NorthGate Constructors

July 15, 2008

Mark Tomlinson
Texas Department of Transportation
TTA Division Director
Texas Turnpike Authority
125 East 11th Street
Austin, Texas 78701-2483

Dear Mark:

NorthGate Constructors (NorthGate) is pleased to submit this proposal for the DFW Connector Project. When completed, this challenging project will provide a critical mobility link for the region. First and foremost, our goal is to exceed your expectations by implementing the best practices that the member firms – Kiewit Texas Construction L.P. and Zachry Construction Corp. – have learned from successfully delivering some of the nation's most complex highway construction projects. Significant projects include the "High Five," IH 30 (Tom Landry Freeway) and the I-25 T-REX Project in Denver.

NorthGate brings several key benefits to TxDOT and the Stakeholders:

- Innovative solutions for the technical specifications to design and safely construct drainage facilities, roadway, walls, bridges and intelligent traffic systems (ITS).
- Proven programmatic applications for quality, safety, construction traffic management, ROW acquisition, environmental management, utility relocation and permitting.
- Implementation of the "Northgate Connections" program of coordinating, collaborating, and cooperating with the Stakeholders to deliver this important project.
- An experienced team and a Capital Maintenance Plan that fully addresses the Comprehensive Maintenance Agreement (CDA) should TxDOT elect to exercise this option.

Our "no surprises" approach, blended with effective project controls, will ensure a solid design and construction approach from initial cost estimating through design approval and constructability reviews. We will apply the same diligence to cost and scheduling on this project that we have demonstrated in overcoming the challenges and opportunities on many other projects.

We will work with TxDOT to make this project a model of the CDA program. This means that we will partner with you to keep you informed every step along the way. We are excited and ready to start working to share our ideas to accelerate the schedule.

If you have any questions during your review of this proposal, please call me at 817-337-7000.

Sincerely,

NorthGate Constructors

Keith Sasich
Project Director

NorthGate Constructors
13119 Old Denton Road, Fort Worth, TX 76177
(817) 337-7000 (817) 337-7001 fax

Kiewit

July 15, 2008

BRUCE E. GREWCOCK
President and Chief Executive Officer

Amadeo Saenz, Jr., P.E.
Executive Director
Texas Department of Transportation
125 East 11th Street
Austin, Texas 78701-2483

Re: Commitment of Executive-Level Manager for the DFW Connector Project

Dear Mr. Saenz:

When presented with the opportunity to compete for large, complex projects with a high degree of regional significance, it has been Kiewit's practice to assign experienced senior managers to lead the project team. For the DFW Connector Project, I am pleased to commit the services of Keith Sasich as Project Director.

Keith currently serves as President of Kiewit Texas Construction L.P. For the past 10 years, Keith has held overall management responsibility for our operations in Texas, Oklahoma and Louisiana. He is a "hands-on" operations executive in the truest sense, and there are few people at his level more knowledgeable about construction in the Texas transportation market.

During Keith's leadership of our Texas operations, he has been responsible for hundreds of millions of dollars worth of construction, including the I-30 Tom Landry Freeway in Dallas and several projects at DFW Airport. His organization has also assisted Kiewit's operations in other geographic areas with management, resources and equipment on successful transportation mega-projects, including the $1.2 billion I-25 T-REX design-build project in Denver and the $1.3 billion design-build I-15 Corridor Reconstruction in Salt Lake City.

Several years ago, we made a similar senior-level commitment for the $1.0 billion Bay Bridge Skyway Segment in San Francisco. Just like Keith on this project, that manager's time was 100% committed to the project, with his deputy assuming leadership of his business unit's remaining construction operations. Keith is likewise fully committed to this project.

The DFW Connector Project will be essential in meeting the transportation needs of the Dallas-Fort Worth area. We are pleased to be able to commit to the project one of our top leaders with decades of construction experience.

Sincerely,

Bruce E. Grewcock
President and CEO

cc: Sam E. Swan, P.E.
Texas Department of Transportation
125 East 11th Street, 5th Floor
Austin, Texas 78701-2483

Mark Tomlinson
TTA Division Director
Texas Department of Transportation
Texas Turnpike Authority
125 East 11th Street
Austin, Texas 78701-2483

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Kiewit Plaza, Omaha, NE 68131
(402) 342-2052

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Proposal Component	Form (if any)	ITP Section Cross Reference	NorthGate Proposal
Technical Proposal			
A. Executive Summary			**Volume A**
Executive Summary **(Exclude price Information)**	No forms are provided	Exhibit B, Section 3.1	Exec. Summary
B. Proposer Information, Certifications & Documents			**Volume B**
Proposal Letter	Form A	Exhibit B, Section 3.2.1	Tab: Form A
Authorization Documents	No forms are provided	Exhibit B, Section 3.2.1	Tab: Form A
Identification of Proposer and Equity Participants	Form B-1	Exhibit B, Section 3.2.2	Tab: Form B-1
Information About Proposer Organization	Form B-2	Exhibit B, Section 3.2.2	Tab: Form B-2
Information About Major Participants, Major Professional Services Firms and Identified Subcontractors	Form B-3	Exhibit B, Section 3.2.2	Tab: Form B-3
Responsible Proposer and Major Participant Questionnaire	Form C	Exhibit B, Section 3.2.3	Tab: Form C
Industrial Safety Record for Team Members Performing Installation or Construction Work	Form D	Exhibit B, Section 3.2.4	Tab: Form D
Personnel Work Assignment Form	Form E	Exhibit B, Section 3.2.5	Tab: Form E
Key Personnel statement of availability	No forms are provided	Exhibit B, Section 3.2.5	Tab: KP Availability
Letters Approving Key Personnel	No forms are provided	Exhibit B, Section 3.2.6	Tab: KP Approval
Letters Approving Changes in Proposer's Organization	No forms are provided	Exhibit B, Section 3.2.6	Tab: Chngs. Approval.
Non-Collusion Affidavit	Form F	Exhibit B, Section 3.2.7	Tab: Form F
Buy America Certification	Form G	Exhibit B, Section 3.2.8	Tab: Form G
DBE Certification	Form H	Exhibit B, Section 3.2.9	Tab: Form H
Child Support Statement for State Grants, Loans and Contracts	Form I	Exhibit B, Section 3.2.10	Tab: Form I
Conflict of Interest Disclosure Statement	Form J	Exhibit B, Section 3.2.11	Tab: Form J

Proposal Component	Form (if any)	ITP Section Cross Reference	NorthGate Proposal
Technical Proposal			
Equal Employment Opportunity Certification	Form Q	Exhibit B, Section 3.2.12	Tab: Form Q
Guarantor Letter (if required)	No forms are provided. If guaranty is required, Form B-1 is required for the guarantor.	Exhibit B, Section 3.2.13	Tab: Guarantor Letter
Surety Information	No forms are provided.	Exhibit B, Section 3.2.14	Tab: Surety Info.
Debarment and Suspension Certification	Form R	Exhibit B, Section 3.2.15	Tab: Form R
Certification Regarding Use of Contract Funds for Lobbying	Form S	Exhibit B, Section 3.2.16	Tab: Form S
[redacted]			
D. Appendices			**Volume D**
Key Personnel Resumes and References	No forms are provided	Exhibit B, Section 3.2.5.1	Section D.1
Technical Drawings, Graphs and Data	No forms are provided	Exhibit B, Section 4.1	Section D.2
Project Schedules	No forms are provided	Exhibit B, Section 4.1.3	Section D.3
E. Proposal Security (Proposal Bond or Letter of Credit)			**Volume E**
Proposal Bond	Form K-1	Exhibit B, Section 3.3.1	Prop. Security Envelope
Letter of Credit	Form K-2	Exhibit B, Section 3.3.2	Prop. Security Envelope
F. Escrow Agreement			**Volume F**
Escrow Agreement	Form L	Exhibit B, Section 3.4	Escrow Envelope

Proposal Component	Form (if any)	ITP Section Cross Reference	NorthGate Proposal
Financial Proposal			
A. Updated Financial Information			
Audited fiscal financial statements for all periods subsequent to the QS and unaudited interim financial statements	No forms are provided	Exhibit C, Section 2.0	Tab: Financials
Guarantor letters of support (as required)	No forms are provided	Exhibit C, Section 2.0	Tab: Guarantor
For publicly held companies most recent SEC 10-K and 10-Q reports and any 8-Ks filed since the QS	No forms are provided	Exhibit C, Section 2.0	Tab: Credit Ratings
Credit ratings	No forms are provided	Exhibit C, Section 2.0	Tab: Credit Ratings
Letter regarding material change in financial condition since submission of the QS and for the next reporting period	No forms are provided	Exhibit C, Section 2.0	Tab: Material Chngs.
Letter disclosing all material off balance sheet liabilities	No forms are provided	Exhibit C, Section 2.0	Tab: Off-Bal. Liabilit.
B. Price Information			
Development Price	Form N-1	Exhibit C, Section 3.1	Tab: Form N-1
Cash Flow Adjustment Table/ Maximum Payment Curve	Form N-2	Exhibit C, Section 3.1	Tab: Form N-2
Maintenance Price	Form O	Exhibit C, Section 3.2	Tab: Form O
EPDs (to be delivered separately into escrow as provided in the ITP Section 4.3.2)	No forms are provided	Exhibit C, Section 3.3	Financial Proposal Binder

C.1

Technical Solutions

Technical Solutions

SECTION C
PROJECT DEVELOPMENT PLAN

C.1 TECHNICAL SOLUTIONS

NorthGate Constructors (NorthGate) was created to provide execution excellence in design-build project delivery and "hands-on" senior management to exceed all nine of TxDOT's DFW Connector Project (Project) goals. This Project is a priority for TxDOT and the NCTCOG region, and we have committed experienced people with unique transportation design-build skills. Our team has expended over 60,000 man-hours in developing solutions to exceed TxDOT's requirements and Project goals. Our technical solutions incorporate four innovative Alternative Technical Concepts (ATCs) and include more than 70 added-value features.

NorthGate Constructors — Two premier Texas contractors have teamed up to guarantee successful completion of the DFW Connector Project ...

Kiewit delivered the $1.2 billion I-25 T-REX project in Denver nearly two years ahead of the owner's original completion date.

Zachry completed the Dallas "High Five" a year ahead of schedule.

Similar to the Dallas "High Five" and Denver's I-25 T-REX project the DFW Connector has no readily available freeway alternatives. This means the technical solutions must move traffic safely and efficiently through the work zone while providing access to local businesses. We expanded and finalized our traffic control and sequencing plans originally submitted in our QS using three independent teams of experienced transportation designers and constructors. NorthGate expended more than 8,000 man-hours analyzing solutions to exceed TxDOT's Project goals and technical requirements. We then integrated our traffic control solutions with NorthGate Connections, our centralized communication and community outreach program. Our public information and communications plan for this Project has been adapted from our award-winning I-25 T-REX program, which received a 93% commuter approval rating.

Based on Stakeholder meetings over the last nine months, mobility and maintaining local access were consistently communicated as a high priority by the City of Grapevine and DFW Airport administrators. Keys to meeting these challenges and minimizing impacts during construction include:

- Our "Smart Start" approach minimizes the duration of construction impacts;
- Our technical solutions were developed to provide high-quality, best-value, whole-life design and construction to exceed requirements and be delivered ahead of schedule;
- Our communications program focuses on setting expectations and providing quantifiable results for Stakeholders; and
- Measurable day-to-day progress will take place to alleviate the "Aren't they done yet?" syndrome.

Our "Smart Start" strategy increases the time for planning and progression of development activities, allowing us to maximize construction efficiency and reduce the duration of construction impacts.

C.1 (a) Alternative Technical Concepts (ATCs) included in Proposal

After evaluating more than 30 ATCs, NorthGate submitted 19, which exceeded $100 million in cost savings and covered a wide range of features. We have included in our proposal four of the six TxDOT-approved ATCs (Figure C.1-1), totaling more than $30 million. Following award, our design-build management team will continue developing solutions with an innovative mindset to exceed TxDOT and Stakeholder expectations and Project goals.

Figure C.1-1 TxDOT-Approved ATCs to be Used by NorthGate

ATC #, Description	ATC Application	Section Reference	Benefit
#2, Deep Foundation Design	Incorporates process for final design of drilled shaft foundations	C.1.1.2, C.1.1.3	Decreases costs by $4,000,000 while providing field verification using Statnamic load testing of actual foundation shafts. This method allows better use of existing soil conditions to reduce design and improve construction quality.
#3, 11-ft. Temporary Lane Widths	Basis for developing construction sequencing	C.1.1.1	Reduces exposure time of the traveling public to construction work zones and allows the Project to be completed within the schedule; reduces $18,000,000 in cost for temporary pavement.
#4, Elevated Direct Connector at SH 26	Basis for our Developer's Schematic Design	C.1.1.3, C.1.1.9, C.1.1.10	Reduces exposure time of the traveling public to construction work zones and allows the Project to be completed within the schedule plus provides reduced construction costs by $8,570,000.
#8, Luminaire Poles for RVSD	Basis for quantifying RVSD mounting poles	C.1.1.12	Reduces construction cost by $365,000 with no negative impacts to Radar Vehicle Sensing Devices (RVSD) performance.
Total savings over $30,000,000			

C.1 (b) Added Value Components

The technical solutions provided in our proposal incorporate added-value components (Figure C.1-2) that exceed Project requirements and goals. These items provide an estimated value exceeding $200 million. Much of this value is attributed to our focus on minimizing impacts and associated economic disruptions to businesses, communities and motorists.

