EXHIBIT 2-F

PRELIMINARY DESIGN-BUILD PLAN

[attached]

4.2 Preliminary Design-Build Plan

4.2.1 Design-Build Technical Solutions

The I-69 DP Team has developed a preliminary Design-Build Plan (DBP) for the I-69 Section 5 Project that is tailored to provide the State and its residents with the best value, quality, innovation, and sustainable solutions. The I-69 DP Team's approach incorporates technical solutions with innovative features that exceed the contract requirements, while delivering IFA a world-class Project. Our integrated team combines local, national and global knowledge and experience.

The I-69 DP Team's DBP is built on the principles of Quality, emphasizing 'Safety First' and 'Right the First Time'. Our development processes are strengthened through vertical integration. Isolux Infrastructure (Equity Member) and Corsan (DB Contractor) are related companies and have extensive experience working together. The I-69 DP Team will be formed to self-perform O&M, both during and after construction.

The I-69 DP Team is led by our Project Manager; Jose R. Ballesteros. Jose has managed many successful projects throughout the world. He has the proven skills for understanding all aspects of the Project including construction, operations, life cycle maintenance, and routine maintenance including snow and ice services.

Our DB Team, led by the Construction Manager, Vicente Ferrio, understands the established Project expectations and goals. We have developed the DBP to exceed IFA's and the public's needs and expectations.

4.2.1.1 Roadway Elements

This Project will convert approximately 21 miles of State Route (SR) 37 in Morgan and Monroe Counties, Indiana, into an interstate facility which will be designated as I-69. As part of the conversion, the existing partially-controlled limited access facility will be upgraded to have fully controlled access and will include four new interchanges at Fullerton Pike, Tapp Road, Sample Road and Liberty Church Road. The improvements also include the construction of four grade separated crossings at Rockport Road, Vernal Pike, Kinser Pike and Chambers Pike. After construction is complete, access to I-69 will be provided via new parallel services roads to locations where existing or new Interchanges are located.

The south terminus of Section 5 is located at the intersection of That Road/SR 37 in Monroe County just north of the I-69/SR 37 interchange (currently being constructed as part of the Section 4 project). The corridor proceeds to the northeast through northern Monroe County into southern Morgan County. The north terminus of Section 5 is the south bridge approach of the Indian Creek Bridge which is located south of the existing SR 39/SR 37 interchange within the Section 6 project limits. Within the I-69 Section 5 corridor, existing SR 37 runs along the west side of the City of Bloomington, through rural Monroe and Morgan counties, ending south of the City of Martinsville. The Project is located in the Indiana Department of Transportation's Seymour District and is part of the I-69, Evansville to Indianapolis, corridor. **Figure 4.2-1** illustrates the I-69 DP Section 5 Project Limits and Construction Zones. For purposes of reference and analysis,

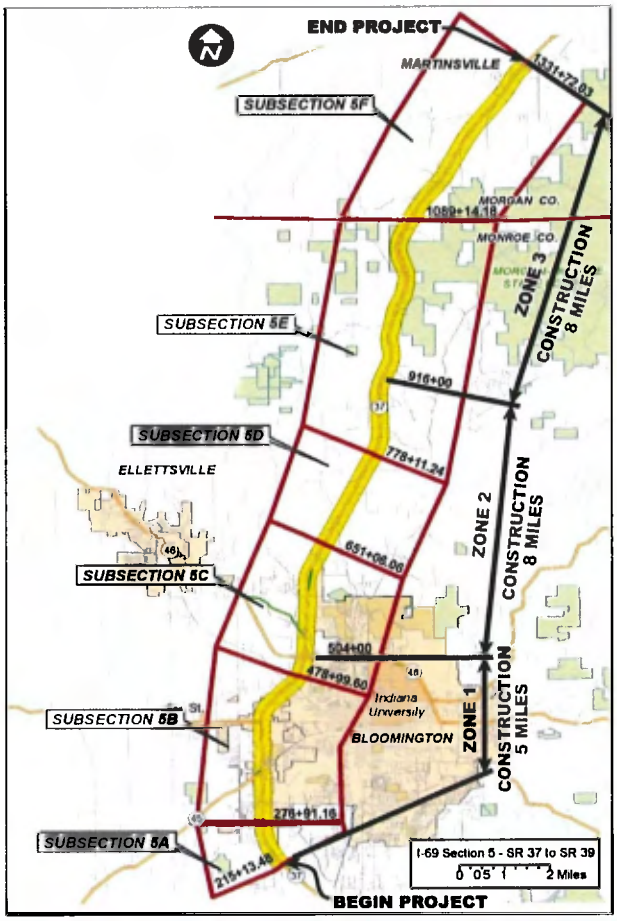


Figure 4.2-1: I-69 Section 5 Project Limits and Construction Zones.

the I-69 Section 5 corridor was divided into six (6) subsections. Each subsection was designated with a "5," representing Section 5 of the I-69 EIS Tier 2 corridor, and a letter – 5A, 5B, 5C, 5D, 5E, and 5F. Subsections were deemed necessary to meet varying topography, urban/rural design criteria, design speeds and jurisdictional differences.

The I-69 DP Team have reviewed the RFP documents in great detail and through months of refinement are providing IFA/INDOT with an improved construction plan that will better serve the public interests and increase construction efficiencies through a well-organized and easier to maintain facility. In creating our improved plan, we developed a number of Alternative Technical Concepts (ATCs). The IFA ultimately approved seven of them (six of which will be implemented). The I-69 DP Team also developed added value items which, along with the approved ATCs, are shown in **Figure 4.2-3.**

4.2.1.1.a Construction Staging & Traffic Control

4.2.1.1.a.i Traffic Management and Control and Sequencing

The I-69 DP Team has developed detailed Transportation Management Plans (TMP), which will ensure a safe, continuous operating roadway for the traveling public and limit disruptions during construction. The TMP includes elements listed in **Figure 4.2-2.**

Traffic Management Plan Elements
Temporary Traffic Control Plan with MOT plans & traffic analysis
Temporary pavement design and unrestricted access details for all businesses & residents
MOT phase change procedures with clear responsibilities and processes for temporary signage markings that provide for safe traffic divertions with limited disruptions
Work zone access, truck routes, & haul route maps to allow for safe ingress/egress for personnel and traveling public
Detour routes & project closures to be approved by IFA
Traffic Operations Plan describing key personnel & responsibilities
Emergency Plan & coordination with emergency responders
Coordination meetings with adjacent projects, transit operators, utility owners, & local public agencies
Coordination with Public Involvement Plan & public communication implementation
Maintenance of roadway drainage during construction, including temporary drainage facilities as needed

Figure 4.2-2: Traffic Management Plan Elements

With approval of I-69 DP's ATC to allow the SR 45/2nd Street Interchange to remain in its current configuration, Bloomington residents will have an unencumbered route across SR 37 for the duration of the project

4.2.1.1.a.ii Conceptual Construction Staging Diagrams

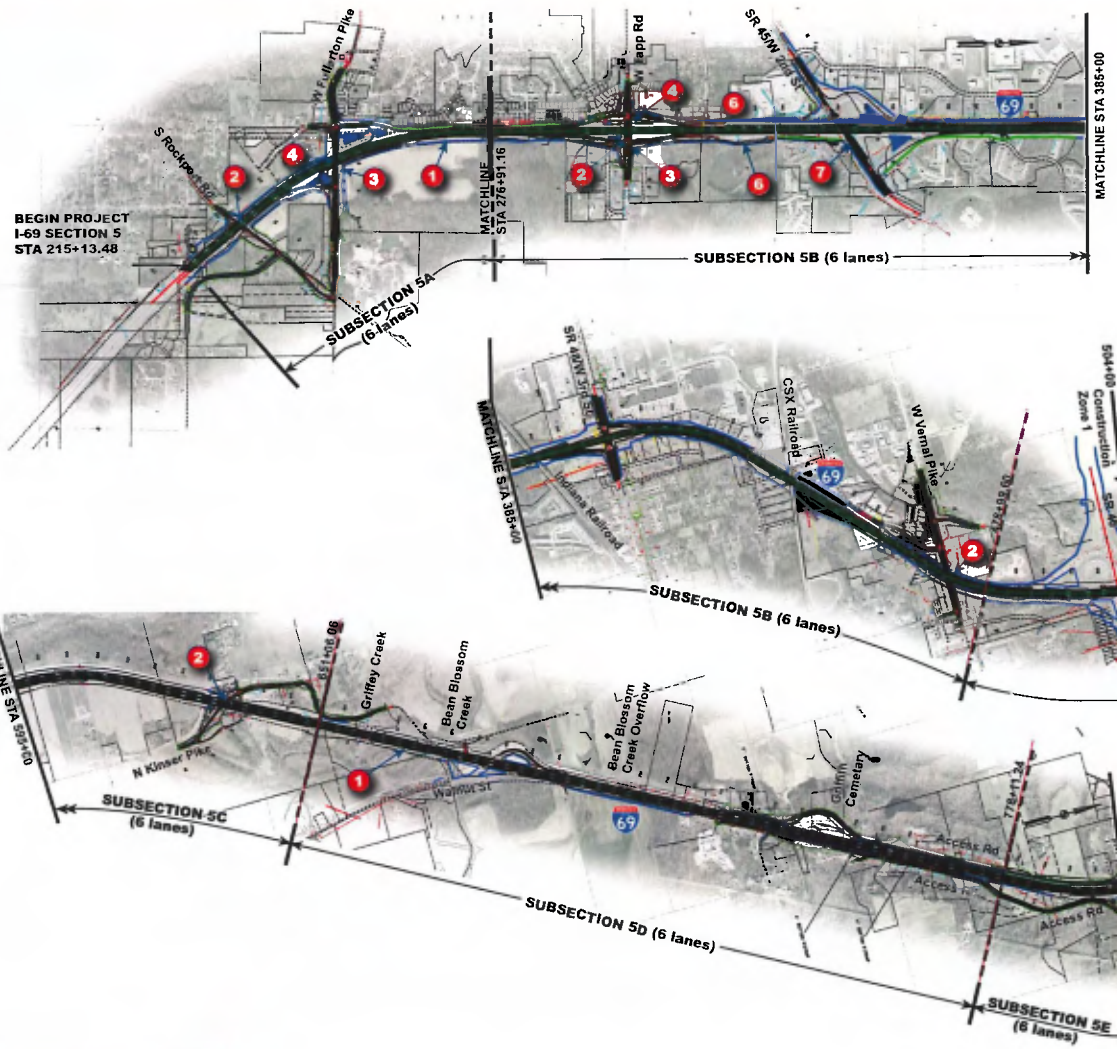
The I-69 DP Team's conceptual construction staging is shown in **Figure 4.2-1.** Zone 1, construction will include all of Subsections 5A and 5B ending just north of the SR 46 overpass. Zone 2 will start just north of SR 46 and continue to a point one-half mile south of Chambers Pike. Finally, Zone 3 will construct the remainder of the project from Chambers Pike to the northern project limits. In order to maximize mobility during construction, there will be no restrictions to consecutive intersections on SR 37. To accommodate this mobility initiative, the Fullerton Pike interchange will be constructed in Zone 2, allowing all other Bloomington interchanges to be completed in 2014 and 2015.

The I-69 DB Team developed detailed construction staging and MOT plans to ensure all components of the Project are coordinated. Staging and MOT was developed jointly by the Design Team and the Construction Team in intensive focus meetings.

