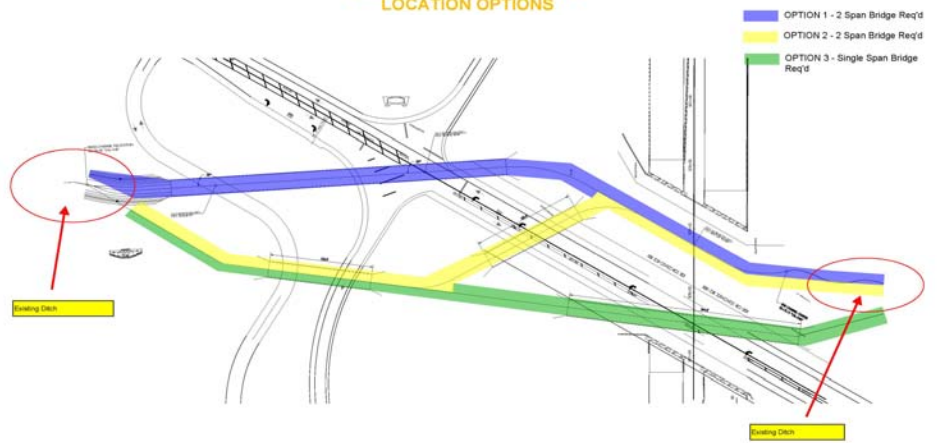
## NEW INDOT Consultant Thinking

- Your company was hired to do the design but we are still the OWNER; so use us and keep us inform; remember we know the big picture for the project and the State.



## US 31 Hamilton County

### LINDLEY DITCH CHANNEL LOCATION OPTIONS





## US 31 Hamilton County

- Option 1 followed the existing stream. The existing crossing at SR38 was by the use of slab bridge. The option put in a culvert and required regrading of the stream all the way to end. The permitting is based on impacts to the stream. The original design thought option one was required because it keep the stream in about the same location as the original stream. But in reviewing the design the entire stream length was impacted. The new culvert is an impact to the stream and the regrading of the stream along SR 38 is also an impact. Due to the large length of impacts this permit would require a individual permit and would really be no different if the steam was realigned. With this in mind we decided to look at these alternatives to help our reduce our construction costs. The original design also made it difficult to maintain the drainage for the stream since it was on essentially the same alignment as the old ditch. This ditch is also a legal drain.



## I-70 HMA Overlay, Functional, from 0.39 mi. W of SR 3 to 0.32 mi. W of SR 1 Wayne and Henry Counties DES # 0501236



Project Location



I-70 HMA Overlay, Functional, from 0.39 mi.  
W of SR 3 to 0.32 mi. W of SR 1  
Wayne and Henry Counties  
DES # 0501236

- Project Overview:
  - ✓ Deteriorating Pavement , Improve Safety and Life of Pavement, Smooth Riding Surface
  - ✓ Ramps State Road 3 & Wilbur Wright Road
  - ✓ 3 R Design Standards
  - ✓ HMA Overlay some 14 miles
- Programmed Budget Estimate \$7,000,000
- *“Rush Rush Rush” Consultant Project*



## Pavement Design Parameters

- Mainline, inside shoulder pavement: 2 inches Surface 5,76, 12.5 mm over 2 inch Intermediate 5, 76 12.5 mm with 2 inch milling
  - ✓ SR 3 Ramp (Median Barrier and Wall Section) 1.5 inches Surface 5, 76 9.5 mm with 1.5 inches milling
  - ✓ Wilbur Wright 2 inches Surface 5, 76 12.5 mm with 2 inches milling



## Pavement Design Parameters cont.

- Mainline and ramp shoulder: 2 inches Surface 1, 64, 12.5 mm with no milling (outside shoulder)
- Replace Underdrains and Underseal as needed



## *Let Me Explain!*

- RFC target date 10/08/2008
- Did not have Preliminary Plans until 7/17/2008
- Went ahead with PFC / field inspections on 7/29-30/08
  - ✓ Scope Creep issues identified
- PFC Plans approved 8/05/08



## *Let Me Explain! cont.*

- **Design Approval Plans** submitted 08/29/08 (CN Cost Estimate at \$12.5 Million); revisions began 9/04/08, approved 9/17/08
- **Final Plans Check Prints** submitted 9/10/08, approved 9/17/08
- **IPOC CN Cost Approval** 9/16/08 (CN Cost Estimate reduced to \$8.7 Million)
- Final Tracings submitted 9/26/2008, approved 10/01/08



## I-70 HMA Overlay, Functional, from 0.39 mi. W of SR 3 to 0.32 mi. W of SR 1 Wayne and Henry Counties DES # 0501236 **Solutions**

- Mainline and ramp pavement 1.5 inch Surface 5,70, 9.5mm over 2 inch Intermediate 5, 70 12mm with 2 inch milling
- Mainline and ramp shoulder is 1.5 inch Surface 1, 64, 9.5mm with no milling (both outside and median side)
- Median side Underdrains deleted except where deep patching due to subgrade drainage problems
- No Underseal