C.1.1 Design and Construction Plan

NorthGate's design and construction plan completes the Work in 1,705 days from NTP1, 29 days ahead of the required schedule duration. Additionally, we have reduced the duration of construction impacts to 1,464 days (referred to as our "Smart Start" approach). These commitments reflect our due diligence efforts to date, guaranteeing Project success. NorthGate team members have a proven record of on-time project delivery, as evidenced by the Tom Landry I-30 Freeway, the Dallas "High Five," the I-25 T-REX project in Denver, and the I-15 Corridor Reconstruction in Salt Lake City. NorthGate's integrated team of designers and constructors expended nine months of planning in task force meetings to exceed all Project goals. Key actions taken to achieve success are:

- Understand TxDOT's goals, terms of the CDA and technical requirements through task force reviews representing each development, design and construction discipline to verify compliance and optimize value
- Conduct outreach with major Stakeholders to gain insight into the surrounding communities' needs during construction
- Apply life cycle costing and constructability reviews to optimize design, minimize impacts and enhance mobility and maintenance costs

NorthGate will expand upon its technical solutions during final design using a systematic process to provide high-quality, cost-efficient design and construction. The design steps include:

- Establish task force groups by discipline and integrate design across elements
- Prioritize design packages to meet schedule requirements
- Schedule design reviews for preliminary, interim and final design packages
- Document issue-for-construction process that ensures quality and conformance with contract and permit requirements
- Provide accurate and timely as-built record drawing submittals

The construction steps include:

- Integrate operations plans with design packages
- Develop daily work plans from operations plans
- Conduct operational pre-activity meetings to verify technical compliance, quality control, safety, hazard analysis and environmental compliance
- Integrate public information with construction to ensure communication with Stakeholders

Figure C.1-2 Added Value Components

Characteristics	Benefit to TxDOT's Project Goals	Referenced
☐ Three-segment, three-phase traffic control plan	Increase mobility	C.1.1.1
☐ On-site TMC operable within three months of NTP1; two months before "cone zone" starts	Increase mobility	C.1.1.1 | C.1.1.12
☐ Traffic Management Strategic Reports provide efficient traffic outreach and traffic shifts	Increase mobility	C.1.1.1 | C.2.3
☐ Dedicate Project Courtesy Patrol during peak hours	Increase mobility	C.1.1.1 | C.2.3
☐ More than 30 strategically placed and monitored emergency pull-outs	Increase safety, mobility	C.1.1.1 | C.2.3
☐ Expanded use of location markers on traffic barriers	Increase safety, mobility	C.1.1.1 | C.1.1.13
☐ GPS coordination to ensure real time data for motorists	Increase safety, mobility	C.1.1.1
☐ Advertise Project impact info at DFW Airport, rental car updates	Increase mobility	C.1.1.1 | C.2.5
☐ Impact projections for community / stakeholder planning and meetings	Mitigate construction impact	C.1.1.1 | C.2.5
☐ Minimize trucking by balancing earthwork within each section	Increase safety, mobility	C.1.1.2
☐ Significantly reduced bridge surface area	Expedite project delivery, increase mobility	C.1.1.3
☐ Use of Tx54 girders to reduce beam lines and pick times	Reduce costs, expedite Project delivery	C.1.1.3
☐ Shorten bridge spans by using MSE wrap-around walls	Reduce costs, expedite Project delivery	C.1.1.3
☐ Standardized design features for all structures	Reduce costs, expedite Project delivery	C.1.1.3
☐ Maximized the use of MSE walls	Reduce costs, expedite Project delivery	C.1.1.3
☐ Minimized use of curved steel plate girders	Reduce costs, expedite Project delivery	C.1.1.3
☐ NorthGate Connections communications program	Increase collaboration, increase mobility	C.1.1.4
☐ Eliminate reconstruction of Minters Chapel Rd.	Reduce costs, expedite Project delivery, increase mobility	C.1.1.4 | C.1.1.9
☐ Weekly TCP meetings	Increase collaboration, mobility, safety	C.1 1.1 | C.1.1.4 | C.2.1
☐ PIC Interface with technical task forces	Increase communication, cooperation, mobility	C.1.1.4 | C.2.5 | C.2.1
☐ Weekly ROW task force meeting	Increase communication, coordination	C.1.1.5
☐ 1,075 potential utility conflicts identified and detailed	Increase likelihood of meeting schedule	C.1.1.6 | D.2.4
☐ "Smart Start" planning includes utility relocations beginning at NTP2	Expedite Project delivery	C.1.1.5 | C.1.1.6
☐ LCCA sensitivities performed to ensure value	Optimize operational life cycle performance	C.1.1.7
☐ Maintenance inclusion on task forces to integrate approach	Create long term value	C.1.1.7
☐ Environmental Compliance combined with QC/QA process	Increase cooperation, expedite Project delivery	C.1.1.8
☐ Use of low sulfur diesel in equipment, "no idle" and "refuel-at-night" policy	Improve air quality	C.1.1.8
☐ Environmental hazard analysis included in daily work plan	Expedite Project delivery	C.1.1.8
☐ Created detailed drainage plan and drawings	Expedite Project delivery, increase quality	C.1.1.9
☐ Cement stabilized base drainage backfill	Increase quality, optimize life cycle, expedite Project delivery	C.1.1.9
☐ Thirteen geometric enhancements during construction	Increase mobility during construction	C.1.1.10
☐ Improved sight distance at Commerce Street / increase mobility	Increase mobility after construction	C.1.1.10
☐ Designated ETCS integrator included in Project partnering meetings	Increase quality, collaboration	C.1.1.11
☐ ITS maintained and enhanced during construction	Increase communications / mobility during construction	C.1.1.12
☐ NorthGate Connections wayfinding outreach	Increase communication, cooperation	C.1.1.13
☐ Rectangular bridge columns facilitate aesthetic enhancements	Increase design, construction quality	C.1.1.14 | C.1.1.3

- Begin field operations with systematic evaluation by inspection/QC at predetermined hold points
- Complete activities and confirm acceptance

Benefits of our design and construction plan are increased assurance for schedule completion, higher quality construction, positive public opinion, continued mobility and minimized business impacts. The following 14 technicalsections highlight our design and construction approach. The Technical Drawings, Graphs and Data included in Appendix D.2 provide details of our diligent planning efforts to date.

C.1.1.1 Construction Staging, Sequencing and Traffic Management

The NorthGate Difference

Our Traffic Control Plan (TCP) reduces the "cone zone" construction period (when traffic is in a temporary configuration) to minimize impacts, improve traffic flow, and create positive Stakeholder response.

Commitment to TxDOT Project Goals Addressed in This Section

(a) **Maintaining mobility through the Project area during construction ...**
We exceed Stakeholder expectations by reducing construction duration over 8%, which minimizes the "cone zone" impact.

(e) **Safe construction**
We will maximize use of concrete traffic barriers to separate construction from the traveling public.

(f) **Expediting delivery of Project improvements**
Our three-segment, three-phase approach effectively coordinates construction operations with dedicated resources and management oversight to meet the aggressive schedule.

(g) **Facilitating participation by DBEs ...**
DBE opportunities include flagging, temporary signage and the Courtesy Patrol.

(h) **Cooperation and coordination with Stakeholders ...**
This is achieved by developing the optimum TCP, then implementing the on-site temporary traffic management center (TMC), Courtesy Patrol and NorthGate Connections, an innovative communications program to connect people, plans and information.

(i) **Use of public-private partnerships ...**
NorthGate firms have committed financial, personnel and equipment resources to develop a Traffic Management Plan that exceeds Stakeholder expectations.

Added Value Items Included in This Section

- **More than 30 pull-outs or "breakdown areas" are provided on controlled access lanes throughout sequencing to improve flow by reducing incident-related congestion and enhancing traffic safety.**
- **The Courtesy Patrol and temporary TMC staff will assist motorists and coordinate with law enforcement and emergency service providers.**
- **Traffic Management Strategy Reports (TMSRs) adapted from our innovative processes on I-25 T-REX improve traffic switch planning and implementation efficiency.**
- **Our three-segment/three-phase TCP approach reduces major traffic shifts to approximately eight shifts per segment. This represents a reduction of 8% - 17% in the number of traffic switches over a four- to six-phase approach. Minor shifts are reduced a similar amount.**
- **Traffic barriers will have markers to easily identify traffic incident locations, expediting response.**

NorthGate's approach prior to the Qualifications Submittal (QS) was focused on traffic control. Evidence of this comes from comments received on our preliminary TCPs submitted in the QS, which were rated "Excellent" (greatly exceeding expectations). Similar to the 25 TCP drawings submitted with our QS, the TCP drawings submitted with this proposal demonstrate solutions to the Project's traffic control challenges. Since the QS, the Project scope has

been refined with additional elevation data and bridges at the DFW interchange, but our commitment to minimizing impacts remains the same. Our team spent more than 8,000 man-hours expanding the level of detail and analysis of our TCP approach. The results of this review include the following:

- Confirmed three-segment, three-phase TCP approach to reduce impacts and maintain existing level of mobility
- Increased confidence in our TCP to construct frontage roads while minimizing business-related access impacts within 18 months of NTP2
- Maximized work areas and productivity, reduced "cone zone" duration by five months and exceeded schedule requirements

With the numerous Stakeholders on this Project, there is a potential for significant negative economic impact if traffic control is not managed properly. Our plan is focused on maintaining mobility and minimizing Stakeholder impacts. NorthGate's TCP minimizes inconvenience to the traveling public and maintains access to commercial properties by:

- Performing active outreach to Stakeholders for feedback on traffic control activities
- Reducing our overall completion schedule from 1,734 to 1,705 days
- Reducing construction duration impacts by 150 days, over 8% of the overall Project duration, to 1,464 days using our "Smart Start" approach
- Constructing the majority of frontage roads for business access in 18 months from the Begin Project Construction milestone
- Maintaining capacity on controlled access roadways
- Assuring that signals and signage are efficient and easily understood through daily inspections
- Holding weekly traffic control meetings with the appropriate TxDOT, Stakeholder and Northgate personnel

C.1.1.1 (a) Overall Traffic Management, Control and Sequencing Approach

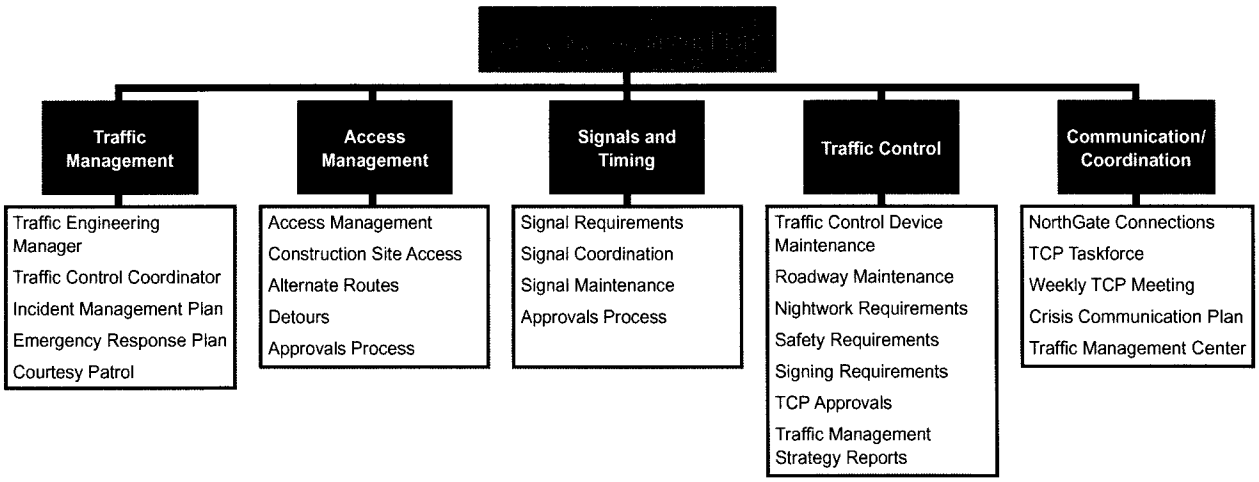
Recognizing the link between traffic management, Stakeholder communications and mobility throughout the construction period, we implemented a comprehensive traffic control strategy integral to achieving the same high public approval rating we received on the I-25 T-REX project.

NorthGate will incorporate a temporary Traffic Management Center (TMC) in the Project office. The TMC will be operational within three months of NTP1 and will remain operational for the duration of construction activities. The NorthGate-provided TMC consists of an operator workstation; a video management subsystem; a video display and communication / application servers, with software including subsystems for monitoring and controlling the CCTV cameras; DMS units (single-line and large signs); and traffic monitoring stations. The TMC will be available for use by TxDOT, law enforcement representatives and NorthGate management personnel and will be linked to TxDOT's TransVISION and other governmental agencies.

Traffic Management Plan (TMP): The TMP, to be approved by TxDOT, will describe traffic management policies and procedures and provide guidelines for the five TMP components (Figure C.1.1.1-1).

Under the Traffic Control component, our TMP describes how to maintain safety, mobility and reduce impacts through the use of temporary pavement, clear signing, safety barriers, and proactive notifications of lane shifts, lane closures and detours. An example under lane closures would provide requirements for bridge construction during off-peak lowest-volume travel times for work such as bridge demolition and girder placement over traffic. Traffic Management Strategy Reports (TMSR) adapted from our I-25 T-REX experience will be used to improve traffic switch planning and implementation efficiency. These TMSR are detailed reports of all work required to implement traffic switches and are reviewed by senior project management for approval.

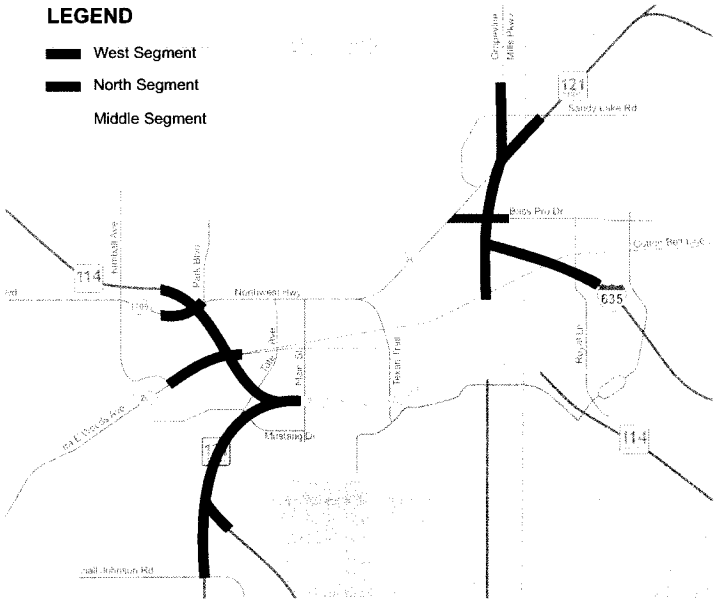
Figure C.1.1.1-1 Traffic Management Plan Components



Traffic Control Plan: Our TCP is based on TMUTCD guidelines and the procedures outlined in the TMP. The TCPs include details affecting all phases of work that impact traffic, including detours, traffic control devices, striping and signage, and required safety features. All TCPs for specific activities will be submitted a minimum of 10 days prior to implementation to ensure TxDOT has adequate time for review. The NorthGate Connections program will simultaneously develop and implement communication strategies for informing the public of new traffic patterns to improve flow and wayfinding plans to assist motorists in accessing businesses and other points of interest. We will have a full-time traffic engineer, traffic coordinator and management group reporting to the Traffic Control Manager to monitor traffic operations, lane closures and detours around the clock. This group is responsible for monitoring, implementing traffic control devices and efficiently moving traffic through the Project.