Detailed MOT staging roll plots are included in the Volume 2 Appendices (H-2: Technical Drawings)

4.2.1.1 a. iii Access to Business and Residential Properties

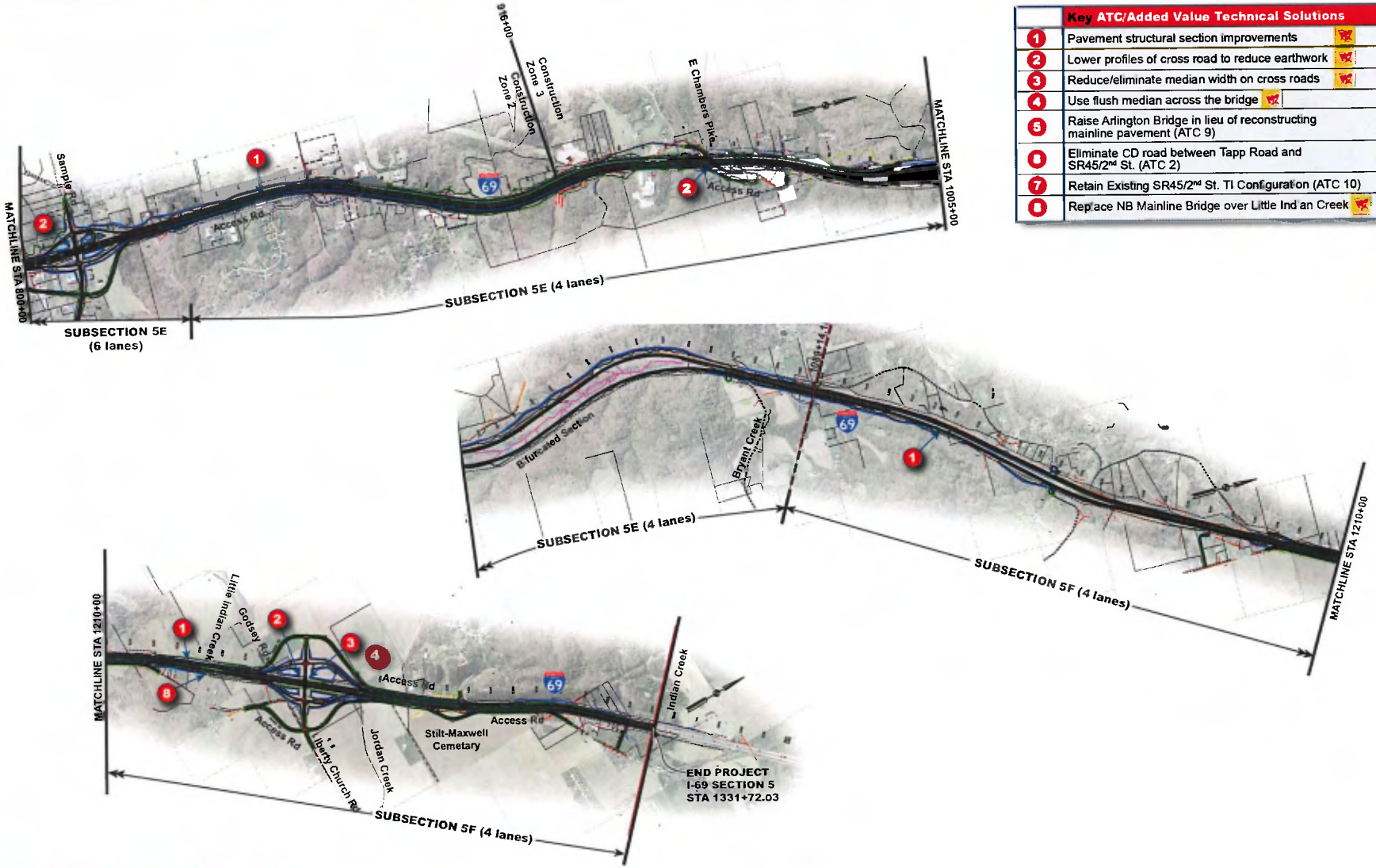
The sequencing of all construction activities will prioritize accessibility to all existing SR 37 at-grade access points by ensuring that an adjacent at grade intersection is kept fully operational and by opening and maintaining alternative access routes to both sides of SR 37. In many cases, the alternative access route will require the construction of either permanent or temporary access roads. These connections will be fully operational prior to the closure of the affected at-grade intersection.



	Key ATC/Added Value Technical Solutions
1	Pavement structural section improvements
2	Lower profiles of cross road to reduce earthwork
3	Reduce/eliminate median width on cross roads
4	Use flush median across the bridge
5	Raise Arlington Bridge in lieu of reconstructing mainline pavement (ATC 9)
6	Eliminate CD road between Tapp Road and SR45/2nd St. (ATC 2)
7	Retain Existing SR45/2nd St. TI Configuration (ATC 10)
8	Replace NB Mainline Bridge over Little Indian Creek

	ATC/Added Value Technical Solutions
ATC 2	Eliminate CD Road between Tapp Road and SR 45/2nd Street Interchanges
ATC 9	Raise Arlington Road Bridge in-lieu of Reconstructing Mainline Pavement
ATC 10	Retain Existing SR 45/2nd Street Interchange configuration
ATC 12	Roundabouts at Liberty Church Road Interchange (not implemented due to additional ROW requirements)
ATC 18	Use of Weed Barrier and Gravel In-lieu of Seeding Adjacent to Cable Barrier to Increase Workers Safety and Minimize O&M costs
ATC 22	Placement of O&M Facility
ATC 23	[redacted]
Added Value 1	Change Profiles of S-Line Roads to Reduce Earthwork
Added Value 2	Develop Compliant Alternative Pavement Structural Sections to reduce costs

Figure 4.2-3: I-69 DP ATCs and Value-Added Solutions



	Key ATC/Added Value Technical Solutions
1	Pavement structural section improvements
2	Lower profiles of cross road to reduce earthwork
3	Reduce/eliminate median width on cross roads
4	Use flush median across the bridge
5	Raise Arlington Bridge in lieu of reconstructing mainline pavement (ATC 9)
6	Eliminate CD road between Tapp Road and SR45/2nd St. (ATC 2)
7	Retain Existing SR45/2nd St. TI Configuration (ATC 10)
8	Replace NB Mainline Bridge over Little Indian Creek

Figure 4.2-3: I-69 DP ATCs and Value-Added Solutions (continued)

The I-69 DP Team's PIP will include specific procedures for interacting with local residents, businesses and other stakeholders near each interchange, including the Fern Hills National Conference, Tapp Road Medical Park, Monroe County Fair and Indiana University.

The I-69 DP Team will ensure that local stakeholders are informed of potential construction impacts throughout the duration of Interchange construction. Our intent is to build on the INDOT "Kitchen Table Meeting" (KTM) process used for land acquisition. We will hold preconstruction and construction update meetings where local access plans will be presented and discussed in detail for each Interchange construction staging phase. These measures are in addition to our proactive public relations approach to maintain public trust and integrity. **Figure 4.2-4** summarizes this proactive approach.

Proactive Public Relations
Sponsor local pre-construction and update meetings
A toll free hotline will accept public feedback which will be discussed at weekly progress meetings
An Emergency Response Plan will be developed in coordination with police and fire departments
Monitor local roadways used for alternative access – maintain driving surface
Portable Variable Message Signs will inform drivers of upcoming traffic control changes and detours
Detours and closures will be publicized in local newspapers and on local TV and radio stations

Figure 4.2-4: I-69 DP Team's Proactive Public Relations

4.2.1.1.a.iv Scheduling and Sequencing Construction

I-69 DP Team has developed a sequencing plan which will construct a great part of the mainline I-69 in the Bloomington area, with the exception of the Fullerton Pike Interchange, during the 2014 construction season. In the 2015 construction season, work will begin just north of the SR 46 overpass and includes access roads, the Sample Road Interchange, the Kinser Pike overpass and the Chambers Pike overpass, among other workfronts. The I-69 DP Team proposes raising the Arlington Road overpass bridge (rather than lowering the I-69 mainline grade) to expedite construction and prioritize mobility on mainline I-69 and SR 46 ramp access. From Chambers Pike to the north, mainline I-69, access roads, and the Liberty Church Interchange will be constructed during second half of 2015 construction season. This sequencing plan prioritizes accessibility in the Bloomington area and overall system mobility. As indicated in **Figure 4.2-7**, we will complete all required milestones on or before the dates required in the ITP.

Figure 4.2-5: Sequencing Meeting

Figure 4.2-6: Jacking Existing Bridge

Schedule Item	Milestone Date	
Bloomington Area	Initiated in 2014	✓
That Road - Local Access Roads & Improvements	Completed by June 1, 2015	✓
Rockport Road Local Access Roads & Improvements	Completed by June 1, 2015	✓
Fullerton Pike – Interchange & Associated Ramps	Completed by December 31, 2015	✓
Tapp Road - Interchange & Associated Ramps	Completed by December 31, 2015	✓
Vernal Pike Overpass	Completed by December 31, 2015	✓
Substantial Completion	October 31, 2016	✓

Figure 4.2-7: ITP Milestones

The I-69 DP Team has incorporated environmental protection and mitigation into the sequencing plan for construction, including:

- Specific erosion control plans for all construction stages
- Minimize temporary pavement which expands the construction footprint
- Protect and avoid karst features during all construction activities
- Avoid tree clearing between April 1 and September 30 (Indiana Bat)

These mitigation measures will ensure that our construction activities respect the existing landscape, ultimately providing a facility with minimal environmental impact.

Throughout the design of Section 5, alternative design solutions will be developed to expedite construction and limit the impacts to the traveling public. The options below not only reduce costs for the project, they also reduce construction time and impacts to traffic.

- **Fullerton Pike** – Reduced overpass bridge width will expedite the opening of the Fullerton Pike Interchange by one month
- **Arlington Overpass** – Jacking the Arlington Bridge prioritizes mainline traffic flow and access to SR 46 while reducing overall construction duration by one month
- **Liberty Church Road** – Reduced overpass bridge width will expedite the opening of the Liberty Church Road Interchange by two months

The I-69 DP D-B approach allows significant construction in the Bloomington area in 2014, which will allow IFA/INDOT to meet its commitments.

4.2.1.1.a.v Locations to be used during Construction

Due to the length of the project and the sequencing of the works, multiple locations will be used during construction as staging areas and laydown yards. In addition, we will utilize off-site borrow pits to import materials needed for embankment construction. A portable asphalt plant for this Project will be strategically located to minimize transportation costs. INDOT approved material sources will be delivered to the plant site for asphalt production.

Figure 4.2-8: E&B Paving Portable Asphalt Plant.

Equipment will be staged at various cross-road locations to allow for refueling and maintenance access in the evening and to minimize transportation expenses. The staging areas will be carefully delineated and all environmentally sensitive areas will be marked to prevent accidental intrusion. Spill containment areas and truck cleanout sites will also be provided at the staging areas.

For structures, laydown areas located immediately adjacent to each structure will be provided. We will also take advantage of just-in-time deliveries, so that the laydown area required is reduced as much as possible and all environmentally sensitive areas are avoided.

In all cases, we will coordinate staging areas and laydown yard locations with local agencies and residents to minimize noise and traffic impacts.

Drainage Design Approach

The key to drainage design for this project is to upgrade the existing storm drainage system to handle the increased runoff from the widened highway and to not increase flows downstream of the facilities. Existing culverts will be extended to drain to their historic outlets and to fix any hydraulic deficiencies. Detention basins will be designed and placed in locations to assure the appropriate volumes and flow rates of storm water arrive at these outlets. In addition, karst mitigation features such as geomembrane liners along the drainage ditches will be provided in accordance with the Technical Provisions.

Figure 4.2-9: Existing Drainage Facilities Will Be Retained If Feasible.

I-69 hydrology and hydraulics will utilize the 100-year storm in the analysis of the existing and proposed drainage facilities.

Materials unsuitable for embankment will be used for ditch and detention basin bottoms

Proposed I-69 on-site drainage features include roadside ditches, detention basins, inlets (roadside and curb), manholes, storm drain, and pavement underdrains. Existing drainage facilities will be used where practical.