I-70 HMA Overlay, Functional, from 0.39 mi.  
W of SR 3 to 0.32 mi. W of SR 1  
Wayne and Henry Counties  
DES # 0501236 **Solutions cont.**

- 54 inch pipe under Dublin Pike deleted
- HMA only and no concrete treatment on SR 3 ramp
- Project estimate lowered to \$8.7 Million and approved by IPOC 9/16/2008
- MOT 8pm to 6am
- Met RFC for 10/08/2008
- Let for \$8.4 Million 02/11/2009



## Lessons Learned

- Field Checks discover issues
- The more people who review your plans, the more errors can be identified and fixed
- Eliminate **Scope Creep** always
- When running out of time, find ways to do things **Concurrently**



## Lessons Learned (cont.)

- If the project goes over budget, resize it
- Seek help from superiors and experts
- Be diplomatic even if it hurts
- Put it in writing/document
- Don't give up if you want to win
- *"It's not over till it's over"- and it's never over*



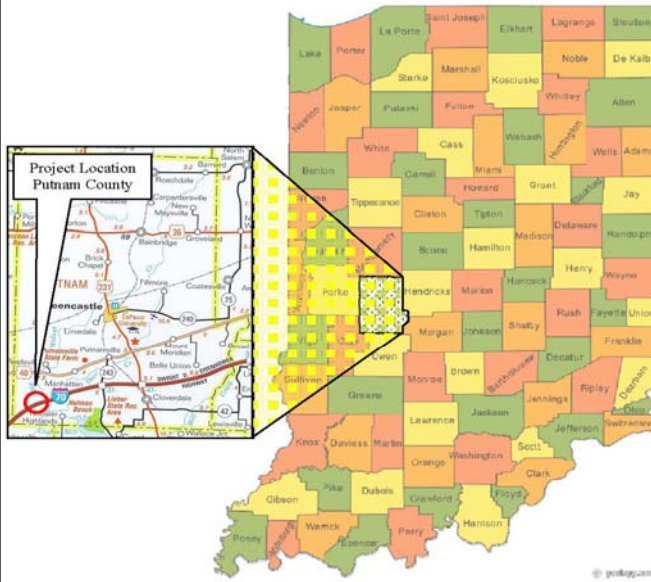
## Designing To A Budget

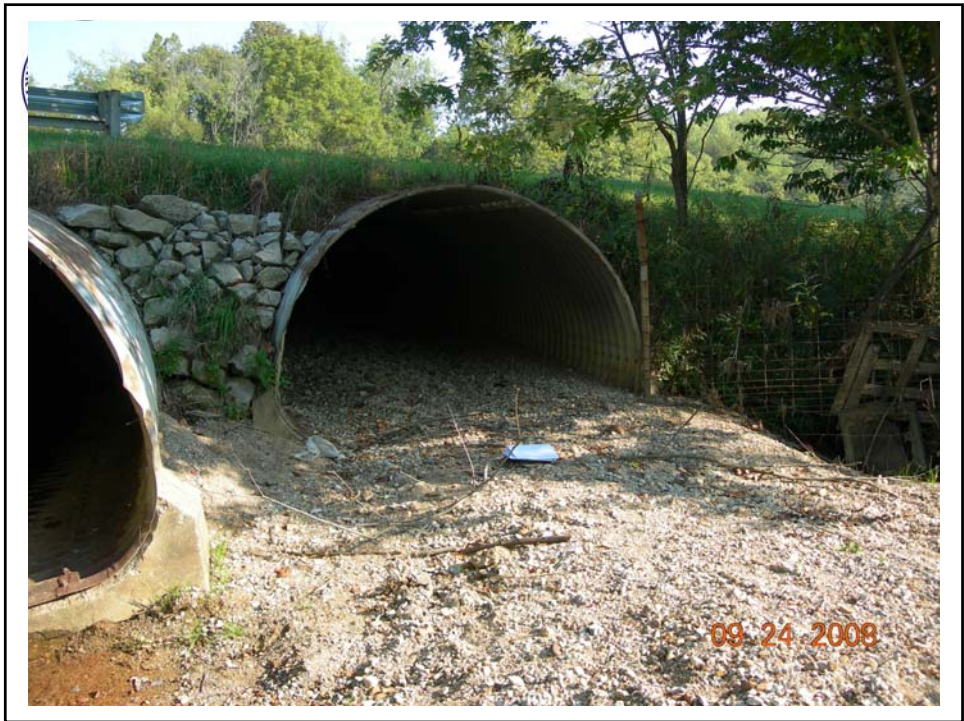
- Examples
  - ✓ Des 0801047 I-70 – bridge replacement; 6.5 miles west of SR243, Putnam Co.
  - ✓ SR246



DES: 0801047  
Emergency Flood Relief Project  
I-70 Bridge Replacement  
Putnam County