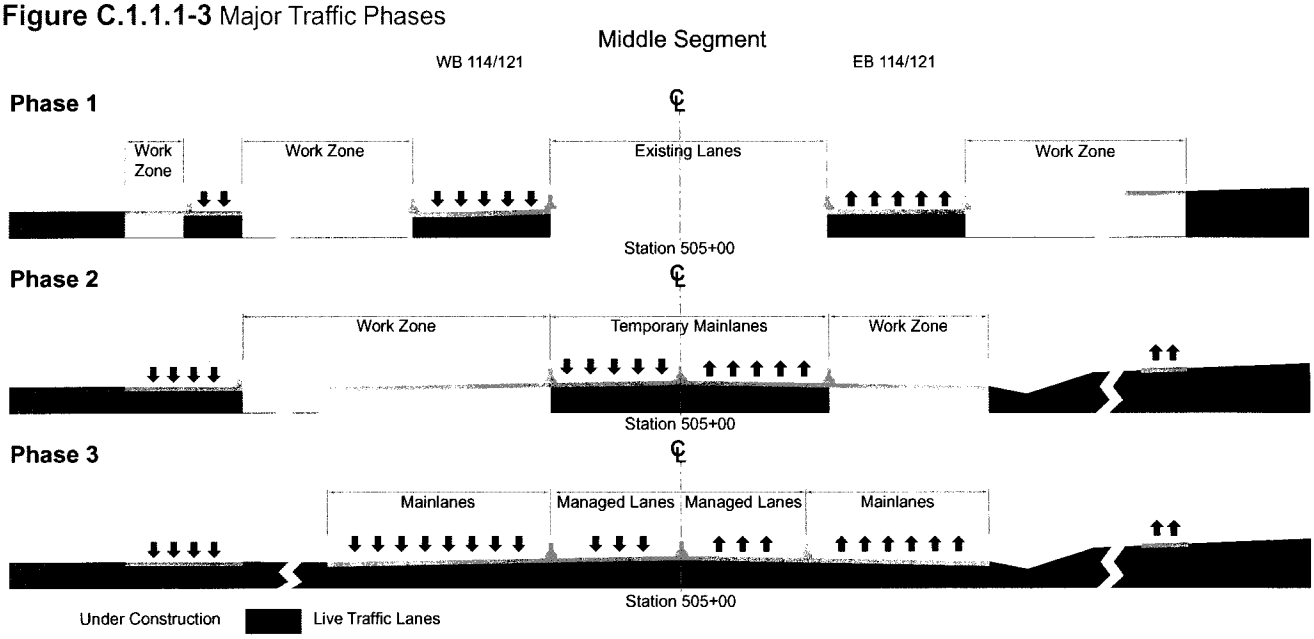
Sequencing Approach: Consistent with our QS, division of the Project into three segments improves management efficiency to expedite construction. Minor adjustments to segments were made to meet our detailed sequencing requirements for this proposal. Figure C.1.1.1-2 illustrates our current segment limits.

Figure C.1.1.1-2 NorthGate Project Segment Map



Our sequencing analyses involved a comprehensive comparison of the cost of temporary pavement and its benefits to increased mobility. This led to increased use of temporary pavement, reducing the number of traffic switches and maximizing work areas and mobility through the work zone. This efficient implementation of temporary pavement, combined with ATC 3, Temporary 11-ft. Lane Widths, allowed us to minimize the number of phases to three. Our detailed Construction Staging and Sequencing Drawings are provided in Appendix D.2.1 and are based on the three major phases incorporating five steps: 1A, 1B, 2A, 2B and 3A. Phase 3B shifts traffic into its final configuration for Substantial Completion. An example of our overall three-phased sequencing approach for the Middle Segment is illustrated in Figure C.1.1.1-3.

Figure C.1.1.1-3 Major Traffic Phases



Phase 1 generally builds the new outer frontage roads and temporary mainlane pavement to shift two mainlanes outward. Phase 1 TMSRs detail all traffic control operations required to shift traffic into Phase 2 configurations. In Phase 2, traffic uses the new frontage roads, collector distributor roads, managed lanes and mainlanes. Phase 2 generally completes the remaining outer mainlanes. Phase 2 TMSRs detail all traffic control operations required to shift traffic into Phase 3 configuration. Phase 3 completes bridges and staged mainlane and ramp work at the SH 114/International Parkway interchange.

A general overview of construction sequencing is shown in Figure C.1.1.1-4. Major work activities occurring in each phase (earthwork/drainage (E), paving (P) and structures (S) are shown in bold to demonstrate the level of activity by phase; how we've planned the work in each phase to progress toward final configuration; and the types and locations of Work.

Figure C.1.1.1-4 Major Traffic Phases

Seg.	Block, Station	Cone Zone				
		1A	1B	2A	2B	3A
W	01, 315+00 to346+00	**E**P**S**	-**PS**	**E**--	E--	E--
	02, 346+00 to 372+00	**EPS**	**EPS**	EP**S**	---	---
	03, 386+00 to 428+00	-P-	EP**S**	EP**S**	**E**--	-P-
	04, 89+00 to 112+50	**EPS**	**E-S**	**E-S**	E-**S**	-P-
	05, 372+00 to 445+00	**EP**S	**EPS**	**EP**-	**EP**-	EP-
	06, 547+00 to 585+00	**EPS**	**EPS**	EPS	**EP**-	EP-
	07, 478+00 to 547+00	**EPS**	EPS	**EPS**	**E**PS	---
	08, 250+00 to 295+00	E**PS**	E--	**E**--	E--	---
M	09, 445+00 to 490+00	**EPS**	**EP**-	**EP**-	**EP**-	E--
	10, 490+00 to 525+00	**EP**-	**EP**-	**EP**-	---	E--
	11, 1788+00 to 1841+00	E**PS**	**EPS**	**EPS**	EP**S**	**EPS**
N	12, 1841+00 to 1911+00	**EPS**	**EPS**	**EPS**	**EP**-	**EPS**
	13, 100+00 to 155+00	**EPS**	EP**S**	E-**S**	**E**--	---
	14, 1911+00 to 1955+00	EP**S**	EP**S**	EP**S**	EP-	-**P**-
	15, 3995+00 to 4055+00	**E**PS	-**PS**	**EPS**	EP-	EP-

E = Earthwork/Drainage, P = Paving, S = Structures, - = No activity
Bold = Major Quantity

C.1.1.1 (b) Concept Drawings and Description of Construction Staging; Minimizing Stakeholder and Community Disruptions / Impacts

Successful traffic control requires developing detailed plans, followed by proper execution. Our reduced "cone zone" duration plan was specifically developed for this Project and, along with the roll plots in Appendix D.2.1, shows the level of our understanding. Upon award, we will advance these plans, continuing to use an innovative mindset based on proven excellence. For example, NorthGate's TxDOT-approved ATC 4, Elevated Direct Connector at SH 26, in the West Segment was originally specified as a depressed section. Using an elevated direct connector reduces this area's the construction time by 20%, eliminates numerous minor traffic switches and significantly reduces impacts to Sam's Club, Academy, Walmart and other area retailers. Another

method of minimizing impacts and disruptions involves locating our laydown areas and plant sites in the work zone, which eliminates the need to merge more than 60,000 truckloads of construction traffic with motorists, minimizing both disruption and impacts.

We will use concrete traffic barriers to provide separation between travelways and work areas to increase Project safety. NorthGate's plans for construction also includes:

- Widening existing roadways with temporary pavement and constructing detours to provide efficient traffic flow and larger work areas
- Coordinating construction activities around community events
- Using TCP task force meetings to coordinate lane restrictions
- Using concrete traffic barriers with location markers to separate traffic from construction, providing a safe environment for both Project personnel and traveling motorists
- Using 11-ft. traffic lanes on controlled-access facilities to reduce Project duration, impacts and cost (ATC 3)
- Providing a Courtesy Patrol to assist stalled vehicles and remove other safety hazards from the roadway and assist first responders with incident management
- Providing strategically placed pull-out areas so that vehicles can move out of traffic lanes
- Communicating with GPS providers to ensure traffic flow information is relayed into their systems

Our detailed planning includes designer-constructor reviews during task force meetings, and a segment-to-segment review to ensure that TCP coordination occurs consistently across boundaries.

C.1.1.1 (c) Business, Airport and Residential Access Management Plan

NorthGate commits to reducing the impact duration of frontage roads and arterial streets affecting businesses. Our plan is to construct continuous blocks, minimizing impacts to community and business-related access, and complete most of the frontage roads impacting business access within 18 months of NTP2.

Informational signs will notify drivers when access routes change. The NorthGate Connections communications program and public information team will continually communicate that "the road is open." We are committed to addressing the concerns of the Cities of Grapevine, Southlake and DFW Airport, and maintaining positive public perception by notifying motorists of travel conditions through the corridor. In providing solutions we analyzed our traffic and business impact ratings (Figure C.1.1.1-5), which allows us to proactively target specific groups with the NorthGate Connections program. This matrix enables us to understand when, where and what type of impact is anticipated and apply focused mitigation measures.

Figure C.1.1.1-5 Traffic and Business Impact Ratings

		Traffic Impact by Phase					Business Impact by Phase				
Location	Blocks	1A	1B	2A	2B	3A	1A	1B	2A	2B	3A
114 Kimball to SH26	1,2	H	H	M	M	L	M	H	H	M	L
114 SH26 to Dallas Co. Line	5,9,10,11	H	H	H	M	L	H	H	M	M	L
115 SH26 to Dallas Co. Line	10,11	H	H	H	M	L	H	H	M	M	L
121 Hall Johnson to SH114	6,7	H	H	M	M	L	M	M	M	L	L
121 Int. Pkwy. to 2499	11,12,14	H	H	H	M	L	M	H	H	M	L
121 2499 to Dallas Co. Line	14	M	H	H	M	L	H	H	M	M	L
SH 360	8	M	M	M	M	L	M	H	M	L	L
IH 635	13	H	H	H	M	M	M	H	M	L	L
FM 2499	15	H	H	H	M	L	M	H	H	H	L
FM 1709	1	H	H	H	M	M	H	H	H	M	M
SH 26	3	H	H	H	H	M	H	H	H	M	L
L=low, M=medium, H=high											

Access management includes constructing driveways while maintaining access to properties and providing temporary access, signage and detour maps. NorthGate has taken into consideration the importance of moving tourists through the corridor to and from DFW Airport and to the many local attractions, such as Great Wolf Lodge, the Gaylord Texan, retail destinations and other facilities such as Baylor Hospital. NorthGate will use temporary signs, dynamic message signs (DMS) and other wayfinding measures to ensure ease of navigation through the construction corridor. All DFW Airport users will benefit from these traffic communication procedures.

NorthGate Connections will provide updates on construction activities and roadway changes that can be accessed by visitors to the area as well as local residents. The NorthGate Connections program will contact individual businesses and residential areas affected by upcoming construction activities directly and provide them with necessary information.

C.1.1.2 Geotechnical and Earthwork Plan

The NorthGate Difference

NorthGate conducted additional geotechnical borings to optimize design and meet technical requirements. We have identified location-specific solutions for the Eagleford and Woodbine geological formations and stratigraphy.

Commitment to TxDOT Project Goals Addressed in This Section

(a) **Maintaining mobility throughout the Project area during construction ... ; and (f) Expediting delivery of Project improvements.**
Our balanced earthwork plan eliminates hauling 1.5 million cu. yd. of excavation off-site. This reduces congestion during construction and expedites construction.

(d) **Securing quality design, construction and capital maintenance services ...**
Our geotechnical investigation plan exceeds TxDOT requirements and significantly reduces geotechnical risk associated with the Project's design, construction and maintenance.

(e) **Safe construction**
Motorist safety is improved by reducing 150,000 truck loads of embankment hauling in the surrounding area.

Added Value Items Included in This Section

- **Eliminating 1.5 million cu. yd. of excavation improves construction-related congestion and adjacent community roadway infrastructure maintenance.**

NorthGate conducted 20 additional borings for extensive laboratory testing to further develop geotechnical criteria. We analyzed locations to minimize intrusion into the Project's right-of-way, and to obtain information to optimize our design to meet the technical requirements. This benefits TxDOT through reduced cost and risk associated with challenging geotechnical conditions. Our additional borings were selected in association with the TxDOT-provided boring data. This information was compiled into a database for evaluation to optimize design and construction options for bridges, walls, pavements, subgrades and earthwork. We also dug additional test pits and performed sulfate testing; to date, all soils tested under 3,000 ppm.

Pavement Subgrade Calculations and Considerations: A potential vertical rise (PVR) calculation was performed for the 40 TxDOT-provided borings and the 20 additional borings performed by NorthGate. For each of the borings, four different moisture condition scenarios were calculated. For wet, average and dry conditions, PVR was calculated assuming a consistent moisture condition to the depth of 20 ft. For the calculation of the in-place moisture content at the time of drilling, the actual moisture contents as shown on the boring logs were used to determine the PVR.

All calculations were summarized to show the PVR and the depth of cover that would be required at each moisture condition to reduce the overall PVR below the required 1 in. for the Project. The moisture condition at the time of drilling shows that the soils were at a predominately dry to average moisture state. For most borings, the depth of

cover needed is slightly less than what is calculated for dry conditions. A few locations will require the full depth of cover as calculated for dry, although their moisture state may be dry to average.

Additional analyses were performed using the "Effective PI" method as outlined in Technical Provisions, Book 2, specifically looking at means to provide materials that result in Effective PI of less than 25. Considerable efforts were employed to delineate by interpolation areas of excessive PI (> 40), based on the available data and extensive local experience. These efforts were performed to develop the most prudent and cost-effective initial pavement sections along the various Project alignments, while simultaneously seeking to minimize construction duration impacts to the local community. The result of effective PI culminated in the delineation of the Project's subgrade requirements by locations shown in Figure C.1.1.2-1 at the end of this section.

Earthwork Plan: The earthwork associated with the Schematic Design was evaluated volumetrically using 3-D modeling software. The Schematic Design excess earthwork volumes required approximately 1,500,000 cu. yd., or approximately 150,000 truckloads, of waste dirt to be hauled over the existing roadway system to local waste sites. Through refinements and modifications to the roadway profile grades, NorthGate's Schematics (Appendix D.2.6) show a reduction in waste excavation requirements. Consistent with design guidelines, this is accomplished by raising the SH 114 roadway profile 4 ft. between Texan Trail and William D. Tate Ave.; eliminating SH 26 excavation for the subterranean direct connectors with TxDOT's approval of NorthGate's ATC 4, Elevated Direct Connectors at SH 26; along with other roadway profile refinements and slope modifications to decrease slope percentage and maximize compaction volumes. Our earthwork plan balances quantities over the entire Project and eliminates the 150,000 truckloads hauled outside the Project's limits – a significant reduction of construction-related congestion and a significant reduction to roadway maintenance. Our plan also provides significant opportunities for DBE trucking to help us exceed the Project's DBE goal.

C.1.1.2 (a) Proposed Geotechnical Investigation Plan

Objectives: Primary objectives for our geotechnical design are to provide geotechnical data and design criteria necessary for the Project's development including bridges, pavements, walls, earthwork and geotechnical stability while meeting or exceeding the standards set forth in the TxDOT Geotechnical Manual (Manual). Value is provided to the Project through selected geotechnical methods not covered in the Manual to support known TxDOT criteria, and by making use of beneficial ground behavior conditions not described by existing procedures to reduce risk to long-term structure performance. We are providing Project-specific Statnamic® field shaft load tests to verify soil characteristics for design of the bridge foundations. The methods approved by TxDOT in NorthGate's ATC 2, Deep Foundation Design, will develop Project-specific design charts for bearing capacity and skin friction.