The Technical Drawing roll plots identify the location of all of the drainage improvements. **Figure 4.2-10 and 4.2-11** list the mainline culvert improvements provided.

Circular Pipe Size	Pipe Type	Left Side Extension Length (ft)	Right Side Extension Length (ft)	Total Constructed Length (ft)	Quantity of New End Sections
15"	CMP	0	67	67	1
15"	RCP	0	12	12	1
24"	CMP	15	0	15	2
24"	RCP	10	125	135	4
30"	RCP	0	12	12	1
36"	CMP	844	110	954	15
36"	RCP	120	162	282	9
36" Inside 54"	CMP	20	0	20	1
42"	CMP	15	0	15	1
48"	CMP	70	0	70	1
48"	RCP	60	65	125	2
54"	CMP	95	0	95	2
66"	CMP	0	44	44	1
72"	CMP	10	0	10	1
84"	CMP	60	0.0	60	1
90"	CMP	262	156	418	4

Figure 4.2-10: I-69 Section 5 Mainline Culvert Summary

CMP – Corrugated Metal Pipe Culvert
RCP – Reinforced Concrete Pipe Culvert

Box Culvert Size	Type	Left Side Extension Length (ft)	Right Side Extension Length (ft)	Total Constructed Length (ft)	Quantity of New Headwalls
2' x 3'	RCB	0	147	147	5
3' x 3'	RCB	90	60	150	4
3' x 4'	RCB	0	60	60	1
4' x 4'	RCB	0	60	60	2
4' x 5'	RCB	0	40	40	2
5' x 5'	RCB	0	90	90	1
6' x 4'	RCB	0	20	20	1
Elliptical Pipe Size	**Pipe Type**	**Left Side Extension Length (ft)**	**Right Side Extension Length (ft)**	**Total Constructed Length (ft)**	**Quantity of New End Sections**
56" x 72"	CMP	140	80	220	4
78" x 102"	CMP	60	0	60	2
28" x 42"	CMP	0	75	75	1
34" x 48"	CMP	0	35	35	1
43" x 63"	CMP	16	0	16	1

Figure 4.2-11: I-69 Section 5 Mainline Culvert Summary Table

CMP-Corrugated Metal Pipe Culvert
RCB- Reinforced Concrete Box Culvert

Signing and Pavement Marking Approach

Prior to starting design, we will conduct an inspection of all existing signs in the project limits to assess the condition of the sign sheeting and mountings. Wherever possible, existing signs will be reused. Signs that need replacement and new signs will use diamond grade sign sheeting. The use of diamond grade sheeting provides reflectivity consistent with the requirements of the Indiana Manual of Uniform Traffic Control Devices (InMUTCD), alleviates the need for sign lighting and requires minimal maintenance over the life of the sign.

Thermoplastic pavement markings will be used throughout the project limits and will meet all INDOT standards for design, materials and reflectivity. Snowplowable Raised Pavement Markers will also be provided. All pavement marking and signing design will conform to the InMUTCD

The design life of the signs is approximately 15 years which coincides with the I-69 DP Team's pavement design life. Thus, signing will be refreshed with each new paving cycle.

Traffic Signals Design Approach

Figure 4.2-12 lists the work required for new and existing traffic signals within the Project limits.

New signals will be constructed as span, catenary, and tether support signals. Modernization of existing signals will include replacement of signal heads (with backplates), new pedestrian signal heads/pushbuttons, new loops (where widening of change of lane position occurs), possible replacement or relocation of controller cabinet and signal electrical service, and in some cases new strain poles and span, catenary and tether supports. Span wire mounted signs will be replaced or rehabilitated as necessary.

Any new traffic signal interconnect installed under the Project will use wireless communications. Existing fiber-optic interconnect will remain in place if it meets the Project Standards.

Design and construction will be in accordance with the IDM Chapter 502 Traffic Design Draft, the INDOT MUTCD and the INDOT Standard Specification/Recurring Special Provisions.

Highway Lighting Design Approach

Full interchange lighting will be provided at the following interchanges with I-69; Fullerton Pike, Tapp Road and Sample Road. Partial interchange lighting will be provided at the Liberty Church Road/I-69 interchange.

Existing interchange lighting will be retained at the following interchanges with I-69; SR 45/2nd Street, SE 48/3rd Street, SR 46 and Walnut Street. Where local roads are currently lit, the lighting system will be retained, relocated or replaced in kind.

If lighting of local roads is required, the I-69 DP Team will work with the local agencies for standards they may have for lighting levels and equipment.

A key lighting decision will be the height of light poles at the Sample Road interchange as the area is more rural than Fullerton Pike or Tapp Road and light intrusion may be an issue.

4.2.1.1.b Addressing Geotechnical-related Issues

From a geotechnical standpoint, I-69 Section 5 is a somewhat complicated project. Besides the considerable amount of karst present on the project, there is also limestone and shale.

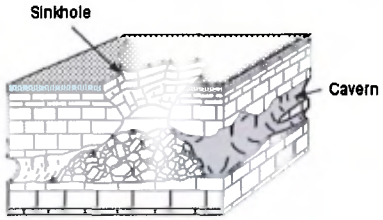


Figure 4.2-13: Sinkhole Formation

In addition, based on the density tests conducted as part of IFA's geotechnical exploration, approximately 49% of the soils are classified as A-7-6 (Clay). This correlates to approximately 22% of the samples tested exhibiting a maximum Proctor Density less than 100 pcf. Soils with unit weights less than 100 pcf will not be useable as embankment fill without modification. However, these clay soils have a low permeability rate and can be used to line ditches and detention ponds. Where good materials are encountered in ditches or detention ponds, we will over excavate to mine the suitable embankment materials and replace them with the unsuitable material.

Location	New Signal	Signal Modernization	Signal Interconnect
SB and NB I-69 Ramps at Fullerton Pike	✓		✓
SB and NB I-69 Ramps at Tapp Road	✓		✓
SB and NB I-69 Ramps at SR 45/2nd Street		✓	✓
SR 45/2nd Street at Basswood Drive		✓	✓
SR 45/2nd Street at Liberty Drive		✓	✓
SB and NB I-69 Ramps at SR 48/3rd Street		✓	✓
SR 48/3rd Street at Franklin Road		✓	✓
SR 48/Gates Avenue			✓
SB & NB I-69 Ramps at SR 46			✓

Figure 4.2-12: I-69 Section 5 New and Existing Traffic Signals

Additional soil borings will be obtained to further identify the bedrock surface and rock characteristics along the project. Geophysical testing will be a critical part of identifying the presence of previously undetected karst features. This will be especially important at structure locations. A combination of Refraction Microtremor (Re-Mi) analysis and 2-dimensional electrical resistivity will be used at each structure where karst features are suspected. Based on the results of the geophysical testing, additional soil borings and rock coring will be conducted to confirm the extent of the karst feature and develop a mitigation procedure. The goal of the karst mitigation is to obtain the most economical solution with minimal environmental impact and adequate performance of the structure in question. **Figure 4.2-14** explains our proposed karst mitigation.

Karst Feature	Mitigation
Exposed Sinkhole	Excavate to remove the soil and bedrock void. Fill with rip rap and cap.
Drainage ditches within 50 feet of an exposed sinkhole, depressed existing ditch or springs	Line with riprap and an impervious geomembrane for the limits +10' of the surveyed feature
Storm water detention basins within the karst sinkhole or buried sinkhole regions	Line with geomembrane
Roadway drainage that discharges to sinking streams or sinkholes	Treat storm water in accordance with SWPP BMPs

Figure 4.2-14: I-69 DP Team Karst Mitigation

Approach to Pavement Design

At Handback, the pavement is required to have 10 years of useful life. The I-69 DP Team's approach is to use an initial 15 year pavement design, followed by two 15-year renewals (at year 15 and year 30 of the Operating Period. Preliminary pavement designs were completed using ASSHTOWare.

We propose an initial 15 year pavement design with subsequent renewals at year 15 and 30 of the Operating Period

Based on overall construction cost, schedule and ease of maintenance/renewals, full depth hot-mix asphalt (HMA) and mill and overlay with HMA will be employed throughout the project.

Traffic loading for the pavement design was based on the traffic volume and truck percentage information contained in Chapter 9 of the Technical Provisions. To determine traffic loading in years beyond 2035, a 1.0% compounded growth factor was used. We believe that the initial pavement may last longer than the 15 year life, as traffic growth predicted by the travel demand model for the Project is quite high and it may take more than 15 years to reach those volumes. Subsequent renewals will be based on updated traffic projections.

4.2.1.1.c Maintaining and Protecting ROW and Adjacent Roads

The I-69 DP Team will maintain and protect the right-of-way (ROW) and adjacent roads during the Project Term. The processes and procedures to accomplish this task include:

- Permanent noise walls will be constructed early to mitigate noise impacts
- Haul routes will be strategically identified to minimize dust and impacts to residents
- Project-specific vibration plan/monitoring will be prepared
- Local roads will be maintained and protected from damage
- S-Lines profiles will be lowered to reduce the amount of fill required
- Dust palliative will be used to control dust
- Erosions control plans and measures will be prepared and implemented
- All on-site contractor use areas, borrow sites and waste sites will be identified
- Local water wells and properties will be protected
- Existing animal crossings will be maintained

When combined with regular and periodic maintenance, I-69 DP's proposed rehabilitation activities will extend the service life of the existing bridges through to Handback

The PIP will include provisions for Project Hot Line signs and flyers to foster community interaction from project inception.

4.2.1.1.d Preliminary Roadway Schematic

The Preliminary Roadway Schematic has been prepared and is presented on 36" x 120" color roll plot drawings (1"=100' scale) which are described further in **Appendix H-2.** There are thirteen roll plots depicting the mainline roadway, ramps and access roads. There are four additional roll plots showing the interchanges and grade separated cross roads for the project. The Technical Drawing roll plots are presented with different colored shapes and hatching to represent the multiple types of pavement overlay, widening and replacement throughout the project. Included on the roll plots are:

- Existing & Proposed Drainage Features
- Retaining & Noise Walls
- Guard Rail & Median Cable Barrier
- Limits of Karst Buried Sinks, Sinkholes & Sinking streams
- Mainline Roadway Profiles
- Replacement & Widening of Bridges
- Concrete Median Barrier
- Curbs, Sidewalks & Bike Lanes
- Proposed ROW with Cut & Fill Grading Lines to Delineate Construction Limits
- Typical Sections

4.2.1.2 Bridge Structures, Retaining Walls, Noise Walls and Other Structures

There are 32 bridges within the project limits; twenty are existing and twelve will be newly constructed. Nineteen of the twenty existing bridges will undergo varying degrees of rehabilitation and widening; one of the twenty existing bridges will not be modified during this project. Twelve bridges are newly constructed to provide grade-separated crossings over I-69 or to allow access roads and ramps to cross creeks and rivers. **Figure 4.2-15** provides a brief description of each structure and scope of work to be performed.

In addition to widening, existing bridges will undergo rehabilitation aimed at extending their service life and minimizing service interruptions. Cracked and spalled concrete will be repaired; steel bearing assemblies will be replaced with elastomeric bearing pads; end bents will be made semi-integral; steel bridges not painted within the past five years will be painted; wearing surfaces with less than 10 years of remaining life will be replaced.

There are 33 proposed retaining walls within the project limits. 15 retaining walls are constructed around the end bents of new bridges crossing over I-69 to retain the embankment of the cross roads and reduce bridge span lengths. 18 retaining walls are located along the I-69 mainline or cross roads to reduce the reach of cut and fill slopes. The majority of retaining walls are constructed in fill conditions; however, two walls are constructed in cut conditions. **Figure 4.2-16** provides a description of the wall type.