➤ Existing – twin, multi-plate arch under fill  
➤ June '08 flood damage:









## Designing To A Budget

### ➤ I-70 fix

#### ✓ Temporary fix –

- Pavement patching
- 55 cys flowable fill placed in, around, and in front of the damaged arch to prevent additional scouring

#### ✓ Permanent fix – replacement with 24' x 8' 3-sided reinforced concrete culvert

- Compressed timeline –
  - July – Scope complete
  - August – Survey complete
  - October – Tracings submitted



## Designing To A Budget

### ➤ I-70 fix

#### ✓ Challenges

- MOT
  - Interstate Lane Closure Policy – required two lanes open Friday thru Sunday; Queuing analysis projected over 2 mile long backups on Friday and Sunday afternoon
  - Several options
    - » Typical crossover – expensive due to an existing overpass located 400 ft west of the project which required the western crossover to be located further away requiring additional widening; In order to maintain 2 lanes – the entire median except for 8 ft would have to be paved between the crossovers



## Designing To A Budget

### ➤ I-70 fix

#### ✓ MOT

- Several options (continued)
  - Shared runaround - similar to a stretched out single crossover with a tangent section centered in the middle of the median but utilizing this a runaround for each direction.
  - 3 main phases of construction
    - » replace the structure in the median while maintaining traffic on the existing pavement
    - » divert westbound traffic onto the shared runaround, replace structure under existing westbound lanes
    - » Divert eastbound traffic onto the shared runaround, replace the structure under the existing eastbound lanes
    - » Saved \$500,000 compared to a typical crossover scenario



## Designing To A Budget

### ➤ I-70 fix

#### ✓ Challenges

- Maintaining existing stream flow per the selected construction phases
  - Typical policy – design the waterway opening for a 10 year storm event for the runaround...not a typical runaround
  - During median construction, the contractor would have manage the stream flow – more than likely having to pump the existing flow around the median construction to eliminate possibly scouring out the eastbound lanes if left to mother nature. Pumping would have been extremely costly due to the flow rate at this location
  - Solution - shift the new structure to allow the undamaged western arch to remain in place to handle existing stream flow



## Designing To A Budget

### ➤ I-70 fix

#### ✓ Summary

- Outside the box thinking allowed this project to proceed at an extremely accelerated pace while still implementing several cost savings methods.
- Project Let in December for \$2.31 million and advanced signing is already up with construction to start very soon



## Designing To A Budget

### ➤ State Road 246

- ✓ Flooding 2008 damaged the road and pipe
- ✓ Road was closed
- ✓ Funding was an issue
- ✓ Only had 180 days to propose, design and construct







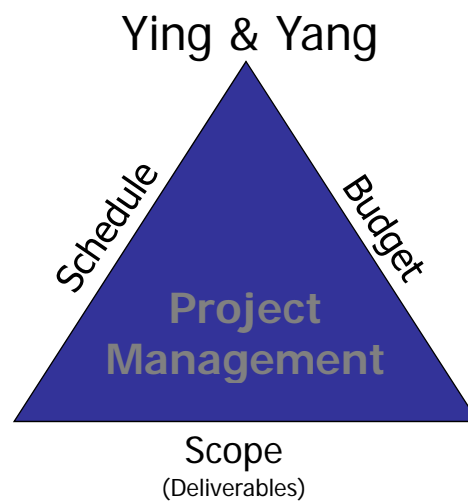




## Designing To A Budget

### ➤ SR 246 (Facts)

- ✓ Field Check was held on 7/11/2008
- ✓ Survey was received on 7/22/2008
- ✓ RFC Date was 8/6/2008
- ✓ Letting was held 8/15/2008
- ✓ Construction was completed and opened to traffic 11/22/2008
- ✓ Engineer's Report Estimate was \$815,000
- ✓ Design Estimate was \$825,926.82
- ✓ Contract Let for \$684,959.20





## Thank You

Greg Griffin  
Project Manager  
INDOT Greenfield District  
32 S. Broadway Street  
Greenfield, IN 46140-2247  
Office: (317) 467-3978  
Fax: (317) 467-3955  
Email: [ggriffin@indot.in.gov](mailto:ggriffin@indot.in.gov)



## Thank You

Shakeel Baig, PE, MBA  
Director of Production  
INDOT Crawfordsville District  
41 West 300 North PO Box 667  
Crawfordsville, IN 47933  
Office: (765) 361-5242  
Fax: (765) 364-9226  
Email: [sbaig@indot.in.gov](mailto:sbaig@indot.in.gov)



## Thank You

Louis Feagans, PE.  
Project Manager Supervisor  
INDOT Central Office  
100 N. Senate Ave  
IGCN- Room N642  
Indianapolis, IN 46204-2216  
Office: (317) 232-5332  
Fax: (317) 233-4929  
Email: [lfeagans@indot.in.gov](mailto:lfeagans@indot.in.gov)