Scope of Work: Our scope of work identifies site-specific subsurface conditions for both stratigraphy and groundwater, and provides the necessary geotechnical design information, including strength and deformation behavior for pavements, subgrades, retaining walls, foundations and other structures. Using the criteria outlined in the TxDOT Manual, we have prepared a detailed spreadsheet documenting the total scope of our investigations (Appendix D.2.10). Using a maximum boring spacing of 300 ft. for the bridges, our estimated boring depths are based on the Manual and on stratigraphic data obtained from our pre-proposal geotechnical investigations.

For retaining walls, we propose a maximum boring spacing of 200 ft., with boring depths of not less than 15 ft. below the base of the wall. For pavements we propose a depth of 20 ft. below finished pavement to evaluate the stipulated potential vertical rise (PVR) requirements at spacing consistent with the Manual.

Our program maximizes the applicability of each boring to multiple structures within reasonable criteria. Where a wall is adjacent to a bridge abutment, a single boring can be used to collect all required data for both structures. This methodology minimizes duplication of data and reduces costs. Our detailed laboratory testing program provides the required geotechnical data for pavements, subgrades, retaining walls, foundations and other structures. Our program includes soil and rock classification tests, soil and rock shear strength tests, and deformations tests.

A key component of the geotechnical investigations will be load testing using the Rapid Load Test method, as described in NorthGate's TxDOT-accepted ATC 2, Deep Foundation Design. The field load test measures the axial resistance of various strata in end-bearing and side shear. These measurements will be correlated to geotechnical parameters (Texas Cone Penetrometer, rock coring and strength tests on cores) at each field test location, so that they can be extrapolated, as appropriate, to other Project locations. Field tests will be performed using a top-

down axial loading of instrumented test shafts at representative Project locations. This innovative approach allows NorthGate to develop specific TxDOT-type design charts for all foundations at the site, following TxDOT-approved methods while taking into consideration the applicable specific subsurface conditions.

Information to be Obtained: We will collect the necessary geotechnical information for input into the design of all structures. Spreadsheets showing the extent of our program are attached in Appendix D.2.10 detailing the required borings, depths and test plans for each Project element. The data obtained will be used to develop construction means and methods. Stratigraphic information will be obtained for all Project elements. For pavements, design information will include earthwork, subgrades, and potential vertical movements. For bridges, foundation design information will be obtained, including point bearing and side shear for drilled shafts. The data will support consideration of alternative foundations, if necessary. Information will be obtained for use in the design of all walls, and will provide input as to the stability of cantilever, mechanically-stabilized earth (MSE), soil/rock nail, tie-back, and drilled shaft walls. Information will also be obtained on trench excavation protection and temporary shoring.

Minimizing Intrusiveness and Community Concerns: NorthGate's geotechnical team is made up of companies with experience on TxDOT projects and significant field-work skills. We will make every effort to minimize intrusiveness, including pre-notification of upcoming testing activities, performing all borings in locations within the Project's easements, and implementing appropriate environmental mitigation measures.

C.1.1.2 (b) Construction Ground and Groundwater Control

Ground: Based on NorthGate's investigations, and geotechnical data provided by TxDOT, construction ground control can be implemented for each of the Project elements. For temporary excavations, trench protection and temporary shoring will be utilized as required. For permanent excavations, depending upon easement constraints and potential impacts on other existing structures, slopes or temporary shoring will be used in some cases, and, in others (for example, where soil nail or drilled shaft walls are installed as permanent structures), the design will include ground control during construction. Temporary casing will be used as needed.

NorthGate considered possible ground needs for excavations, walls and shafts. Drilled shafts, in particular, require ground-control techniques depending on site-specific subsurface conditions. The Project requires control of soft or caving ground and/or groundwater which occurs at various depths. Control will be accomplished during drilled shaft installation with the use of casings or slurry placement methods to stabilize the excavation.

Groundwater: The groundwater conditions are highly variable, as expected based on the site's geologic formations. Relatively shallow groundwater seepage was noted in some borings, while others remained dry. The geotechnical investigation plan will better define groundwater conditions for each Project area. Specific conditions identified will be addressed during design and construction. For deep foundation construction, temporary casings will be available for use as needed, and NorthGate will be prepared to switch to slurry methods in the rare event that they are required. Where a cut for the new grades may encounter groundwater, the situation will be addressed during design and construction. The resulting design will include permanent groundwater control, and construction methods that make use of temporary groundwater control.

C.1.1.2 (c) Pore Pressure, Settlement and Stability; Monitoring and Instrumentation

As part of the design process, soils will be tested to determine soil properties located within the Project limits, and evaluated by our geotechnical consultant for long-term stability and settlement problems. Designing and building quality embankments and slopes using the Project's Design Criteria should limit the need for monitoring and instrumentation. Soils identified by the geotechnical consultant as "marginal to poor" will be noted to the design team with recommendations. The design team will evaluate the recommendations and implement a strategy such as using soils outside of the roadbed areas in shallow flat slopes. However, as further design and analysis is undertaken, we are prepared to install vibrating wire piezometers with automatic data loggers, inclinometers and wire settlement plates as needed.

Pore Pressure: Pore pressure measurements within soils for embankments and walls will be collected using vibrating wire piezometers. NorthGate will use multilevel piezometers to monitor pore pressures at a single location at various depths. Pore pressure data will allow us to monitor internal drainage, providing a basis for evaluating the time-rate of consolidation and estimating the percent complete.

Settlement: At Project locations identified as critical or "controlling," we will measure the settlement of road embankments and retaining walls using inclinometer casing, in-place inclinometers, and/or vibrating wire settlement plates installed at the time of construction to effectively measure the settlement during construction and over the life of the structure. The basis of method selection will be cost, access to instrumentation after construction, and the magnitude of the deflection anticipated.

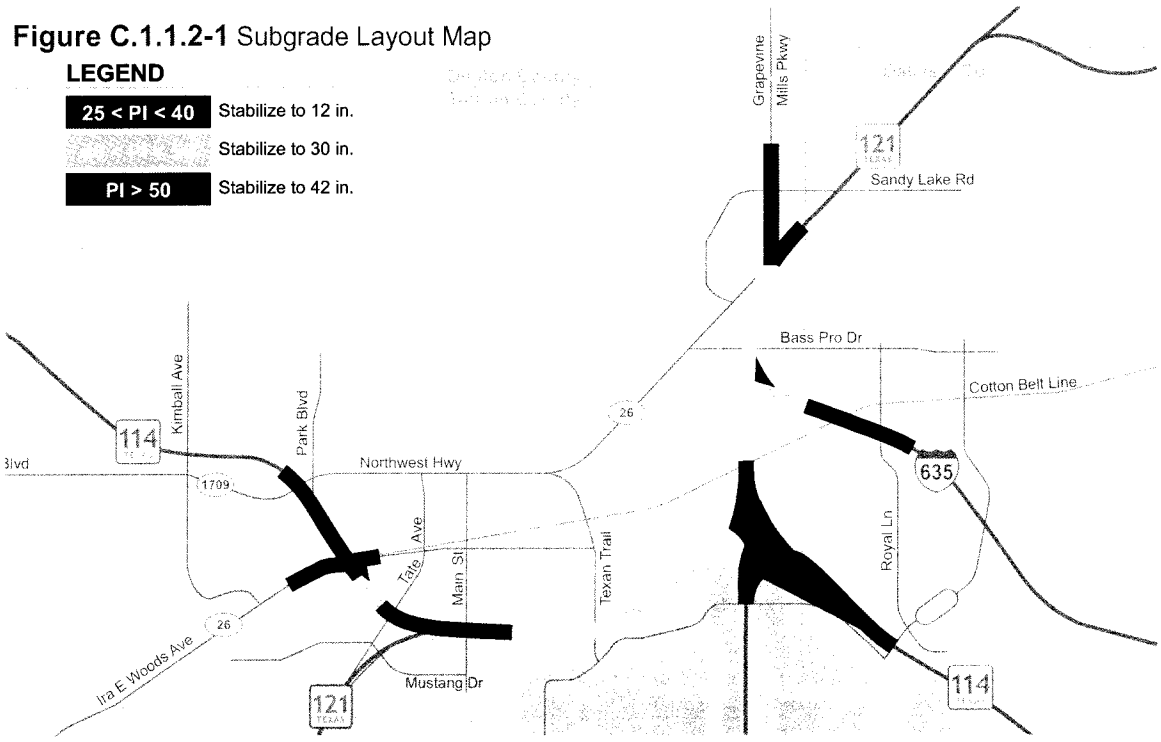
Stability: Monitoring critical retaining walls and embankments reduces the risk associated with failure and the cost of replacing a wall during operation. In-place inclinometers and inclinometer casing will be used to monitor critical walls. For measuring loads on rock/soil nails used in both temporary support and as permanent structures, instrumented rods will be installed. Instrument selection will be made on a case-by-case basis during the design of critical wall sections.

Monitoring: Instruments will be monitored both during construction, to develop baseline readings, and after construction, to measure long-term performance. For both types of instruments, specific monitoring programs will be developed for the remaining construction, in the immediate periods following construction, and for the long-term operational period.

C.1.1.2 (d) Preliminary Pavement Design Report

Our Preliminary Pavement Design Report is provided in Appendix D.2.11 and has been developed with consideration of appropriate projected EASLs and design life. The data provide for sub-grade and sub-base materials that result in an effective Plasticity Index (PI) of less than 25 when calculated to a depth of 8 ft. from finished pavement surface for mainlane pavements, and to a depth of 7 ft. from finished pavement surface for non-mainline pavements. Based on results of soil sulfate testing, existing soils will be lime treated to varying depths, depending on the soil PI and pavement section thickness, in order to provide an 8-ft. structure with an effective PI of less than 25. A soil PI and treatment depth map was developed based on the geotechnical investigation of the Project site (Figure C.1.1.2.-1). To address the non-swell requirements for the pavement design, Northgate is evaluating the PVR method and the effective PI below the finished pavement surface. In each case, the geotechnical data collected by Northgate's proposed geotechnical investigation plan will be used to determine the most effective method for meeting the non-swell requirements, reducing construction costs, and reducing maintenance costs over the life of the Project.

Figure C.1.1.2-1 Subgrade Layout Map



C.1.1.3 Bridges and Surface Structures

The NorthGate Difference

In addition to traffic control challenges, the bridge and structure work will be multi-phased and require detailed planning due to the close proximity of other construction activities, traffic and business access. Of the 86 bridges, 81 will be completely reconstructed and the remainder will be widened. Additionally, over 1.2 million square feet on more than 100 retaining walls will be constructed.

Commitment to TxDOT Project Goals Addressed in This Section

(a) Maintaining mobility during construction and minimizing impacts
Our planning reduced the square footage of bridges to minimize construction-related impacts.

(d) Securing quality design, construction and maintenance services ...; and (f) Expediting delivery of Project improvements
Using standardized and readily available components on our bridges and structures exceeds TxDOT standards and reduces the construction duration and impacts on the traveling public.

Added Value Items Included in This Section

- Standardized design and construction improves quality and reduces duration, which simplifies phasing.
- The bridge deck was reduced by more than 100,000 sq. ft., which reduces initial and life cycle costs.
- Concrete beams were used on all but five of the curved steel plate girders to take advantage of the available and preferred construction materials.
- Wraparound MSE walls reduce the overall bridge spans, saving cost and time plus reduced life cycle costs of the facility.
- Numerous span arrangements use TxDOT-standard Tx54 beams to reduce the lead time and schedule risk, and cut life cycle costs in half.
- Beams exceed the allowable release or ultimate strength of concrete by TxDOT and use 0.5-in. or 0.6-in.-diameter strands for an ultimate strength of 270 KSI steel.
- Our design maximized use of MSE walls to approximately 75% of the total wall area.

C.1.1.3 (a) Bridge Concept Plans

Our design of bridges and surface structures is based on CDA, Book 2 and Book 3 requirements. From our award-winning experience on the $1.2 billion I-15 Corridor in Salt Lake City, where we constructed more than 140 bridges in four years, we have employed standard designs and materials to ensure a similar appearance and achieve significant efficiencies. Performing repetitive tasks allows our bridge crews to perform high-quality construction, reduce duration and work safely.

Bridge numbering was developed early in our process to provide flexibility to adjust bridge numbers during scope development. Figure C.1.1.3-1 is an example of the bridge summary sheet, which demonstrates our procedure for designating the vertical level (VL), bridge number, bridge description, segment, average width and length, bridge and girder type. This table also includes the Bridge type: Overpass (O/P), Flyover (F/O), Widening (WD), Water (W), and Railroad (RR). Girder types are indicated as follows: standard precast bulb-tee (BT), precast and post-tensioned U (PTU), precast and post-tensioned I (PTI) and steel plate (ST). A complete listing of the bridges and additional details, along with our Preliminary Bridge Plans, can be found in Appendix D.2.2.

Figure C.1.1.3-1 Example of NorthGate Bridge Details on 17 of 86 Bridges

VL	Brdg.#	Description / Location	Segment	Avg. Width	Length	Type	Girder Type
2	13	Connector from Bridge 2 - 12 for Exit Ramp to SH 360 SB	West	38 ft	774 ft	F/O	BT
2	14	Connector from Bridge 2 - 12 for Exit Ramp to SH 121 SB	West	28 ft	891 ft	F/O	BT
1	15	SH 114 EB Frontage over SH 26 (Ira E. Woods)	West	69 ft	432 ft	RR	BT
1	20	SH 114 EB Frontage TurnAround to SH 114 WB Frontage @ W. D. Tate	West	25 ft	365 ft	O/P	BT
1	21	W. D. Tate over SH 114 Mainline	West	126 ft	365 ft	O/P	BT
1	22	SH 114 WB Frontage TurnAround to SH 114 EB Frontage @ W. D. Tate	West	25 ft	365 ft	O/P	BT
2	55	Exit / Connector Ramp from SH 121 Frontage connecting to Bridge 2 - 53.	Middle	28 ft	985 ft	F/O	BT
2	56	Exit / Connector Ramp from International Pkwy. SB to SH 114 EB	Middle	61 ft	390 ft	F/O	BT
2	58	Exit / Connector Ramp from Bridge 2 - 56 to SH 114 EB Mainline	Middle	28 ft	1,135 ft	F/O	BT
3	64	Exit / Connector Ramp from SH 114 WB Mainline to International Pkwy. SB into DFW connecting to Bridge 3 - 63.	Middle	37 ft	2,464 ft	F/O	BT/PTU
4	65	International Pkwy. NB from DFW, Exit / Connector Ramp to SH 114 WB Mainline and SH 114 Frontage WB	Middle	30 ft	4,385 ft	F/O	BT/PTU
1	66	SH 121 Frontage SB from Bass Pro Drive over DART (Cottonbelt) Rail Line	North	42 ft	505 ft	RR	BT
2	84	TurnAround Bridge at Bass Pro Drive to SH 121 SB to SH 121 NB Frontage	North	25 ft	520 ft	F/O	BT
2	85	SH 26 NB Connector Ramp to SH 121 NB Mainline	North	35 ft	2,536 ft	F/O	BT/PTU
2	86	SH 121 NB Frontage from Bass Pro Drive to Connector with Bridge 2 - 85 to SH 121 NB Mainline	North	28 ft	361 ft	F/O	BT
1	87	FM 2499 SB Collector Distributor to I-635 EB and SH 121 SB Mainlines.	North	58 ft	1,317 ft	F/O	BT
1	88	I-635 EB Collector Distributor to FM 2499 NB Mainline and Frontage	North	60 ft	1,169 ft	F/O	BT/PTU/ST

C.1.1.3 (b) Retaining Wall Concept Plans

After analyzing six wall types, we have identified four different walls that will be used: mechanical stabilized earth (MSE), cast-in-place (CIP), drilled shaft (DS), and soil nail (SN) walls.