There are three noise walls within the project limits. They are located along the I-69 mainline in the more populated areas between Fullerton Pike and SR48. The walls range in height from 12 feet to 18 feet. Two of the noise walls are ground mounted while one of the noise walls is mounted to the top of a retaining wall. **Figure 4.2-17** indicates the location and limits of each noise wall.

4.2.1.2.a Approach to Materials Selection

Concrete, with its lower initial cost and lower life-cycle maintenance cost, is the preferred material for structures and its aesthetic characteristics also compliment the local environment of Monroe and Morgan Counties. All new bridge structures will be constructed with prestressed concrete bulb-tees or prestressed concrete box beams.

> The D-B Team and the O&M Team have had extensive interaction on determining bridge materials, methods and rehabilitation strategies.

Existing bridges which require additional beams for widening will be widened in-kind with reinforced concrete beams, prestressed concrete beams, rolled steel beams, or welded steel plate girders. Steel superstructures will be painted: no weathering steel will be used on bridges since none has been used on any of the existing bridges throughout the project limits.

Mechanically Stabilized Earth (MSE) with concrete facing panels will be used for retaining walls in fill conditions to expedite construction. Cast-in-place concrete will be used for retaining walls in cut conditions to reduce the amount of over excavation required behind the wall.

Bridge Name	Improvements	Structure Type	Spans	Abutment Type	Pier Type	Vertical Clearance
Rockport Road over I-69	New Structure	Prestressed Concrete Bulb-Tee	98' – 98'	Integral on Driven HP Piles	Multi-Column on Driven HP Piles	16'-9"
Fullerton Pike over I-69	New Structure	Prestressed Concrete Bulb-Tee	105' – 119'	Integral on Driven HP Piles	Multi-Column on Driven HP Piles	16'-9"
Tapp Road over I-69	New Structure	Prestressed Concrete Bulb-Tee	83' – 83'	Integral on Driven HP Piles	Multi-Column on Driven HP Piles	16'-9"
SR45/2nd Street over I-69	Existing Structure to be Reconfigured	Welded Steel Plate Girder	149' – 146'	Semi-Integral on Driven HP Piles	Multi-Column on Spread Footing	16'-10"
Indiana Railroad Overpass	Existing Structure to Remain As-is	Welded Steel Through Plate Girder	77.5' – 77.5	Full-height on Spread Footing	Wall on Spread Footing	16'-0"
SR48/3rd Street over I-69	Existing Structure to be Widened	Welded Steel Plate Girder	117' – 117'	Semi-Integral on Driven HP Piles	Multi-Column on Driven HP Piles	16'-5"
I-69 NB over CSX Railroad	Existing Structure to be Widened	Rolled Steel Beam	60' – 75' – 70'	Semi-Integral on Driven HP Piles	Multi-Column on Driven HP Piles	22'-1"
I-69 SB over CSX Railroad	Existing Structure to be Widened	Rolled Steel Beam	60' – 75' – 70'	Semi-Integral on Driven HP Piles	Multi-Column on Driven HP Piles	22'-1"
Vernal Pike over I-69	New Structure	Prestressed Concrete Bulb-Tee	131' – 120'	Integral on Driven HP Piles	Multi-Column on Driven HP Piles	16'-9"
SR46 over I-69	Existing Structure to be Enhanced	Post-tensioned Concrete Bulb-Tee	131.8' – 131.8'	Integral on Driven HP Piles	Multi-Column on Driven HP Piles	16'-9"
Arlington Road over I-69	Existing Structure to be Raised	Welded Steel Plate Girder	110' – 110	Semi-Integral on Spread Footing	Multi-Column on Spread Footing	16'-0"
Kinser Pike over I-69	New Structure	Prestressed Concrete Bulb-Tee	110' – 103	Integral on Driven HP Piles	Multi-Column on Spread Footing	16'-9"
I-69 NB over Griffy Creek	Existing Structure to be Widened and Lengthened	Prestressed Concrete I-Beam	55.5' – 55.5' – 57' – 56.25' – 55.5'	Semi-Integral on Driven HP Piles	Wall on Driven HP Piles and Spread Footing	NA
I-69 SB over Griffy Creek	Existing Structure to be Widened	Prestressed Concrete I-Beam	55.5' – 55.5' – 57' – 56.5' – 55.5'	Semi-Integral on Driven HP Piles	Wall on Driven HP Piles and Spread Footing	NA
I-69 NB over Beanblossom Creek	Existing Structure to be Widened	Welded Steel Plate Girder	90' – 112.5' – 90'	Semi-Integral on Driven HP Piles	Wall on Driven HP Piles	NA
I-69 SB over Beanblossom Creek	Existing Structure to be Widened	Welded Steel Plate Girder	90' – 112.5' – 90'	Semi-Integral on Driven HP Piles	Wall on Driven HP Piles	NA
Walnut Street Overpass	Existing Structure to be Enhanced	Welded Steel Plate Girder	133' – 129'	Semi-Integral on Driven HP Piles	Wall on Driven HP Piles	16'-0"
I-69 NB over Beanblossom Creek Overflow	Existing Structure to be Widened	Prestressed Concrete Box Beam	38' – 38.5' – 38.5' – 38'	Semi-Integral on Driven Pipe Piles and Driven HP Piles	Wall on Driven Pipe Piles and Driven HP Piles	NA
I-69 SB over Beanblossom Creek Overflow	Existing Structure to be Widened	Rolled Steel Beam	38' – 38.5' – 38.5' – 38'	Semi-Integral on Driven HP Piles	Wall on Driven HP Piles	NA
Sample Road over I-69	New Structure	Prestressed Concrete Bulb-Tee	103' – 89'	Integral on Driven HP Piles	Multi-Column on Spread Footing	16'-9"
Chambers Pike over I-69	New Structure	Prestressed Concrete Bulb-Tee	94' – 119' – 119'	Integral on Driven HP Piles	Multi-Column on Spread Footing	16'-9"
I-69 NB over Bryants Creek	Existing Structure to be Widened	Prestressed Concrete I-Beam	44.6' – 53.1' – 44.6'	Semi-Integral on Driven HP Piles	Wall on Spread Footing	NA
I-69 SB over Bryants Creek	Existing Structure to be Widened	Rolled Steel Beam	44' – 54.5' – 44'	Semi-Integral on Driven HP Piles	Wall on Spread Footing	NA
I-69 NB over Little Indian Creek	Existing Structure to be Replaced	Post-tensioned Concrete Bulb-Tee	85'	Integral on Driven HP Piles	NA	NA
I-69 SB over Little Indian Creek	Existing Structure to be Widened	Rolled Steel Beam	75	Semi-Integral on Driven Timber Piles and Driven HP Piles	NA	NA
Liberty Church Road over I-69	New Structure	Prestressed Concrete Bulb-Tee	89' – 89'	Integral on Driven Pipe Piles	Multi-Column on Driven Pipe Piles	16'-9"
I-69 NB over Jordan Creek	Existing Structure to be Widened	Reinforced Concrete Beam with Monolithic Deck	43'	Semi-Integral on Driven Timber Piles and Driven Pipe Piles	NA	NA
I-69 SB over Jordan Creek	Existing Structure to be Widened	Reinforced Concrete Beam with Monolithic Deck	43'	Semi-Integral on Driven Timber Piles and Driven Pipe Piles	NA	NA
Liberty Church SB Exit Ramp over Jordan Creek	New Structure	Prestressed Concrete Box Beam	57.5'	Integral on Driven Pipe Piles	NA	NA
Liberty Church West Access Road over Little Indian Creek	New Structure	Prestressed Concrete Bulb-Tee	77.25'	Integral on Driven Pipe Piles	NA	NA
Liberty Church West Access Road over Jordan Creek	New Structure	Prestressed Concrete Box Beam	57.5'	Integral on Driven Pipe Piles	NA	NA
Liberty Church East Access Road over Jordan Creek	New Structure	Prestressed Concrete Box Beam	51.25'	Integral on Driven Pipe Piles	NA	NA

Figure 4.2-15: I-69 DP Team Bridge Structures to be Widened or Constructed

Noise Walls	Location	Type	Length (FT)	Height (FT)	Area (SF)
NW-1	I-69 SB, Sta. 251+80 to Sta. 300+00	Ground Mounted	4820	12	57840
NW-2	I-69 NB, Sta. 326+50 to Sta. 341+00	Wall Mounted	1450	18	26100
NW-3	I-69 NB, Sta. 347+30 to Sta. 389+70	Ground Mounted	4240	14	59360

Figure 4.2-16: I-69 DP Noise Walls

Retaining Wall	Location	Type	Length (FT)	Area (SF)
RP-1	Rockport Road Bridge Abutment 1	MSE	185	3520
RP-2	Rockport Road Bridge Abutment 2	MSE	220	4450
F-1	Fullerton Pike Bridge Abutment 1	MSE	270	5900
F-2	Fullerton Pike Bridge Abutment 2	MSE	270	6300
T-1	Tapp Road Bridge Abutment 1	MSE	270	6160
T-2	Tapp Road Bridge Abutment 2	MSE	270	6160
V-1	Vernal Pike Abutment 1	MSE	220	3900
V-2	Vernal Pike Abutment 2	MSE	300	8450
K-1	Kinser Pike Abutment 1	MSE	190	3200
K-2	Kinser Pike Abutment 2	MSE	200	4110
S-1	Sample Road Abutment 1	MSE	230	5860
S-2	Sample Road Abutment 2	MSE	210	4740
C-2	Chambers Pike Abutment 2	MSE	215	4090
LC-1	Liberty Church Road Abutment 1	MSE	240	5980
LC-2	Liberty Church Road Abutment 2	MSE	240	5980
RW-1	Fullerton Pike EB, Sta. 68+50 to Sta. 70+85	MSE	235	1680
RW-2	Fullerton Pike WB, Sta. 67+25 to Sta. 73+94	MSE	669	8042
RW-3	I-69 SB, Sta. 275+00 to Sta. 280+00	CIP	500	5285
RW-5	SR48 WB, Sta. 42+50 to Sta. 47+00	MSE	450	5400
RW-6	SR48 EB, Sta. 41+80 to Sta. 47+05	MSE	525	5250
RW-7	SR48 EB, Sta. 53+00 to Sta. 57+90	MSE	490	7680
RW-8	I-69 NB, Sta. 727+08 to Sta. 734+57	CIP	749	9415
RW-9	I-69 SB, Sta. 756+18 to Sta. 757+78	MSE	160	2242
RW-10	I-69 NB, Sta. 765+09 to Sta. 774+84	MSE	800	24000
RW-11	I-69 SB, Sta. 940+41 to Sta. 943+28	MSE	287	3012
RW-12	I-69 NB, Sta. 945+50 to Sta. 947+50	MSE	200	3000
RW-13A	I-69 SB, Sta. 953+04 to Sta. 959+65	MSE	674	12037
RW-13B	I-69 SB, Sta. 951+93 to Sta. 958.38	MSE	746	16353
RW-14	I-69 SB, Sta. 1146+00 to Sta. 1157+75	MSE	1175	8120
RW-15	I-69 NB, Sta. 1159+00 to Sta. 1168+50	MSE	950	9545
RW-16	I-69 SB, Sta. 1173+75 to Sta. 1176+75	MSE	300	2945
RW-17	I-69 SB, Sta. 1180+50 to Sta. 1182+50	MSE	200	2000
RW-18	I-69 NB, Sta. 1181+50 to Sta. 1185+58	MSE	408	4636

Figure 4.2-17: I-69 DP Retaining Walls

MSE – Mechanical Stabilized Earth // CIP – Cast-in-Place

It will also be used when the retaining wall must support a noise wall. Precast concrete panels with limestone veneer form liner pattern mounted between painted wide flange steel posts will be used for all noise walls. Noise walls will be accentuated with wide, limestone-clad pilasters at regular spacing. The materials and methods chosen are commonly used throughout the State and have a performance record that, with proper Routine Maintenance and Rehabilitation Work, will provide structures with at least the required Residual Life at Handback. All materials and methods used in the construction of the bridges and walls will be accordance with the Department Standard Specifications.