Initial analysis showed approximately an equal split between MSE and DS walls with small amounts of CIP and SN walls. Following analysis of soil sediment, wall height, life cycle cost analysis, material availability and constructability, we refined our design through the task force process to maximize implementation of less expensive and faster-to-construct MSE walls (nearly 75% of the total wall area). In cut areas, we have 21 DS, two CIP walls and one SN wall. In compliance with the draft environmental mitigation measures provided by TxDOT, NorthGate is not constructing any noise walls. The Preliminary Wall Plans including typical sections, proposed locations and limits can be found in Appendix D.2.3.

C.1.1.3 (c) Bridge Materials and Methods of Construction

Our bridge approach focused on minimizing the use of steel girders. This was due to the variable cost and availability of these materials, which introduces significant risk to the cost and schedule. The majority of the NorthGate bridges are concrete girders with only five steel girders, five bridge widenings and one box beam bridge.

TxDOT-standard Tx28 to Tx70 prestressed concrete I girders were used primarily throughout the corridor locations. In select geometrically sensitive cases, either an 84-in. prestressed I girder or a precast U girder was used to eliminate the steel girder spans. Structure configuration is controlled by span length and by vertical clearance requirements of the features crossed.

For all bridge decks, an 8-½-in.-thick concrete deck slab with Class "S" concrete will be used to meet the 100-year service life requirements. The 8-½-in. deck will provide a 2-in. cover for the top mat of steel reinforcement, extending the life of the top mat of steel. The live load impact to the deck will be resisted by a stiffer member, which will minimize the vibration of the deck and increase the life span of the structure. Historically, an 8-½-in deck has a 30%

longer life span than an 8-in. deck. Due to the direct impact of the live load, the deck of the structure goes through more stress reversals than any other member of the bridge. A deeper member reacts better to stress reversals, which increases the life span of the bridge. This will provide reduced maintenance of the structure during the life span of the bridge.

To minimize the number of expansion joints, two-span or three-span units with continuous slabs over interior bents will be used. Standard 4-in.-thick prestressed concrete panels were used as the forming system to support the weight of the top 4-½ in. of concrete slab. This top slab will have a top mat of epoxy-coated reinforcing steel. Prestressed concrete panels provide added value since it reduces the time required to form and strip this work.

Where site conditions required longer spans or significant horizontal curvature, structural steel plate girders were used. Like the concrete I girders, these will be painted to create aesthetically appealing structures. The deck slab thickness for the steel spans is also 8-½ in., and the forming system for steel girders will be metal stay-in-place forms. The straight steel bridges were designed as two- or three-span continuous units, and curved steel bridges as three- or four-span continuous units.

Of the five bridges to be widened, four are on I-635 and the other occurs at SH 360. These bridges will match the current structure and use prestressed type IV beams. A box beam bridge will be constructed over Denton Creek. This structure was designed to provide adequate clearance for stormwater flow. The box beams for this structure are TxDOT standard design.

Most superstructures are supported by rectangular single-column or multi-column bents of varying heights. Round columns will be used in limited locations to match structures unaffected by the Project aesthetics. Single-column (hammerhead) bents are used primarily on collector-distributor ramps where deck width is up to 42 ft. Multi-column bents of two or more columns will be used on mainlane structures where deck width is greater than 42 ft. The overhang for the caps on the single-column bents varies depending on the size of the column; whereas on multi-column bents, the overhang is held constant. Each rectangular column is founded on a drilled shaft as described in Section C.1.1.2 Geotechnical and Earthwork Plan. Where ramp alignments cross at high skews, straddle bents will be used. Straddle bents are primarily drop caps with post-tensioning due to the length. Some locations require integral or inverted caps to meet vertical clearance requirements. Columns located within the traffic clear zone will be placed behind protective barriers.

This bridge example shows Tx54 girders with a standard hammerhead pier cap and square column substructure.

Abutments will be standard TxDOT-type stub abutments with a cap beam supported on drilled shafts. Slopes in front of the abutments are protected with stained concrete at a 3:1 slope. The rip-rap will extend around each side. Standard TxDOT approach slabs will be used in the design, and retaining walls will not support abutment foundations. Bridge barriers are TxDOT-standard 36-in. single-slope traffic rail, stained to match the substructure elements. All controlling clearances and clear zones conform to the TxDOT Book 2 Geometric Design Criteria table shown in Section 11 – Roadways, pp. 11-3 and 11-4.

Activities over traffic or requiring lane closures will occur during non-peak hours, typically at night. Construction of this amount and variety of structures will require detailed planning to ensure the work is phased correctly and executed according to plan. All bridges will be constructed full width without longitudinal expansion joints.

Bridge widening will begin with a narrowing of the existing traffic and placement of concrete barrier. Then, any demolition required for tie-in to the existing structure will be performed, followed by extending the existing structure. Upon completion, the new capacity will be opened to traffic as soon as possible in accordance with our overall traffic control plans.

New bridge construction will follow standard industry methods beginning with foundation work on the drilled shafts. Next, the substructure work will be performed. Using standardized substructure components will reduce the formwork and allow crew efficiencies given the number of Project bridges. Following this, the deck work will

commence. For precast concrete I girder bridges, a pre-stressed concrete deck panel will be used to reduce time, followed with an integral deck pour. For steel girder bridges, a permanent metal decking will be used followed by standard formwork and completion of the deck.

C.1.1.4 Connectivity / Interconnections

The NorthGate Difference

Coordinating the connection of the DFW Connector Project with other current and future infrastructure assets will reduce conflicts and create efficiencies.

Commitment to TxDOT Project Goals Addressed in This Section

(a) **Maintaining mobility through the Project area ... through effective communication, cooperation and coordination**
Coordinating with local agencies and Stakeholders will help maintain mobility by reducing the potential for construction activities in the same place at the same time.

(e) **Safe construction**
Coordinating activities will allow agencies and Stakeholders to work together to provide safer work areas.

(f) **Expediting delivery of Project improvements**
Reviewing requirements for interim design reviews and revocable permits will reduce time for approvals.

(h) **Cooperation and coordination with Stakeholders ...**
Coordinated efforts with other agencies reduces the possibility of late design concept changes.

Added Value Items Included in This Section

- **As an example of our coordination with government agencies, Stakeholders and the utility companies, we eliminated the need to remove existing roadway pavement for the Minters Chapel Road drainage work.**
- **Our weekly Project Management Look-Ahead meeting provides Project direction relating to public information and communications, traffic handling, Project mobility and construction impacts.**

The Project connects to multiple public infrastructure assets including existing transportation, public transportation, railroads and other infrastructure construction projects. Coordinating with local governmental agencies and Stakeholders will reduce potential Project conflicts when concurrent work occurs. Sharing details of construction activities, TCPs and possible impacts will ensure projects do not overlap and whether certain work items can be combined for efficiency and cost savings. Coordinated work locations also improve safety.

Connectivity/Interconnections with Existing Transportation: There are numerous points of interface with existing transportation infrastructure, including connections to existing roadways owned and maintained by TxDOT, DFW Airport, and the Cities of Grapevine and Southlake. The Project also interfaces with rail at a future underpass structure to accommodate DART's proposed rail access to DFW Airport Terminal B; and overpass structures at two existing DART rail crossings, currently used by Fort Worth Western Railroad (FWWR). NorthGate's approach to successfully managing these points of connectivity involves:

- Using NorthGate Connections to communicate accurate and timely information
- Keeping local agencies and Stakeholders informed on Project design, construction and maintenance schedules
- Meeting with adjacent public works departments to coordinate phasing, TCPs and other Project activities
- Coordinating with DFW Airport and DART/FWWR to reduce potential mobility impacts
- Coordinating with new or pending construction projects that may impact the Connector corridor

The connectivity/interconnections with existing transportation infrastructure affected by the Project and the corresponding jurisdictional entity are shown in Figure C.1.1.4-1.

Figure C.1.1.4-1 Existing Transportation Facilities

Infrastructure Facility	Jurisdiction	Infrastructure Facility	Jurisdiction
W Northwest Hwy E of SH 114	City of Southlake	Mustang Dr E of SH 121	City of Grapevine
FM 1709 (E Southlake Blvd)	City of Southlake	Stone Meyers Pkwy	City of Grapevine
SH 26 (E of SH 114)	TxDOT	International Pkwy (S of TxDOT ROW)	DFW Airport
SH 26 (W of SH 114)	TxDOT	SH 114 - western Project terminus	TxDOT
W D Tate Ave (W of SH 114)	City of Grapevine	SH 114 - eastern Project terminus	TxDOT
W D Tate Ave (E of SH 114)	City of Grapevine	SH 121 - southern Project terminus	TxDOT
Main St	City of Grapevine	SH 121 - northern Project terminus	TxDOT
Texan Trail	City of Grapevine	IH 635 - eastern Project terminus	TxDOT
Bass Pro Dr	City of Grapevine	FM 2499 - northern Project terminus	TxDOT
Grapevine Mills Blvd	City of Grapevine	Stone Meyers Parkway	City of Grapevine
Stars and Stripes Way	City of Grapevine	Rail line	The T / DART / DFW Airport
North Airfield Dr.	DFW Airport	Euless - Grapevine Rd	City of Grapevine

Connectivity/Interconnections with Utility Infrastructure in the Project Area: By reviewing the original TxDOT utility drawings, making site visits and meeting with the utility owners in the Project area, we identified and verified the existing owners, types of utilities and locations in accordance with proposal instructions. New utilities constructed since the TxDOT mapping and utilities currently under construction were also identified. These utilities are summarized in Appendix D.12 Utility Summary and include owner, type, size, location, length, depth and property interest details. By coordinating with the utility companies, we will be able to reduce the need for relocations and roadway disruptions. As the Project moves through design, construction and maintenance, we will continue to coordinate utility-related activities.

Procedures for Coordinating with Other Governmental Agencies and Stakeholders: Early contact and frequent coordination efforts and meetings with other agencies affected by the Project are important to design development, reducing the possibility of late design concept changes. Our plan for coordinating and communicating with individual agencies and Stakeholders is described below:

TxDOT: We will coordinate with TxDOT regarding future improvements east of the eastern Project terminus on SH 114. A transition from the proposed section of managed lanes and general purpose lanes to the existing SH 114 general purpose lanes will also be required at this location. The northern Project terminus on SH 121 will also require a transition to match the existing conditions.

Local Governments: As an example of our coordination with government agencies, we eliminated the need to remove existing roadway pavement on Minters Chapel Road for drainage work. Following NTP1, we will meet with the Cities of Grapevine, Southlake, Coppell and Colleyville to review their technical requirements for design of roadways, bicycle and pedestrian facilities, drainage, traffic signals, traffic control, and aesthetic treatments. Additionally, we will obtain plans for proposed development of adjacent properties and coordinate with any designers the city may have working on adjacent projects that interface with the DFW Connector. With each entity, we will review their requirements for interim design reviews, revocable permits and obtain the names of staff within the various city departments who will be reviewing and approving the design, with an understanding of the lead time required for reviews and approvals. Updates on the Project's status will be disseminated through council briefings and meetings with the mayors and commissioner's courts.

DFW Airport: Reconstruction of International Parkway to and from the north entrance of DFW Airport will require timely coordination with DFW Airport on construction staging, sequencing and traffic management and landscaping and aesthetics. We will continue to meet with DFW Airport representatives to review their requirements for interim design reviews, construction permits and obtain the names of staff who will be reviewing and approving the design, and establish the lead time required for reviews and approvals.

DART: Accommodating the future underpass structure required for DART's proposed rail access to DFW Airport Terminal B is another critical interface. The NorthGate team reviewed the conceptual plan and profile of the

proposed rail access to DFW Airport Terminal B, but it will be necessary to hold several coordination meetings with DART to obtain a complete understanding of their plans. Additional coordination with DART will be required for two proposed overpass structures crossing the existing DART rail line, used by FWWR, west of SH 26 and south of the SH 121/IH 635 interchange.

North Central Texas Council of Governments (NCTCOG): We will monitor NCTCOG's regional transportation planning as projects are developed.

C.1.1.5 Right-of-Way Services

The NorthGate Difference

NorthGate has developed a specific, detailed and realistic parcel-by-parcel Project schedule to ensure that appropriate parcels are cleared as necessary to support the overall construction schedule.

Commitment to TxDOT Project Goals Addressed in This Section

(f) **Expediting delivery of Project improvements**
NorthGate has the right-of-way resources and experience to meet our reduced time in the "cone zone" schedule.

(h) **Cooperation and coordination with Stakeholders ...**
The ROW team will work with Stakeholders during the ROW process to coordinate acquisition activities.

(i) **Use of public-private partnerships ...**
Right-of-way issues will be coordinated with TxDOT, the Attorney General's office and the Tarrant County court system to prevent bottlenecks and aggressively and consistently pursue settlement and possession.

Added Value Items Included in This Section

- **The critical parcels have been analyzed and tailored to our "Smart Start" approach, allowing us to epedite the ROW acquisition process prior to the "cone zone"**
- **Weekly ROW task force meetings will be held to communicate status and coordinate with other disciplines.**

C.1.1.5 (a) Right-of-Way Acquisition and Relocation Approach

Upon notice to proceed, NorthGate will immediately enact the following six activities:

- Finalize and submit the acquisition plan
- Finalize the Project schematic
- Begin sales research for affected parcels, and order specialty reports and/or land plans
- Conduct site surveys and prepare the relocation plan
- Order title reports
- Begin pre-appraisal contact and obtain rights of entry

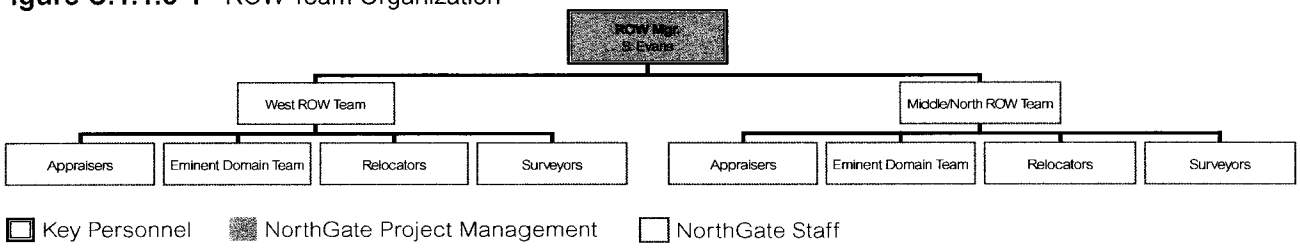
NorthGate's ROW Manager is responsible for property acquisition oversight and integration with other Project team members. The ROW Manager will lead the ROW task force that will include the NorthGate ROW, design, utility and construction team members along with representatives from TxDOT, the City of Grapevine, the City of Southlake and the Attorney General's Office. The ROW Task Force will meet weekly to exchange information, analyze and improve upon existing procedures, and coordinate overall ROW acquisition.

NorthGate is an integrated team that uses a single project schedule. All ROW acquisitions are represented by activities in the schedule with logic ties to predecessor and successor activities, allowing the team to make informed management decisions should any activity, including ROW acquisition, vary from plan. If the acquisition of any parcel is delayed, schedule mitigations are evaluated and implemented as necessary. Such mitigations may include re-sequencing of work to accommodate longer-duration acquisitions, re-design to avoid difficult acquisitions, multiple work shifts to accelerate the schedule, or modifications of construction means and methods, such as directional boring of utilities versus conventional excavation.

To further support schedule compliance, the NorthGate ROW group is divided into two teams for our identified Project segments; the Middle Segment has minimal ROW challenges and is combined with the North ROW activities.

This structure allows each team to address the specific needs of the landowners and businesses affected by the Project in the most timely manner possible.

Figure C.1.1.5-1 - ROW Team Organization

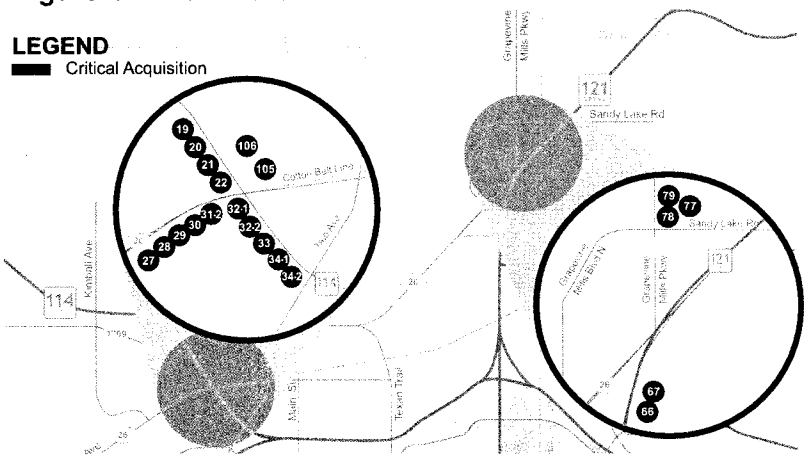


Critical Parcels: NorthGate has identified 106 total parcels, including those for ATCs, that need to be acquired to facilitate construction. Of the 106 parcels, NorthGate has evaluated the acquisitions and assumed that 21 will require condemnation proceedings, and we have accounted for this time in the submitted schedule (Figure C.1.1.5-2).

C.1.1.5 (b) Right-Of-Way Quality Control Methodology

NorthGate's integrated team brings proven processes to seamlessly integrate ROW acquisition with the Project's design, construction and maintenance phases. We are prepared to submit our ROW acquisition plan for approval at NTP2. This plan incorporates all requirements of the Uniform Relocation and Real Property Acquisition Policies Act of 1970, as amended, to ensure 100% compliance and safeguard the rights of the property owners.

Figure C.1.1.5-2 - Critical Parcels



NorthGate's Row acquisition plan has been prepared in conformance with ISO standards, and will be monitored and audited as part of our ISO 9001:2000-certified quality plan. Our ROW acquisition plan includes check-and-hold points to ensure that packages transmitted to TxDOT are accurate and complete to support rapid approval; that the Project design is consistent with the established ROW limits; and that the plans released for construction are verified in compliance with the appropriate property acquisition.

C.1.1.5 (c) Right-Of-Way Process and Schedule

NorthGate is committed to acquisition and relocation processes that both support the Project schedule and take into consideration the needs of all interested parties. Immediately upon NTP1, we will begin researching all affected properties, ordering specialty reports and/or land plans as necessary to ensure that we fully understand the ownership structure of each parcel to be acquired and associated leasehold obligations, if any.

NorthGate will conduct public forums and meet with property owners individually, as well as with local officials, to allow issues to be raised and to see that concerns are addressed. We will dedicate two ROW acquisition teams to this Project. Each team will have more time to concentrate on the needs of their constituent parcel owners and tenants, providing sensitive service while maintaining the Project schedule.

C.1.1.6 Utilities

The NorthGate Difference

NorthGate has investigated the utility impacts to the Project and will develop a highway design to promote compatibility with the utilities remaining in place.

Commitment to TxDOT Project Goals Addressed in This Section

a) **Maintaining mobility through the Project area during construction ... ; and (e) Safe construction**
Protection of existing utilities is a high priority on this Project to prevent injuries, avoid schedule delays and minimize inconvenience to the public. Potholing crews will physically locate and mark utilities as needed, and utility recognition will be a part of each operation's work plan and discussion at pre-activity meetings.

(b) **Cooperation and coordination with Stakeholders ...**
NorthGate has already begun the utility coordination process, meeting with utility owners and reviewing current as-built plans. This process will continue upon NTP1 with a Utility Task Force meeting that will include utility owners, TxDOT and members of the design and construction teams.

(i) **Use of public-private partnerships ...**
The utility adjustment process is an interactive partnership with TxDOT, the utility owner, the local community and NorthGate to promote cooperation for the benefit of the traveling public.

Added Value Items Included in This Section

- **Our extensive utility due diligence has enabled us to identify 1,075 potential utility conflicts.**
- **After performing thorough utility investigations, we have advanced our plans and developed the appropriate action to either protect-in-place, re-locate the utility or design around existing conditions.**
- **NorthGate's "SmartStart" strategy includes meeting all utility companies within 30 days of NTP1, having MUAs negotiated, and beginning relocations at NTP2.**

More than 1,000 existing utilities are in potential conflict with the roadway improvements associated with this Project (Appendix D.2.12 Utility Summary). NorthGate recognizes that utilities have a statutory right to occupy the public ROW as granted by the Texas Legislature and regulated through the Texas Administrative Code. The utility companies have the obligation to provide goods and services to their customers without interruption, just as TxDOT must provide mobility routes for the travelling public.

TxDOT manages accommodation with utility owners through either a permit or a Utility Joint Use Acknowledgement. These two documents also provide the terms for utility access and maintenance to the utility facility. NorthGate commits to the spirit of cooperation intended in previously executed Memoranda of Understanding and will conduct meetings with utility owners to introduce the Project configuration and to initiate utility assignment discussions.

TxDOT has provided utility information in the form of utility strip maps identifying the relative location, size, ownership and type of facility located within the schematic ROW. Through preliminary meetings with utility owners and field investigations, NorthGate has identified the scope of work associated with the utility impacts and the critical path scheduling for these utility adjustments. NorthGate has developed an innovative highway design to mitigate the utility impacts and protect-in-place those utilities located within the final ROW.

NorthGate will manage the utility adjustment process as defined in TxDOT's Utility Manual, FHWA's Alternate Procedures, the Utility Accommodation Rules and the technical requirements outlined for utility adjustments in the Project documents.

The utility adjustment process is an interactive partnership with TxDOT, the utility owner, the local community and the Developer to promote cooperation for the benefit of the traveling public. A utility conceptual plan was developed to establish the utility assignment, and will serve as the tool for initial design and property acquisition considerations with utility owners. As the Master Utility Agreements (MUAs) are negotiated, the assemblies (with associated components including sealed utility designs and property interest documents) are packaged and presented to

the utility owner and TxDOT for execution. After completion of the utility adjustment, the record plans and the utility property quitclaim deeds are submitted to TxDOT prior to final utility payments. NorthGate is responsible for addressing each utility within the ROW, including managing unidentified utilities discovered after the Project contract date and new utilities entering the ROW before construction begins.

NorthGate will furnish TxDOT a utility matrix with adjustment costs for FHWA Alternate Procedure approval, and will notify TxDOT of any unidentified utilities immediately upon their discovery.

C.1.1.6 (a) Utility Location Methods

The collection and systematic depiction of reliable data for existing subsurface utilities is critical for the design team to make informed decisions and support risk management protocols regarding a project's impact on these utilities.

NorthGate will employ a combination of Subsurface Utility Engineering (SUE)-level methods to identify and create an Existing Utility Strip Map of the utilities within the Project ROW. These methods will include utility coordination meetings with utility owners to obtain and verify existing utility owner records (QL–D); surveying and plotting visible above-ground utilities to confirm existing as-built information (QL-C); utilizing non-destructive detection methods such as cable avoiding tools, magnetometers, and ground-penetrating radar (QL-B); and exposing utilities through a coordinated potholing program to ascertain the actual horizontal and vertical positions (QL-A).

C.1.1.6 (b) Utility Planning, Communication and Construction

NorthGate has already begun the utility coordination process, meeting with utility owners and reviewing current as-built plans. This process will continue upon NTP1 as part of our "Smart Start" strategy with a Utility Task Force meeting that will include utility owners, TxDOT and members of the design and construction teams. The task force will be the main method for communicating and exchanging information regarding utility identification, the proposed design plan, construction methods and schedule. A Utility Tracking Report (UTR) will be developed, reviewed at task force meetings and updated on CentricProject, NorthGate's electronic information management system. The UTR will be used to track and record all utility activities and will be maintained throughout the Project's duration.

C.1.1.6 (c) Methods of Design and Construction

Design Criteria: Designs for utility construction will be performed according to the utility owners' criteria, standards, details and specifications to meet the requirements of TxDOT's Utility Accommodation Policy (UAP), Utility Manual and Utility Accommodation Rules (UAR). Designs will conform to federal, state and local laws.

Design Responsibilities for Utility Relocations: Utilities currently under construction have been added to our Preliminary Utility Plans to provide the most current data available. The proposed utility relocation strip plots are included in Appendix D.2.4. NorthGate will continue to investigate and identify any utilities not already accounted for during the design and construction phases of the Project. NorthGate will prepare relocation designs and plans for water, wastewater, force mains, cable, fiber optic, communication and telephone conduits. The electric, gas and petroleum companies will design their facilities in coordination with NorthGate. NorthGate will provide a location (corridor) between the back of curb on the frontage roads/cross streets and the ROW, or within a utility easement identified in this proposal for the utility to place their designed relocation.

NorthGate will coordinate utility relocation designs to ensure adequate clearances and elevations to eliminate potential conflicts with other utilities, services, bridge construction, retaining walls, culverts, closed storm sewer systems and inlets. Construction phasing will also be reviewed to determine the order of design effort and any temporary connections that will be required to maintain and protect each utility.

Corridors: As shown on the schematics in Appendix D.2.4, the parkway/border along frontage roads between the back of curb and the ROW is typically 20 ft. We propose placing the sanitary sewer 5 ft. back of curb and the water 15 ft. back of curb (5 ft. from ROW). This provides the required TCEQ separation between the two utilities. Power poles (where required) will be 3 ft. inside the ROW, and communication and gas/petroleum lines will be between the water and sanitary sewer or between the power poles and the ROW with 1-ft. clearance. Where the number of utilities in a particular area will not fit in the proposed ROW, an easement will be needed. These are noted on the Preliminary Utility Plans in Appendix D.2.4.

Utility Replacement: We met with utility owners and have not been requested to provide any betterments (upsizing) or new utilities. Therefore, we will replace existing utilities with in-kind facilities. The number of conduits, pipe sizes and pole spacings will match the current facilities. A sanitary sewer main may be designed to a larger size if necessary to provide capacity equal to the existing main. Underground cables, communication and wiring lines will be replaced with a minimum of two, 4-in. PVC conduits with sand backfill per owner, or match the number presently existing. These services will be constructed in a common trench with two conduits wide and multiple conduits deep (stacked) to maximize the available parkway/border space. We will replace asbestos cement (AC) water mains with PVC mains within the Project area.

Coordination With Other Design Disciplines: The Utility Task Force will perform utility conflict analysis and will coordinate with other team members to provide clearances for or interface with bridges, retaining walls, culverts, closed storm sewer systems, stormwater detention areas, signals, illumination, communication and DMS.

TCP/Phasing: The design and construction of the utility relocations will be phased according to the TCP and phasing plans in Section C.1.1.1 and Appendix D.2.1. To minimize disruption to both the construction schedule and utility service, the majority of relocations will occur near the beginning of the Project, following ROW and easement allocation. Utility construction will be coordinated with traffic phasing and will include necessary temporary connections to maintain the utility services during construction.

General Notes: Through TxDOT's previous field work (SUE) and NorthGate's continuing efforts, utilities affecting construction have been identified. General notes will be provided on the plans to indicate field location, flagging, marking and other identifiers during construction to provide protection and temporary supports or proper cover for existing utilities. Notes on specific utilities will be separated under each utility type's heading in the general notes. Notes will require adequate trench safety plans and designs to protect workers and the public.

Construction Drawings: Utility relocation plans will be prepared in Microstation CAD format. GeoPAK software will be used to generate existing and proposed ground lines over each underground utility. The plans for design/construction will be prepared as strip plots 22 in. x 72 in. at 1 in. equals 100 ft. horizontal scales and 1 in. equals 5 ft. vertical scales.

Record drawings will be produced according to specifications at the completion of construction and will be prepared on cut sheets (11 x 17 in.) with typical TxDOT borders and title blocks for permanent files. Sealed, signed mylar originals will be delivered to TxDOT along with CDs containing the electronic files of the construction documents. Traditional summary sheets and estimate and quantity sheets will not be prepared for the record drawings of this Project. Per requirements, TxDOT Form 1814 will not be submitted to establish a special specification and pay code numbers for the utility items on this Project.

Protection of Utilities: Protection of existing utilities is critical to prevent injuries, avoid schedule delays and minimize inconvenience to the public. Prior to excavation or drilling in any area, dig-TESS will be contacted for utility mark-outs, along with reviewing NorthGate's utility mapping. Utility recognition will be a part of each operation's work plan. If utilities exist in an area to be excavated, further potholing will be conducted. NorthGate will have several potholing crews on the Project. Potholing will be conducted to physically locate and mark the utility as frequently as necessary (depending on the utility type). Potholing will discover any deviations in the existing utility's alignment (both horizontally and vertically), which can be overlooked by standard locating procedures. In addition to subsurface utilities, all equipment working near or crossing under overhead utilities will have a designated spotter. These extra efforts are included in all daily work plans.