4.2.1.2.b Structures Schematics

The preliminary designs have been advanced with the goal of providing the most cost effective and attractive structures that can be constructed efficiently and with the least disruption to existing traffic. The Technical Drawing roll plots identify the location of each of the bridges, retaining walls, and noise walls throughout the project. The Technical Drawing roll plots are identified in **Appendix H-2.**

4.2.1.2.c Preliminary Durability Plan

Implementing a transportation structure Durability Plan is a key element in the overall Asset Management program for Section 5. The Durability Plan prepared by the I-69 DP Team will present a uniform approach and implementation to the design, construction, and operation and maintenance of bridges with goals to specifically exceed the specified condition rating of each structure at substantial completion.

The Durability Plan will include:

- Identification of deterioration mechanisms
- Materials selection during design
- Design detailing in accordance with durability goals
- Verification that construction quality and components are in compliance with durability requirements
- Development of an in-service inspection and deterioration modeling program to plan, prioritize and budget maintenance activities

The major stages in the Durability Plan implementation include:

- Preliminary and Final Engineering Design
- Construction Stage Methods and Detailing
- In-Service Operation and Maintenance and Inspection
- Residual Life at Handback

It will allow designers to make good decisions on materials, design details, construction methods and operational aspects, such as inspection access, with the goal of increasing service life and lowering maintenance costs.

The principal deterioration mechanisms for bridges and structures in Indiana are climatic and environmental. Freeze-thaw cycles, rain, snow and de-icing materials accelerate the rate of degradation of structure elements. Other impacts to service life come from wear and traffic use and include traffic volumes, trucks over the load limit, and even extreme events that include petroleum spills, fires and earthquakes.

The type of concrete design used for various elements will consider special mix designs for low-permeability for decks, barriers and other areas exposed to weather and water splashing. Epoxy-coated reinforcing steel for bridge decks, barriers and portions of the substructure connected to the deck will reduce potential for corrosion and deterioration. The use of protective elements such as concrete sealants and paint and overlays for deck wearing surface are also planned for this project and will further slow deterioration.

> The use of concrete for new bridge decks, girders and crash-tested barriers will lower the risk of environmental and life cycle events and decrease the rate of deterioration.

Past experience has shown that significant long-term maintenance issues are caused by poor design and/or poor construction detailing practices. An example of design detailing is the use of deck joints. It is well-documented that water intrusion occurs through deck joints, and in combination with ice and snow, will cause concrete spalling and deterioration of abutment and pier seats and accelerate bridge bearing failure. Use of integral and semi-integral abutments proposed for this project eliminates deck joints. Our design has been coordinated with both O&M and LCM to provide the most cost effective design.

The quality of construction can also be determinant to the overall service life. The quality and durability of construction materials and the processes taken to ensure conformance to the specifications and expected service life will be outlined in a Construction Quality Management Plan (CQMP). The CQMP will outline processes and methods that ensure quality control and testing and proper verification of quality conformance. Contractor and Sub-contractor work, manufacturers, products and materials suppliers will be subject to compliance with durability requirements.

Bridge inspection and reporting is a major component of the on-going evaluation of structure condition and the basis for establishing a baseline f or deterioration models that measure deterioration rates of structure elements over life cycle and for predicting maintenance costs. Each bridge will be inspected at least every two years and in-depth for critical elements such as fracture critical steel at intervals that vary depending on structure type. The conditions will be input to deterministic deterioration models using the AASHTOWare BrM software and enable us to prioritize, budget and plan for annual maintenance activities. Additional discussion regarding our overall Project Durability Plan is provided in Section 4.1.5.2.

Figure 4.2-18: Spalling of Concrete on Bridge Deck

Bridge inspection reports will be prepared in NBIS format and include element-level condition assessments in accordance with the AASHTO *Guide Manual for Bridge Element Inspection*

4.2.1.3 Context Sensitive Solution Elements

The Section 5 corridor is visually separated into urban, rural, forested and agricultural segments. Our Aesthetic and Landscape Concept Master Plan will be designed to enhance the qualities of those areas. Contour grading, slope treatments, planting schemes and landscape surface treatments will reflect the landscape character of the overall regional landscape. For instance, the planting schemes in urban areas are more formal than those in rural or forested lands, Indiana Limestone outcroppings will be carefully excavated to expose features as they would appear in nature and retaining walls and sound walls will be designed to be reminiscent of these local limestone features. The Technical Drawing roll plots in Appendix H-2 depict the concepts to be employed. Context sensitive site level solutions involve line, form, texture and color selections of landscape architectural treatments that create a sense of place. Examples of site level context sensitive solutions we will employ include the detailed design of the unique architectural treatment of abutments at bridges, enhanced light fixtures along sidewalks, and railings and parapets at bridges. Pedestrian and bicycle accommodations further enhance the settings and help introduce a pedestrian scale to the project.

Bridge Enhancements – Seven bridges, a combination of new and existing, have been selected to receive bridge aesthetic enhancements. These four types of aesthetic enhancements include Community Identifiers, Indiana Limestone Veneer/texture in bridge elements, Ornamental Lighting, and Enhanced Architectural Railing.

Figure 4.2- 19: Indiana Limestone Veneer

- Tapp Road and Fullerton Pike bridges will receive all identified enhancements
- The SR 48/3rd Street and SR 45/2nd Street bridges will receive all identified enhancements except for the Indiana Limestone Veneer/ texture
- SR 46 and Walnut Street bridges will only receive Community Identifiers
- Sample Road bridge will only receive the Community Identifier and the Indiana Limestone Veneer

In addition, all seven bridges will incorporate a natural color palette on the bridge structure elements such as the parapet walls, pilasters, girders, and bridge piers. Ornamental lighting will also be incorporated into the bridges to highlight the Community Identifiers and bridge sidewalks. The design team's landscape architects and bridge engineers will work together in the development and incorporation of these aesthetic enhancements, as shown in Figure 4.2-20.

Figure 4.2-20: Example of the bridge aesthetics the I-69 DP Team will incorporate on the Project

Streetscape Enhancements and Vegetation – The landscape palette selected for this Project includes a strategic array of native plants to provide visual interest in all seasons, introduce shade and minimize extensive maintenance.

Figure 4.2-21: SR 45/2nd Street Landscape Concept

Bicycle and Pedestrian Facilities - Bicycle and Pedestrian Facilities are integrated with the planned landscape, roadway and bridge structures. A concerted effort has been made to promote and encourage bicycle and pedestrian use of the overpasses through widened sidewalks and trails as well as signage to direct the users. Street tree planting concepts are planned to further make these areas more pleasing and compatible with pedestrian and bicycle travel. The City of Bloomington Bike Plan provides a wealth of background information to help accommodate the needs of the bicycle community. This Plan was referenced in the design of the Project.

Retaining Walls – Retaining walls will generally be less visible to the traveling public since they are constructed in cut sections and placed lower within a traveler's viewshed, while the noise barrier walls loom as high as 20 feet above the landscape and often follow the roadway for long distances. The lower retaining walls will appear as limestone outcrops with Limestone Veneer form liners texturing the wall's face.

Noise Barrier Walls – Three noise barrier walls have been identified within the project limits. These walls range in heights from 12 feet to 18 feet and would be constructed of pre-cast concrete panels set between wide flange beam posts and pre-cast 30" wide pilasters. These noise barrier walls provide the opportunity for the introduction of texture and color. The pre-cast panels would have a natural limestone texture with a random pattern viewable from I-69. A color similar to that of the natural limestone will be applied as paint or stain.

The neighborhood side of the noise barrier walls will have a different texture. Three alternatives have been proposed, Running Bond Brick Pattern, Horizontal Groove Pattern, and the Random Ashlar Pattern. These patterns along with other patterns and color alternatives will be presented to the public to determine the final neighborhood wall pattern and color.

Figure 4.2-22: Indiana Limestone Outcropping

Rock Cuts/Slope Rounding - Indiana Limestone will definitely be encountered throughout the corridor with concentrations in Segments 5D, 5E and 5F. Rock cuts will be carefully excavated to reflect the character of the limestone outcrops as they appear naturally creating additional visual interest along the roadway. The near vertical limestone faces will transition between sloped earth-cut slopes that will further accentuate the limestone outcrop as a visual feature. Earth slopes will be generously rounded to facilitate blending the project with the existing rolling terrain and dominant agricultural character of the area. Slopes will be seeded with native seed varieties and wild flowers to further blend the project with the

environment. All slopes will be protected with temporary and permanent erosion control features that include progressive grading and seeding, erosion control blankets and fiber rolls and a program to continually evaluate and maintain the landscape and erosion control features.

Woodlots – Mature woodlands and mixed hardwood trees are spaced randomly throughout the corridor. Where trees have to be removed to accommodate the widening, the result is a tree line of bare tree trunks with leaves clustered at the tree tops. The foliage that once reached to the ground

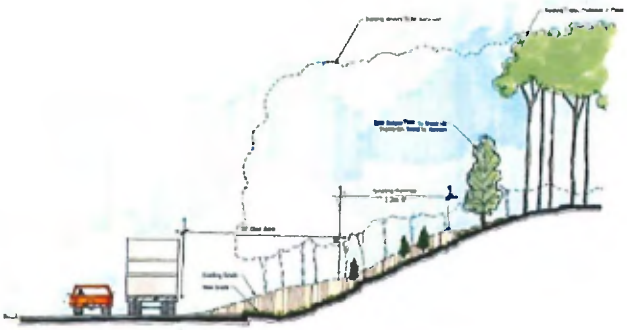


Figure 4.2-23: I-69 DP Woodlot Planting Scheme

forming an attractive visual barrier will be gone. One way to help blend this roadway with the natural landscape is to reestablish a solid tree line edge. This will be done by planting caliper hardwood trees near the ROW where mature trees have been removed. Seedlings will also be planted on the grassy slopes closer to the roadway to create a vegetative transition between the roadway and mature forest vegetation. Over time, this planting scheme will provide visual interest to the traveling public and reestablish a visual screen for adjacent residents.

Selected Intersection Enhancements – We have taken the opportunity to enhance existing and new traffic interchanges and selected intersections within the context sensitive approach. Enhancements will include streetscape improvements include street tree and shrub plantings in medians and street furniture along sidewalks and bike and pedestrian amenities, where trails or multi-use paths are adjacent to or across the road.

Figure 4.2-24: SR 48/3rd Street Intersection Enhancements

4.2.1.4 Utility Relocation and Adjustment Work Elements

The I-69 DP Team has developed a Utility Master Plan included in the Technical Drawing roll plots. The plan includes protection in place, relocation concepts and priority relocation stages to ensure the highway construction stays within the allotted schedule and budget.

Included in our utilities approach is the overall goal to reduce protection work and utility relocations through value engineering, construction sequencing and clear understanding of the utility relocation process as it relates to overall construction.