As-Built Plan Collection: We've begun collecting as-built plans from utility owners to determine private services that will be tied to the relocated utilities. We will also obtain the design criteria, specifications, standards and details from each owner.

Quality Procedures: Design and construction of utilities are governed by the quality procedures and checks as prescribed in NorthGate's Quality Management Plan (QMP). Design quality procedures ensure the contract drawings are reviewed for utility location, accuracy and any possible conflict. Construction quality procedures ensure utilities are properly installed in the correct location according to the design and specifications. NorthGate's QMP is described in detail in Section C.3.

C.1.1.6 (d) Methods for Minimizing and Managing Utility Conflicts

NorthGate will manage utility conflicts utilizing a monthly updated UTR. This report will identify the owner's name, the unique assigned tracking number, the utility description, the Developer-managed or owner-managed agreement, the right of occupancy (easement or permit), the utility joint use acknowledgement, the replacement property interests, the cost estimate approved in the assembly, tracked payments to the utility owner, tracked acquisition status and costs for replacement interests with property owners by parcel number. Through NorthGate's due diligence, and investigation of utilities and discussions with utility owners to verify specific parameters, constraints, utility crossings and conflicts, we have determined the appropriate action to either protect-in-place, re-locate the utility, or design around the existing conditions.

C.1.1.6 (e) Utility Cooperation and Negotiation Methods

NorthGate will conduct periodic Utility Task Force meetings with utility owners to negotiate agreement language. Each utility will require an agreement with the utility owner, TxDOT and NorthGate describing the terms and conditions and responsible managing partner for the utility adjustment process. These meetings will continue until the partners are satisfied with the resolution of the utility adjustment, and the Utility Assembly is approved.

The utility owner will continue to be engaged in the process to help facilitate the coordination of inspections, outages and cut-overs during the utility construction phase. Communication, cooperation and coordination will be used to build rapport and foster excellent working relationships with the utility owners to negotiate utility adjustment agreements and resolve any betterment issues. NorthGate will promote the spirit of cooperation with the utility owner by providing Project information as it is developed and discussing the procedures and advantages regarding Developer-managed agreements versus owner-managed agreements in the utility adjustment process. NorthGate will continue to cooperate with the utility owners and to coordinate the work and determine solutions in a manner beneficial to all parties involved.

Utility adjustments identified as betterments will be evaluated on a case-by-case basis and will be required to follow the TxDOT Utility Manual procedures for betterments.

C.1.1.7 Life Cycle Cost Methodology

The NorthGate Difference

Northgate has already begun an integrated approach for addressing the life cycle cost analysis (LCCA) process by carefully and systematically analyzing design alternatives that meet the CDA technical requirements and developing our proposed solutions that present the optimal whole-of-life costing. This process has taken place in our pre-proposal design and construction technical task force meetings and will continue during the final design period.

Commitment to TxDOT Project Goals Addressed in This Section

(d) **Securing quality design, construction and capital maintenance services ...**
NorthGate intends to deliver a design that meets CDA requirements and has the lowest whole-life cost to achieve the best overall value for TxDOT based on a series of life cycle cost analyses.

(i) **Use of public-private partnerships ...**
Our team is committed to providing the best value and least costly (i.e., lowest overall net present value) alternative over the life of the asset, while continuing to provide a high-quality roadway.

Added Value Items Included in This Section

- **Our LCCA analyzed multiple scenarios to measure sensitivities and ensure value over the life of the facility.**
- **Key maintenance managers will fill critical roles on the construction team, participate in task forces relating to maintenance/long-term performance and transition into their CMA roles upon successful completion of CDA.**

Life cycle cost analysis (LCCA) is a process for evaluating and comparing the economic worth of a project element by analyzing initial capital costs and discounted future costs, such as maintenance, user, reconstruction,

rehabilitation, restoring and other costs specific to the analyzed element over the useful life of the project element. Our approach brings together the expertise of the design team for assessing technical solutions; the construction and capital maintenance team for reviewing constructability, schedule and costing for both the initial capital cost and future rehabilitation costs; and numerous specialty subcontractors and material suppliers for the various scenarios.

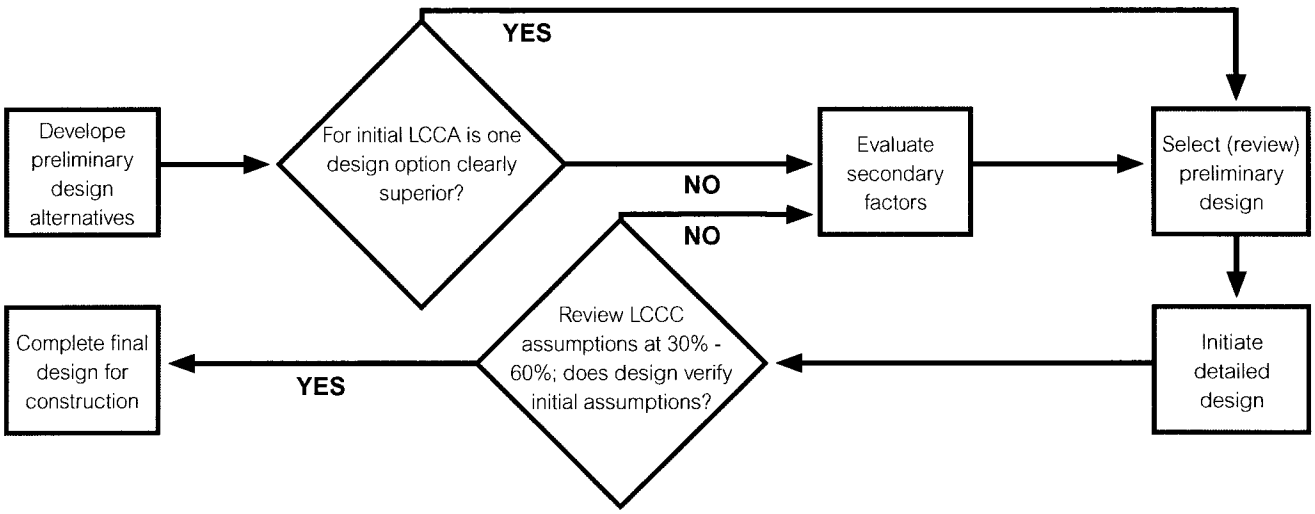
Approach to Implementing Life Cycle Cost Analysis: Our team members work together in the decision-making process regarding design, materials and construction methods to provide a unified approach regarding life cycle management and an effective asset management strategy:

- Design – Each design discipline (roadway, structures, toll systems, ITS, etc.) works with the corresponding contractor lead, capital maintenance representative and material suppliers to assess methodologies and materials that promote the optimal long-term cost for each element.
- Construction – Construction methods are investigated to increase strength and prolong the life of slopes, pavements, structures, walls, drainage facilities and other elements. Decisions are made early during final design regarding the use of certain construction materials that may increase costs but will endure longer and prove to provide long-term value. The design and construction of the Intelligence Transportation System (ITS) involves key decisions in collaboration with the TxDOT Electronic Toll Collection System (ETCS) integrator to use complementary hardware that resists deterioration.
- Maintenance – Capital maintenance personnel who are involved in the long-term preservation of the Project assets will be engaged in the design process to provide input to the design and construction teams regarding the proper selection and installation of materials that provide the best long-term value.

Examples of our initial LCCA approach are provided for reference in Appendix D.2.13

The following flow chart illustrates our general approach for LCCA when selecting design elements:

Figure C.1.1.7-1 Element Selection Flow Chart



Assumptions and Estimated Cost Results: The LCCA generally compares initial capital costs to ongoing maintenance, rehabilitation and replacement costs by calculating the net present value (NPV) using the Project discount rate of 5% per annum for each option, and selecting or proposing the higher valued comparable. Time horizons are designed to capture the whole life of each element including replacement cycles for all options considered.

C.1.1.8 Environmental Permitting, Mitigation and Impacts

The NorthGate Difference

Our environmental approach will achieve zero environmental violations by proactively addressing environmental issues and challenges.

Commitment to TxDOT Project Goals Addressed in This Section

(d) Securing quality design, construction and capital maintenance services ...

We will coordinate environmental commitments through design, construction and maintenance using our ISO 14001-compliant Environmental Compliance and Mitigation Plan, submitted to TxDOT for approval, to ensure conformance to the CDA/CMA.

Added Value Items Included in This Section

- **An environmental hazard analysis will be developed and included in daily work plans, then monitored consistently through the QA/QC process.**
- **As part of our environmental stewardship, we use low-sulphur diesel fuel in all equipment, implement a "no idle" policy for construction equipment, refuel at night and minimize trucking requirements to save fuel and reduce emissions.**

NorthGate understands the delicate balance between maintaining Project progress while meeting all environmental commitments. Extensive due diligence during the proposal process determined environmental obligations under the permitting process. Our approach will prevent, minimize and correct any non-compliance with the requirements, leading to zero violations. This will be achieved through an ISO 14001-compliant program, which focuses on processes for communication, training, observation, procedures, checklists, follow-up and documentation. The program will reference and follow the ISO-certified quality procedures for Control of Nonconformance, Corrective Action, Preventative Action, Document Control, Control of Records and Internal Auditing included in our Project Quality Management Plan (QMP) found in Appendix D.2.B.

C.1.1.8 (a) Environmental Permits and Amendments List

Primary permits to meet environmental laws and regulations were identified during proposal preparation and are shown in Figure C.1.1.8-1. Early identification of these required permits will enable NorthGate to proceed with agency coordination immediately following Notice of Award.

Figure C.1.1.8-1 Environmental Permitting Requirements

Permit Description	Issuing Agency	Approach
TPDES(1) Stormwater	TCEQ (2)	Upon NTP1, NorthGate will develop a stormwater pollution prevention plan and submit a Notice of Intent seeking coverage under the TPDES permit.
TPDES Stormwater	City of Southlake and City of Grapevine MS4	Upon NTP1, notify MS4 prior to commencement of construction activities.
Excavation dewatering discharge permits	TxDOT; local municipalities	NorthGate to provide.
Clean Water Act, Section 404 and 401	USACE(3)/TCEQ	TxDOT responsible. NorthGate to provide preconstruction notification and comply with 401 BMP particularly at Grapevine Creek and Cottonwood Branch NWP 14-PCN.
Clean Water Act, Section 402 (TPDES)	TCEQ	NorthGate to provide.
Archaeology/Historic preservation	SHPO (4)	If needed, TxDOT provides with supporting technical reports from NorthGate.
Asbestos Abatement Permit	TCEQ; possible local municipalities	On all utilities and/or properties where asbestos-containing material (ACM) is identified, NorthGate will provide abatement permitting prior to remediation.
Off-Site Disposal	TCEQ	Prior to transporting any materials to an off-site disposal location, NorthGate will conduct a site assessment to verify and document that the facility meets regulatory approval.

Permit Description	Issuing Agency	Approach
Investigation/remediation of Pre-existing Hazardous Materials	TCEQ	NorthGate has identified 14 possible locations where contamination may reside. Immediately following NTP1 NorthGate will conduct further investigations to delineate areas of concern prior to disturbance.
Variance to Noise Ordinance	Cities of Grapevine and Southlake	Prior to commencement of any work requiring variance to city noise ordinances, NorthGate will meet with city regulators to ensure compliance.
Air Emission Permits	TCEQ	Concrete, asphalt or crushing plants will have required air emission permits and NorthGate will comply with any non-attainment issues associated with permits.

(1) TPDES: Texas Pollution Discharge Elimination System (2) TCEQ: Texas Commission on Environmental Quality (3) USACE: United States Army Corps of Engineers (4) SHPO: State Historic Preservation Office

C.1.1.8 (b) Permits and Compliance Measures

Method for Compliance with Environmental Commitments: To achieve zero environmental violations, we will use the QMP as a framework to verify and document that services and products conform to the contract, design drawings, Project specifications and applicable environmental rules and regulations during design, construction and maintenance.

The team will review all of the commitments, permits and documents to create an environmental compliance database. This database will be provided to all design discipline leads for use in the development of their design. Further, the Environmental Compliance Manager will verify that all identified commitments and requirements are incorporated into the plans prior to issuing them for construction. During each phase of the Project, the following steps are required to ensure compliance:

Figure C.1.1.8-2 Environmental Compliance Steps by Phase

Project Phases	Environmental Compliance Steps
Design	Database development of environmental commitments, training of design team on environmental database content, task force cross-discipline interface and incorporation of environmental requirements and commitments.
Construction	Environmental orientation and continued training of employees and subcontractors, daily work plans incorporating environmental commitments and environmental hazard analysis, documentation of processes audits and inspections of construction activities to ensure compliance and closure of environmental permits.
Maintenance	Monitor elements for continued compliance, maintenance work plans to ensure compliance and notification to TxDOT of any outside impacts jeopardizing compliance.

Approvals Relating to Cultural Resource Studies: If modifications result in additional properties being required outside the Project ROW, NorthGate will perform cultural resource surveys, evaluations, testing and mitigation, as defined in the original NEPA approval document. Compliance activities will be coordinated with TxDOT in accordance with Section 106 of the National Historic Preservation Act and the Antiquities Code of Texas.

If evidence of archeological remains is encountered, work will be stopped immediately and the area secured. TxDOT will be contacted to initiate accidental discovery procedures. Work will resume after NorthGate receives notification and approval from TxDOT.

During the proposal phase, NorthGate conducted a preliminary review of planned property impacts to determine if the site is eligible for inclusion in the National Register of Historic Properties (NHRP). At this time, 18 buildings will be removed, and they do not fall under this category.

C.1.1.8 (c) Addressing Environmental Issues

During the proposal preparation process, Northgate identified areas that will be included in the Comprehensive Environmental Protection Program to avoid and minimize impacts to the environment through design, construction and maintenance activities (Figure C.1.1.8-3). Upon review of the NEPA approval, additional issues may be identified and will be addressed.