We have identified and been in communication (with IFA's consent) with the following thirteen utility companies:

- AT&T (Distribution and Long Distance)
- City of Bloomington Utilities (CBU)
- Comcast Central Indiana
- Duke Energy
- Hoosier Energy Rural Electric Cooperative
- Indiana University
- Martinsville Utilities
- South Central Indiana REMC
- Southern Monroe Water Corporation
- Smithville Communication
- Washington Township Water Corporation
- Vectren Energy
- Zayo Fiber Solutions

4.2.1.4.a Performance of Utility Relocations, Adjustments and Protections

While all utilities within the project limits are critical facilities that must be protected in place or relocated, we have identified three major utilities that require immediate attention due to their:

- Relocations costs
- Location within the proposed first phase of construction
- Facility being critical to the utility company and/or the local users

Duke Energy: Duke Energy Transmission has existing 138kV overhead transmission within a 100' easement on the west side of I-69 from Fullerton Pike to 3rd Street. In a meeting held with Duke Energy on October 24, 2013, it was identified that this line could remain in the current alignment within their 100 foot easement with new, raised poles installed to meet clearance requirements above newly placed roadway embankment for the cross roads. This is circuit is part of a redundant system therefore it is permissible to take the line out of commission during the allowable outage dates of September 15th to June 1st. Construction of Rockport Road and Tapp Road crossroads and bridges will be sequenced to allow relocation of Duke Energy facilities prior to the start of work. In addition, Duke Energy has identified an existing pole at the intersection of the two circuits in the system. This pole, located just south of 2nd Street and must be protected in place as relocation of this pole would necessitate a shutdown of the entire redundant system, which is both costly and has the potential to impact the surrounding area. **Our plan to retain the existing configuration of the SR 45/2nd Street interchange allows this pole to remain in place.**

Figure 4.2-25: Duke Energy Transmission Line

Vectren Energy: Vectren Energy Transmission has an existing 16" high pressure gas main on the west side of I-69 at both Fullerton Pike and Tapp Road. The existing line is located within a 50 foot easement, which Vectren has requested be retained outside the LARW. INDOT has recently converted this relocation to a Type 1 relocation and although the this agreement will now be between the Utility and the State, easement acquisition for this relocated facility has the potential to impact scheduling of Phase 1 of construction. Our team will develop workarounds, like the one we proposed in an ATC which would allow the transmission line to remain in place until the bypass line is installed and two diversion valves are installed. The existing line could then be abandoned in place.

Figure 4.2-26: CBU Lift Station on Vernal Pike

City of Bloomington: City of Bloomington Utilities (CBU) exists throughout the corridor at the southern end of the project. CBU has developed preliminary work plans for review by both INDOT and the development teams. In reviewing the work plan provided by the City and in a meeting held on October 10, 2013, the team has identified three requests by CBU which should be considered a betterment, meaning the costs of such request should be paid for by CBU:

- Dual casings at every crossing of I-69. The second casing is for future use and should be considered a betterment.
- Casings for sewer crossings. Per the INDOT Utility Accommodation Policy, one casing is required for crossings of utilities under pressure. Casings for gravity systems should be considered at the request of the utility and thus a betterment.
- Casings for future utilities. CBU is requesting several casings for future water line crossings.

4.2.1.4.b Construction Staging

In addition to those utilities listed above, we have created a Utility Matrix to continually track progress of all utilities at specific locations, expanding upon the Matrices provided by IFA during the bidding phase of the project. Our team has added tracking information such as required relocation timeline, agreement status, prior rights

determinations and comments. This matrix consists of 208 line items that will be used throughout design and construction of the project to guarantee utilities do not affect the critical path schedule.

4.2.1.4.c Coordination with Utility Owners

The I-69 DP Team has attended and/or held meetings with utility companies listed in **Figure 4.2-27**. In these meetings, we gained valuable insight including location specific solutions for protection-in-place and/or utility relocations which will be utilized and further expanded during final design to complete the relocation agreements and the relocations themselves in a timely manner and within budget. We will continue this proactive coordination during final design.

Date	Utility
Sept. 25, 2013	IFA Utility Forum
Oct. 10 & Dec. 19, 2013	Vectren Energy
Oct. 10, 2013	Hoosier Energy Rural Electric Cooperative
Oct. 24, 2013	Indiana University
Oct. 24 & Dec. 20, 2103	Duke Energy
Oct. 10 & Dec. 19, 2013	City of Bloomington Utilities
Oct. 10 & Dec. 19, 2013	Smithville Communications
Oct. 11, 2013	Washington Township Water Corporation
Oct. 24, 2013	AT&T Distribution
Dec. 20, 2013	South Central Indiana REMC

Figure 4.2-27: I-69 DP Team Utility Meetings

4.2.2 Design-Build Management Approach

The I-69 DP Team's approach to D-B management is based on the full integration of design, construction and quality control. This allows our team to provide timely input during the process to efficiently and effectively fulfill the IFA goals.

4.2.2.1 Organization

4.2.2.1.a Project Management Organization for Design and Construction

The I-69 DP Team organization will provide services of the highest quality, consistent with the best transportation P3 management practices and in accordance with the requirements of the RFP. **Section 4.1.1.a.i** and **Figure 4.1-5** identifies our overall project management organization and the participating firms and individuals involved in the design and construction of the project.

4.2.2.1.a.i Management Approach for Design Development and Coordination

Vicente Ferrio, our Construction Manager, will be responsible for the overall management of the D-B Team. Our Lead Engineer, Mike Riggs will manage the design team and coordinate with Vicente throughout the D-B process. This will result in an integrated, efficient, quality project that meets all of the IFA/INDOT objectives. Our coordination approach will include: Early Design Workshop, Internal Morning Design Coordination Briefings, Design Status Meetings and Task Force (TF) Meetings. All meetings will be held at the Project Office in Bloomington. Each of these meetings is described in **Figure 4.2-28**.

4.2.2.1.a.ii Approach for Design Delivery

Project Team Location

The Key Personnel of the I-69 DP Team will be located in the Project Office 100 percent of the time as required in the PPA. The other design members will perform their work in their respective offices, but will be available to attend meetings and perform other activities at the Project Office. It is anticipated that the Project Office will be in Bloomington, Indiana.

Integration of Design to Ensure Consistency and Quality

To ensure consistency and quality, all I-69 DP Team members will be trained in a full-day workshop knows as: "Our Success Design-Build Processes" which will include but is not limited to:

- Contract Requirements
- Documentation Requirements
- Filing Requirements
- Quality Control Requirements
- Electronic Document Procedures
- Utilization of INDOT CADD Standards
- Use of Project Wise to Control the Integrity of our CADD files
- Understanding the Baseline Project Schedule
- Project Team Commitments

The I-69 DP Design Team and the Construction Team has been working closely together for the past six months to develop a superior design and approach to constructing the project.

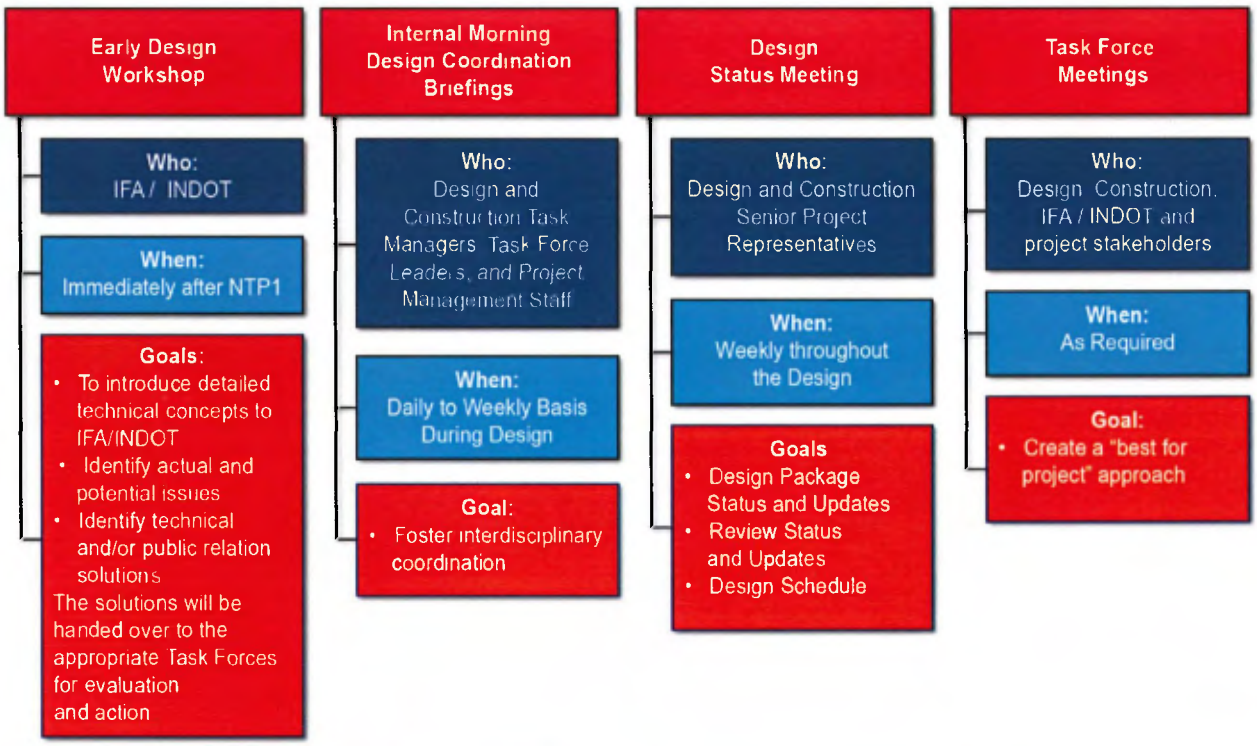


Figure 4.2-28: The I-69 DP Team Coordination Meetings

4.2.2.1.b Internal Organization Systems

The I-69 DP Organization System enables full design and construction integration. We have a proven management and delivery team that is results based driven and has successful completed projects similar in nature to this project. The features of our Organization System include:

- Safety First Mentality
- Integration of the Design and Construction Personnel
- Ownership of Work
- Accurate Reporting
- Informed Decision Making
- Coordination with Utilities and Project Stakeholders
- Coordination with O&M Personnel
- Dispute Resolution at the Lowest Staff Levels
- Schedule Driven Results

4.2.2.1.b.i Management Approach for Construction

As is shown in **Figure 4.1-5** (the I-69 DP Team Organization Chart), clear lines of responsibility have been determined from the Construction Manager to the various managers and superintendents. The Construction Manager will be responsible for coordinating the activities of the various managers and superintendents who in turn will manage subconsultants and subcontractors. The managers and superintendents will be empowered to make key decisions affecting the day-to-day construction of the Project. Weekly meetings will be held with the entire construction management team to plan for upcoming activities, and to discuss and reach resolution on any outstanding issues. Another very key element in the management approach for construction will be the inclusion of the design team in interaction with the construction team. For the past six months, the designers have been working closely with Corsan staff and representatives from the three major subcontractors (Gradex, E&B Paving and Force Construction) to ensure that the preliminary designs we are presenting have been fully vetted for constructability and value. This interaction will continue throughout the project.

4.2.2.1.b.ii Approach to Providing a Unified Work Effort

For design, we have broken the project into ten Design Units, each of which will be led by a Design Unit Manager, who will report to the Lead Engineer. Within the Design Units, various AZTEC/TYPSA disciplines and subconsultants will be tasked to develop portions of the design. The Design Unit Manager will be responsible for leading the Design Unit's efforts, making sure that all work efforts are unified. We will utilize Project Wise as a collaboration tool to share information between Design Unit team members. The Lead Engineer will manage the Design Unit Managers, making sure that they have adequate resources, clear design direction and that questions and issues are resolved in an expeditious manner. As with the construction team, the Design Unit Managers will be empowered to make key decisions affecting the day-to-day design of the Project.

Breaking the design portion of the Project into Design Units, each of which will have a Design Unit Manager, improves the span of control for the Lead Engineer.

4.2.2.2 Design-Build Baseline Schedule

The I-69 DP Team utilized Primavera P6 to develop the Design-Build Baseline Schedule. All major tasks associated with the design, construction, and O&M have been included and the critical path items have been determined for monitoring purposes. The Schedule is more fully discussed in Section 4.1.2 and Appendix H-3.

4.2.2.2.a Schedule

4.2.2.2.a.i Approach for Updating Schedule

The I-69 DP Team Lead Scheduler will update the baseline schedule on a monthly basis beginning with the first full month after receiving NTP1. The process will involve obtaining and documenting the percentage completed for all tasks started or in progress from the task manager in-charge of each work item. Once this information has been obtained, the P6 schedule will be updated and the appropriate data entered to determine the monthly progress for the project.

We will submit monthly progress reports to the IFA no later than 7 business days following the end of each month. The progress report will contain the updated project schedule along with a narrative including the following information:

- A description of the Project progress as a whole, including all phases of the Work. We will identify start date and completion dates on major areas of the Work. The information will grouped based on the WBS
- A summarization of QA/QC findings
- Identification of any pending or resolved claims during the period
- Identification of schedule activities planned for the upcoming period
- Identification of any problems and issues that arose during the month and issues that remain to be resolved
- Summarization of resolution of problems/issues raised in previous progress reports or resolved during the period
- Identification of Critical Path issues and proposed resolution
- Provision of a report on the Project Schedule Deadlines showing the schedule dates for the immediate prior month and current month. We will provide a narrative to explain variations greater than 30 days
- Provision of monthly expenditure projection curves
- Provision of monthly earned value report for all activities and a total earned value for the Project
- Identification of requested and/or required IFA actions for the next month
- Provision of digital progress photographs that accurately depict project progress as outlined in the Progress Report narrative

4.2.2.2.a.ii Work Breakdown Structure (WBS)

The WBS defines tasks that can be completed independently of other tasks, facilitating resource allocation, assignment of responsibilities, and measurement and control of the project.

A complex and/or large project is made manageable by first breaking it down into individual components in a hierarchical structure, known as the WBS. The I-69 DP Lead Scheduler has developed a WBS for this project that follows the following elements:

- The scope of the deliverables of the project
- The start and end time of the deliverables of the project
- The budget for the deliverables of the project
- The name of the person, group, discipline, or division responsible for the deliverables of the project

This detailed Primavera P6 schedule is contained in Appendix H-3.

4.2.2.2.a.iii Approach to Integrate Subcontractors

The I-69 DP Lead Scheduler has prepared the preliminary baseline schedule with input from subcontractors and suppliers and we will continue to integrate their input during monthly schedule updates to provide accurate information in the monthly progress reports. Future integration will be accomplished through a variety of methods including phone conversations, e-mails, visits to supplier's offices, and discussions with subcontractors at regularly scheduled project team meetings. We believe that the schedule is only as good as the information input and therefore we fully understand that all items must be updated accurately.

We will require our subcontractors to execute the work based on their contracted milestones to ensure schedule compliance.

4.2.2.2.a.iv Approach to Manage Resources and Activities

The I-69 DP Lead Scheduler will integrate the cost control module within Primavera P6 to manage resources and activities to take full advantage of the scheduling software capabilities. Should the work be delayed on any critical path item for the greater of either 30 days in the aggregate or the number of days in the aggregate equal to 5 percent of the days remaining until Substantial Completion, the next Project Status Schedule shall include a recovery schedule demonstrating the proposed plan to regain lost progress and how to achieve Substantial Completion by the specified date.

Sometimes the critical path items are not resources but are rather a supply issue. In this case, we will call other suppliers to try to obtain the materials sooner or we may ask to accelerate supplies scheduled in later months to make up the negative schedule float. We have the experience and resources to deliver this project on our proposed schedule.

4.2.3 Design-Build Quality Management

Our DBQMP consists of the Design Quality Management Plan (DQMP) and the Construction Quality Management Plan (CQMP).

The I-69 DP Quality Manager, Mario Benitez, will be responsible for executing the Design-Build Quality Management Plan (DBQMP). The number one goal of our DBQMP is to ensure that the work conforms to the requirements of the PPA. We will produce the DBQMP by following the guidelines described in Section 2 of the Technical Provisions.

Implementation of a comprehensive and well-executed DBQMP will result in superior quality deliverables, shorter review times and a superior design product. I-69 DP has developed the plan to ensure preparation of quality products and compliance with IFA/INDOT requirements.

4.2.3.a Design Quality

Role	Responsibilities
Design Quality Manager (Tom Maki) 	• Overall implementation of the DQMP • Verify that all design comments are appropriately resolved and incorporated • Verify that the review becomes part of the project record
Design Unit/Task Managers	• Selecting reviewers • Assembling the review packages for distribution by document control • Consolidating review comments • Resolving comments and their final disposition • Ensuring that comments are incorporated or addressed in their discipline's packages.
Document Control Manager	• Distributing the review packages • Recording receipt of review comments • Distributing the comments to the Design Unit/Task Managers • Maintaining a clear record of the reviews and updated design deliverables

Figure 4.2-29: Quality Team Responsibilities

All design documents that are submitted for formal review or release undergo detailed quality control checks beforehand. Detail checking is completed on all deliverables, including the following: Plans, Calculations, Computer Program Input, Specifications or Special Provisions, Structural Design Plans and Calculations and Studies, Reports, other Design Documents.

Several review procedures define the ongoing review of the design as it progresses from proposal stage to completed plan documents. These procedures include the following:

- **Coordination Reviews** that assure all aspects of the design are considered as the design progresses. These reviews are accomplished by routing the design documents of one discipline to all other disciplines for review and comment.
- **Technical Reviews** that utilize the technical expertise of senior staff to enhance the design process. The reviewers are chosen for their prior experience and extensive background and experience on similar projects. Reviewers are not involved directly in the project design, their reviews focus on assuring that the design meets all project requirements, utilizes the best technology and methodology available, and includes client-specific preferences. Their input is given periodically in formal comments that are written and tracked until resolution is reached and the comments are incorporated into the design.
- **Constructability Reviews** assure that construction related expertise is incorporated into the design. Experienced construction engineers and managers will complete these reviews, adding practical construction considerations to the design. The reviews include the use of tracked and formal comments which are returned to the design team in written form. **The I-69 DP Team has been doing exactly this for the past six months, developing the preliminary design and Technical Proposal.**
- After all reviews are completed and comments are received, the Design Unit Team will assess the comments and meet with the reviewer to resolve them. Tracking forms will document this progress. Once all comments are resolved, the design package will be forwarded to the next steps in the agency review process.

The DQMP goes into detail for each of the listed functions, giving staff the quality roadmap for the project design development. Procedures will be included for preparing and checking all drawings, specifications, and other design submittals to ensure that they are independently checked by experienced and qualified professionals. Our Design Quality Management Process is shown in Figure 4.2-30.

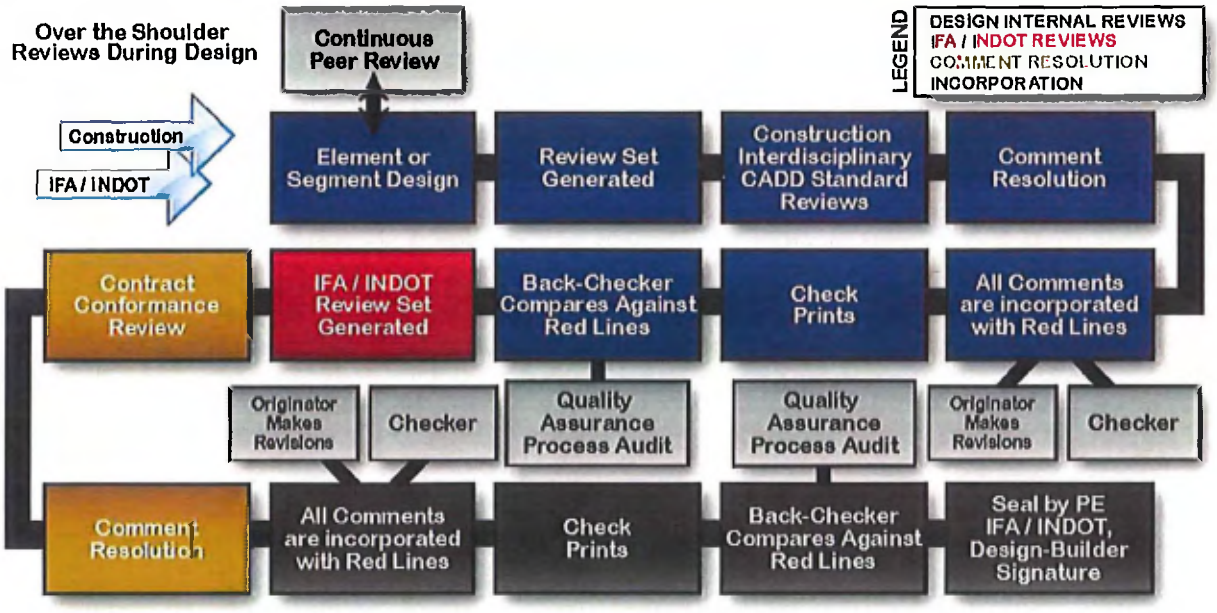


Figure 4.2-30: I-69 Design Quality Management Process

How the IFA/INDOT will be Involved

IFA/INDOT will have quality control personnel co-located with I-69 DP staff at the Project Office to oversee the I-69 DP Team QC efforts. On occasion, other organizations, such as municipalities, counties, or utilities will request to review and comment on the design. These reviews will be scheduled and scoped per the IFA's direction. The reviews will be documented and comment tracking forms will be used and entered into the standard review and comment resolution process.

> Audits will be periodically performed by the IFA quality management staff to certify that the QC procedures and all applicable reviews have all been accomplished.

Proposers Approach to Working Relationships and Responsibilities

The I-69 DP Team believes positive working relationships lead to an on-time or early delivery of a high quality project. Through the one-on-one meetings with IFA/INDOT, we have begun development of a positive relationship. Internally, the six months of work between our designers, contractors and the concessionaire has built the foundation for continued synergy, which we will carry forward into final design, construction and the Operating Period. We will continually monitor the working atmosphere on the project and make improvements as necessary. All team members will fully understand their responsibilities and workshops will be held on a regular basis for updated procedures and policies.

IFA/INDOT Oversight Procedures to be Implemented

IFA/INDOT will perform Owner reviews in accordance with the contract requirements. Formal final reviews will include the use of electronically tracked, formal comments delivered to the design team for resolution. Each comment is tracked until resolution between the IFA/INDOT's reviewer and the designer is reached and the comment is incorporated into the design.

Conformance with Federal Oversight Requirements

The I-69 DP Team will review all Federal guidelines and implement procedures and training to all staff in the Federal processes. We will incorporate the Federal guidelines into the design and design review procedures and follow through with the resolution of outstanding issues.

How Design Quality Management will be Documented

The Design Quality Manager will be responsible for the documentation of design quality management. All staff will be required to enter their quality management actions into ProjectWise (the document control system) at regular intervals.

> The I-69 DP Team document control system will have a quality management tracking component that will contain all details of the quality management functions.

How Changes will be Made to Correct Design

Verification will be performed in accordance with DQMP procedures to ensure that the design packages have incorporated all applicable requirements and met all design standards. Validation will be performed in accordance with planned procedures to ensure that the resulting product is capable of meeting the requirements for the specified application and intended use. Non- conformances that are discovered will be addressed by corrective actions with follow-up by quality management staff for completeness. The I-69 DP Team will follow the detailed prescribed procedures in the DQMP for the resolution of non-conformances.

4.2.3.b Construction Quality

The benefits of a P3/DB project include faster delivery, improved constructability, less cost growth and early cost certainty. To assure the Owner of a quality project, the I-69 DP Team will have an excellent CQMP managed by experienced quality professionals.

The Federal Highway Administration's Transportation Construction Quality Assurance (QA) Reference Manual defines QC as "The system used by a contractor to monitor, assess, and adjust their production or placement processes to ensure that the final product will meet the specified level of quality"

The Construction Quality Manager will report directly to the overall Quality Manager who in turn reports directly to the Board of Directors. This

conveys support for quality control and minimizes potential conflicts with the production staff. The CQMP describes all of the quality control activities that are required to meet the specified level of quality.

Our CQMP consists of the following core elements:

- Contractor Quality Control
- Agency Acceptance
- Independent Assurance
- Dispute Resolution
- Personnel Qualifications
- Laboratory Accreditation

Coordination and communication between the design-builder and the Owner is essential for effective quality management. By working together within a well-defined QA program, the IFA and the D-B team can meet the goal of delivering a high quality project to the travelling public.

CQMP reviews and audits at prescribed intervals will be used to monitor conformance and success in meeting plan goals. The reviews will consist of an evaluation of the effectiveness of the quality processes.

Approach for Integrating with Design

Working with the Construction Quality Manager, the Design Quality Manager will assure integration of the construction quality process into the design areas. When the Project is being constructed, the Design Quality Manager will verify that all engineering design requirements are met. Design reviews with construction personnel will be conducted to evaluate that appropriate design, safety, environmental, and technical standards are being incorporated into the final contract documents. These design services continue during construction, as follows:

- Field design changes
- Notice of design changes
- Requests for information from the field
- Coordination with the construction contractor to answer and resolve any design related questions
- Participation in the construction conferences
- Participation in construction meetings when requested
- Review of shop drawings, project information, shop and material certifications and test results
- Review requests for contractor change orders and provide recommendations

Discussions and decisions rendered during these meetings or communications will be documented in writing. These decisions will be considered as the recommended course of action and will follow the procedures outlined in the DQMP and CQMP.

Our Construction Quality Manager, Jason Bagwell,

is responsible for overall implementation of the CQMP. The I-69 DP CQMP will detail the procedures, criteria and directives to assure conformance with the contract. The plan will highlight inspection requirements as well as management procedures and document preparation and control for such items as Inspector Daily Reports, Field Supplemental Agreements, Work Orders, Supplemental Agreements, and claim file development. Our construction quality management process is shown in **Figure 4.2-31.**

All personnel performing sampling and testing for QC used in the acceptance decision, verification, or Independent Assurance (IA) will be qualified. The D-B contract documents will specify the minimum qualifications for design-build personnel performing QC sampling, testing, and inspection. Minimum qualifications for the I-69 DP quality management personnel will also be clearly stated in the CQMP to ensure staff has a thorough understanding of QA principles and experience working under QA specifications.

I-69 DP will follow the processes and procedures contained in the CQMP plan and will document their quality control activities. Major features of the CQMP plan address quality objectives including: Analysis, Strategy, Staff, Administration, Procedures, Certifications, Records, Subconsultant Quality Management.

An example of our CQMP process, specifically our paving workflow chart, is shown in **Figure 4.2-32**. Quality Assurance certifications for construction materials will be checked for conformance to project standards and specifications upon delivery to the project site. Materials will be tested by CEI staff prior to placement and used only when quality control measures have been verified. All material certifications will be filed in the field office for ease of access. Whether discovered by the D-B Team or the IFA, materials or workmanship that do not meet

the specified level of quality will be properly documented, including the nature of the non-conformance, location, extent, and disposition. The non-conformances will then be corrected as prescribed in the CQMP.

How the IFA/INDOT will be Involved

IFA/INDOT will be involved by having representatives at meetings concerning the development of the construction portion of the project. IFA/INDOT will convey their industry practices related to construction at each step of the development process.

During construction, IFA/INDOT will perform Independent Assurance (IA) functions related to construction. The purpose of the IA system is to assure the reliability of all data used by the agency in the acceptance determination. This includes the agency's verification data and the design-builder's QC data. This ensures validated quality control data is included in the final acceptance determination. Independent Assurance is intended to confirm that the sampling and testing activities performed by the agency and the design-builder are conducted by qualified personnel using proper procedures and properly calibrated and functioning equipment.

An engineering firm not associated with the I-69 DP Team or IFA will be retained to implement the CQMP procedures to control inspection, measuring, and test equipment. The Quality Manager will work directly with this firm to ensure that they are implementing the control procedures without bias to the DB Team.

On this Project, it may be challenging to conduct verification testing at the specified rate due to the large quantities of material being placed and the fast-paced nature of the work. The I-69 DP Team will work cooperatively with IFA/INDOT to provide access and to find solutions to these issues to ensure quality will not be sacrificed due to large material quantities or fast-paced work.

Also, visual inspection will be a key part of IFA/INDOT acceptance on this project. We will provide all access for inspection of the component materials at the time of placement or installation, as well as the workmanship and quality of the finished product.

How Construction will be Documented and Corrected

During construction, a team of experienced construction inspectors and technicians will monitor and document all aspects of the construction process. Material tests will be completed at an acceptable frequency and reports issued for quality assurance record keeping.

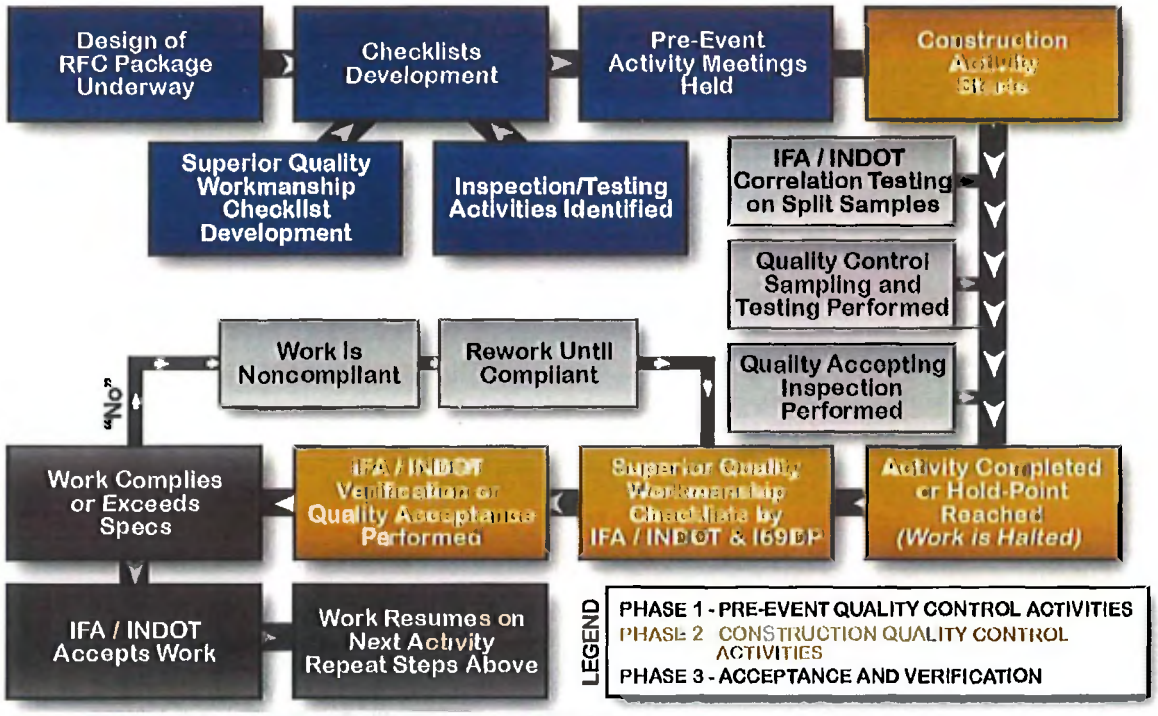


Figure 4.2-31: I-69 Construction Quality Management Process

A procedure for control of project documents and records will be established and maintained, as discussed in Section 4.1.1.2.6. This technical document control system will provide assurance that all approved contract drawings and specifications are available to all users.

The corrective action and dispute resolution process will be unbiased and timely. To address testing related disputes, the use of retained splits of samples will be used in the acceptance decision with a well-defined decision process to determine the outcome of the dispute. The I-69 DP Dispute Resolution process is illustrated in Figure 4.1-11.

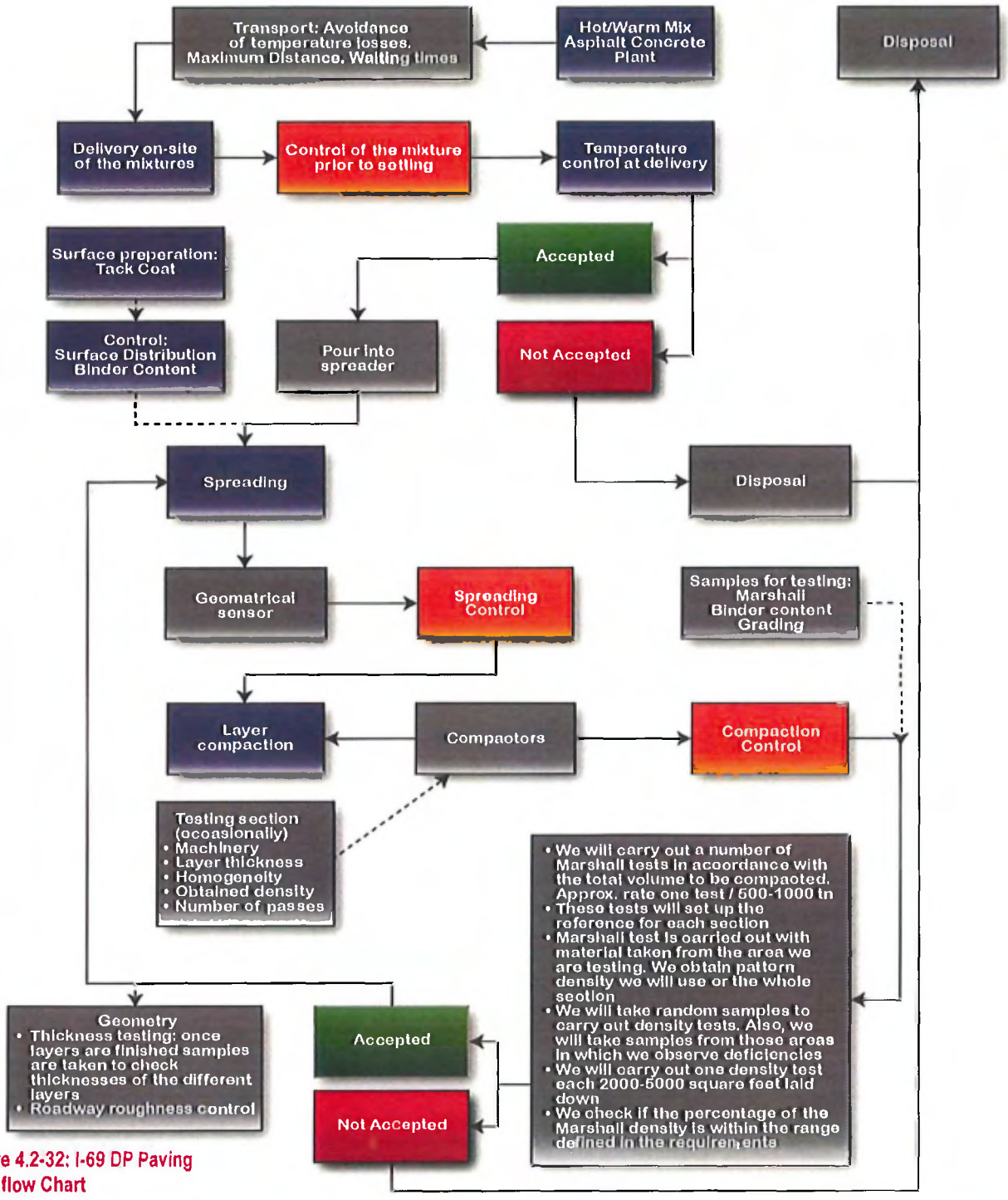


Figure 4.2-32: I-69 DP Paving Workflow Chart