Figure C.1.1.8-3 Environmental Issues

Issue	Resolution
Water Quality	Mitigate potential impacts to waters of the state through implementation of BMPs associated with the SWP3.
Hazardous Materials	Hazardous materials will be properly managed and staged with containment to minimize potential impacts to human health and the environment.
Recycled Materials	Recycle 1.3 million tons of concrete and asphalt to minimize impacts to local landfills. Materials to be recycled include but are not limited to construction debris, paper, cardboard, spent spray cans, batteries, oily rags, used oil and used antifreeze.
Noise Mitigation	Specific pieces of equipment will be muffled, sound-abated or silenced to mitigate invasive noise. NorthGate will comply with local noise ordinances to reduce impacts to sensitive receptors.
Dust Mitigation	Mitigation of dust is discussed in Section C.2.3 (c) and includes temporary measures to control dust transport, minimizing dust from entering stormwater structures and introduction of irritants to local communities.
Air Quality	Comply with air permit specifications. In addition, NorthGate will use low-sulfur diesel fuel in construction equipment adding value to the Project over use of conventional diesel fuel. A "no idle" policy will be implemented for construction equipment with a goal to improve air quality in the Dallas-Fort Worth Metroplex. The majority of equipment refueling will occur at night. Through efficient trucking logistics, we will reduce diesel emissions by 100,000 gallons.
Spill Prevention	Implementation of spill prevention, control and countermeasure plans will be an effective measure to mitigate potential spills and accidental releases.
Wetlands and Waters	Potential wetlands and water bodies affected by the construction pathway will be identified, delineated and surveyed in cooperation with TxDOT and USACE. Upon identification, measures to monitor, protect and restore these important habitats will be implemented.
Riparian Vegetation	Less than one acre of direct impacts to riparian vegetation is anticipated. An analysis of possible shading impacts will be evaluated and discussed with TCEQ and USACE to verify mitigation requirements.
Vegetation	Aerial photography and ground verification will identify vegetation types. Adjustments to vegetation mapping will then be made so that adverse impacts to existing vegetation is avoided. Restoration and reseeding will meet TxDOT Seeding for Erosion Control, Executive Order 30112, on Invasive Species and the Executive Order on Beneficial Landscaping. A mix of native and non-native drought-tolerant grasses and forbs will be used to revegetate the right-of-way.
Bird Nesting	Migratory bird nests will be identified and removed from all structures that will be impacted by construction. This will be completed prior to the initiation of construction activities.

NorthGate's environmental strategy will be implemented through the Environmental Compliance and Mitigation Plan (ECMP) and will be reflected throughout design, construction and maintenance. NorthGate is committed to environmental compliance, being a good corporate citizen and minimizing our environmental footprint during design, construction and maintenance of the Project.

C.1.1.9 Drainage Design Approach

The NorthGate Difference

Our drainage design approach focuses on correctly sizing drainage structures and mitigating potential adverse drainage impacts.

Commitment to TxDOT Project Goals Addressed in This Section

(a) Maintaining mobility through the Project area during construction ...; and (e) Safe construction
Due to the Project's phased nature, maintaining positive outflow of stormwater during construction is crucial to the mobility and safety of the traveling public and is accommodated through temporary connections.

(d) Securing quality design, construction and capital maintenance services ...
NorthGate's extensive due diligence ensures schedule and cost estimates are accurate for final design; for example, ATC 4, Elevated Direct Connector at SH 26, reduces costs and minimizes construction impacts.

Added Value Items Included in This Section

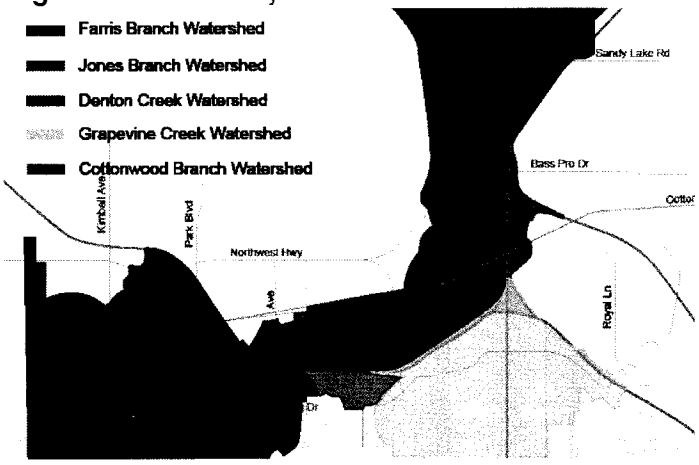
- We created a total of 30 Drainage Drawings showing the location of drainage swales, storm sewer trunk lines, inlet and manhole types, cross drainage structures and detention basins.
- We designed a solution to handle required drainage without removing existing pavement for Minters Chapel Road.
- Backfill requirements for all drainage systems under roadways are cement stabilized backfill (CSB) or flowable fill to 1 ft. above the pipe. Backfill requirements for all pipe other than roadway is CSB or flowable fill halfway on pipe.

This Project is located within the watersheds of Denton Creek, Cottonwood Creek, Grapevine Creek, Big Bear Creek, Jones Branch and Ferris Branch (Figure C.1.1.9-1). Each watershed has been studied as a part of the National Flood Insurance Program (NFIP), and there are defined floodplains on the main stem channels of each watershed crossed by the Project. There are a total of 24 drainage outfalls in the area.

As part of our due diligence, we reviewed local, state and federal regulations for applicable criteria. In addition to floodplain management regulations and drainage design criteria, we have included the Grapevine Master Drainage Plan that provides direction for proposed improvements to adjacent drainage facilities. The Federal Emergency Management Agency regulates the NFIP, and the U.S. Army Corps of Engineers has jurisdiction over Waters of the U.S. and wetland areas. The Waters of the U.S. and wetlands are defined to protect water quality. Our approach to water quality preservation is presented in Section C.1.1.8 Environmental Permitting, Mitigation and Impacts, and includes comprehensive investigation, planning, implementation and audit.

NorthGate used a combination of design criteria from TxDOT, DFW Airport and the City of Grapevine to analyze and size the drainage systems and components. The City of Grapevine's floodplain management regulations and the Grapevine Master Drainage Plan require that all new drainage systems be sized for ultimate development. The drainage system components (including inlets, leads, trunk lines, culverts and bridges) are sized according to the location and function class of the roadway and consistent with storm frequencies listed in Book 2, Table 12-1: Drainage Design Frequencies. Bridges are designed with a freeboard of 2 ft. over the 50-year water surface elevation. The allowable water surface elevation next to a culvert is the lower of either the existing 100-year water surface elevations

Figure C.1.1.9-1 Project Watersheds



at the upstream limits of the Project ROW, or 1 ft. below the shoulder point of intersection elevation of the applicable roadway low point. For storm sewer systems, the hydraulic grade line for the design frequency event is no higher than 1 ft. below the lip of the nearest gutter, the top of the nearest grate inlet and the top of the nearest manhole cover. Stormwater peak flow rate at the downstream edge of the Project ROW is limited to the existing peak flow rate for the 100-year event. Mitigation in the form of in-line stormwater detention facilities is used to reduce the proposed condition flow rates to the existing condition flow rates, and to limit need for additional ROW.

The methods used to design the drainage facilities are in accordance with the applicable design criteria and good industry practice. The preliminary hydraulic analyses for each cross drainage structure provided by TxDOT were used as a starting point for the drainage design. Drainage areas and hydrologic parameters for the areas upstream of the Project ROW were delineated from topographic data and aerial photographs and checked for reasonableness. Within the Project ROW, the latest highway design schematic was used to delineate the drainage areas and determine hydrologic parameters. The Rational Method was used to compute peak flow rates for drainage areas of 200 acres or less. For drainage areas greater than 200 acres, HEC-HMS was used to compute peak flow rates. The hydraulic design of the storm sewer systems was prepared using PAK Drainage. Cross drainage culverts and bridges were analyzed with the HEC-RAS. The stormwater detention volumes were determined using the Modified Rational Method. Mitigation requirements where the upstream flow greatly exceeds the ROW-generated flow were determined using HEC-HMS computer modeling or Regional Regression Equations.

C.1.1.9 (a) Drainage System, Materials and Components Description

The figure below summarizes the components associated with each drainage outfall. Included are the drainage areas upstream and within the Project ROW, short descriptions of the cross drainage structures and storm drainage systems and mitigation measures. Backfill requirements for all drainage systems under roadways are cement stabilized backfill (CSB) or flowable fill to 1 ft. above the pipe. Backfill requirements for all pipe other than roadway is CSB or flowable fill.

Figure C.1.1.9-2 Drainage Outfall

Location	Drainage Area	Proposed Cross Drainage Structure(s)	Storm Drainage System / Stormwater Mitigation
Watershed: Denton Creek			
FM 2499 / Denton Creek	U: 2,350 ac P:80 ac	Bridge: 1 - 140 ft x 180 ft / Stars and Stripes box culvert: 1 – 8 ft x 6 ft, 3,200 ft	Storm sewers: 2 trunk lines ranging 24 in to 48 in, 11,500 ft / Stormwater: No mitigation
SH 121 / Sandy Lake Dr.	U: 0 ac P: 59 ac	1 - 3 ft x 3 ft box culvert: Culvert parallel to existing 7 ft x 3 ft box	Storm sewer: 3 trunk lines ranging 24 in to 42 in, 6,500 ft / Stormwater: No mitigation
Watershed: Cottonwood Branch			
SH 121 south of FM 2499	U: 66 ac P: 63 ac	9 – 7 ft x 5 ft box culverts from 236 to 590 ft	Storm sewers: 11 trunk lines ranging in size 18 in to 3 ft x 3 ft, 17,900 ft / Stormwater detention: 1 basin covering 0.24 ac. Providing 0.6 ac ft.
SH 121 south of Bethel Road	U: 74 ac P: 24 ac	6 – 8 ft x 5 ft box culverts from 107 to 485 ft	Storm sewers: 3 trunk lines ranging in size 18 in to 36 in, 5,700 ft / Mitigation included in the outfall SH 121 at Cottonwood Branch, below.
SH 121 south of I-635	U: 39 ac P: 10 ac	3 – 5 ft x 3 ft box culverts 702 ft	Storm sewers: 1 trunk line ranging in size 18 in to 36 in, 2,100 ft / Mitigation included in the outfall SH 121 at Cottonwood Branch, below.
SH 121 / Cottonwood Br	U: 1,599 ac P: 68 ac	22 – 8 ft x 10 ft box culverts from 281 to 562 ft	Storm sewers: 4 trunk lines ranging in size 18 in to 4 ft x 6 ft, 4,600 ft / Stormwater detention: 1 basin covering 2.0 ac. Providing 8.5 ac ft.
Watershed: Grapevine Creek			
SH 114 east of B114	U: 85 ac P: 57 ac	15 – 5 ft x 4 ft box culverts from 64 to 459 ft	Storm sewers: 9 trunk lines ranging in size 18 in to 4 ft x 3 ft, 18,400 ft / Stormwater detention: 1 basin covering 0.25 ac. Providing 0.9 ac ft.
SH 114 west of B114	U: 141 ac P: 48 ac	15 – 10 ft x 5 ft box culverts from 339 to 1893 ft	Storm sewers: 9 trunk lines ranging in size 18 in to 4 ft x 4 ft, 20,200 ft / Stormwater detention: Box culvert 1 – 8 ft x 5 ft, 461 ft. = 0.4 ac ft.

Location	Drainage Area	Proposed Cross Drainage Structure(s)	Storm Drainage System / Stormwater Mitigation
SH 121 north of SH 114	U: 0 ac P: 126 ac	1 – 7 ft x 4 ft box culvert: 181 ft	Storm sewers: 4 trunk lines ranging in size 24 in to 48 in, 13,100 ft / Stormwater detention: 1 basin covering 1.7 ac. Providing 7.7 ac ft.
International Parkway	U: 64 ac P: 110 ac	5 – 7 ft x 5 ft box culverts1,286 ft	Storm sewers: 1 trunk line ranging in size 24 in to 36 in, 800 ft / Stormwater detention: 1 basin covering 1.96 ac. Providing 5.1 ac ft.
SH 114 / Grapevine Crk	U: 1,703 ac P: 54 ac	9 – 10 ft x 10 ft box culverts, 400 ft	Storm sewers: 4 trunk lines ranging in size 18 in to 8 ft x 4 ft, 18,400 ft / Mitigation provided with International Parkway outfall.
Watershed: Big Bear			
SH 114 west of William D Tate	U: 0 ac P: 10 ac	No cross drainage structure	Storm sewers: 4 trunk lines ranging in size 24 in to 36 in, 3,400 ft / Stormwater detention: 1 basin covering 0.6 ac. Providing 0.35 ac ft.
SH 121 east of William D Tate	U: 146 ac P: 67 ac	Box culvert: 2 – 7 ft x 7 ft, 750 ft 3 – 8 ft x 5 ft, 110 ft	Storm sewers: 7 trunk lines ranging in size 24 in to 48 in, 8,500 ft / No mitigation
SH 121 north of Mustang	U: 11 ac P: 13 ac	Concrete pipe: 1 – 48 in, 320 ft, 2 – 48 in, 100 ft	Storm sewers: 2 trunk lines ranging in size 24 in to 30 in, 800 ft / Stormwater detention: 1 basin covering 0.4 ac. Providing 0.35 ac ft.
SH 121 south of Mustang	U: 110 ac P: 54 ac	7 – 5 ft x 5 ft box culverts 290 to 550 ft	Storm sewers: 4 trunk lines ranging in size 24 in to 36 in, 4,000 ft / Stormwater detention: 2 basins covering 0.7 ac. Providing 0.63 ac ft.
SH 121 north of SH 360	U: 99 ac P: 24 ac	2 – 8 ft x 4 ft box culverts 570 ft	Storm sewers: 3 trunk lines ranging in size 24 in to 42 in, 3,300 ft / Stormwater detention: 2 basins covering 0.26 ac. Providing 0.42 ac ft.
SH 121 / Big Bear Creek	U: 22,320 ac P: 43 ac	Bridge: 1 – 45 ft x 125 ft 1 – 200 ft x 540 ft, 1 – 40 ft x 180 ft	Storm sewers: 3 trunk lines ranging in size 24 in to 48 in, 8,600 ft / No mitigation
SH 360 / Big Bear Tributary 3	U: 1,009 ac P: 15 ac	5 – 8 ft x 8 ft, Box culverts 470 ft	No storm sewers /Stormwater detention: 2 basins covering 0.75 ac. Providing 0.72 ac ft.
SH 360 / Stone Myers Pkwy	U: 43 ac P: 36 ac	1 – 8 ft x 5 ft box culvert: 630 ft	Storm sewers: 1 trunk line ranging in size 24 in to 5 ft x 4 ft, 3,200 ft / No mitigation
SH 26 east of SH 114	U: 0 ac P: 7 ac	No cross drainage structure	Storm sewers: 4 trunk lines ranging in size 24 in to 36 in, 4,900 ft / No mitigation
Watershed: Jones Branch			
FM 1709 / Jones Tributary	U: 69 ac P: 7 ac	Concrete pipe: 2 – 36 in, 320 ft	Storm sewers: 4 trunk lines ranging in size 24 in to 36 in, Total length 2,300 ft / No mitigation
FM 1709 / Jones Tributary	U: 20 ac P: 5 ac	Concrete pipe: 1 – 24 in, 148 ft	Storm sewers: 2 trunk lines size 24 in, Total length 1,700 ft / No mitigation
(U: Upstream; P: Project ROW)			

C.1.1.9 (b) Concept Plan Drawings

NorthGate's due diligence during preliminary design of the drainage system ensures that our schedule and cost estimates are accurate for the final Project design and increases the likelihood of successfully meeting our schedule commitments. The drainage systems are annotated on the Project schematic drawings. We developed 30 roll plots showing the location of the drainage swales, storm sewer trunk lines, inlet and manhole types, cross drainage structures and detention basins. The size, length and elevations of each component are included on the Preliminary Drainage Drawings found in Appendix D.2.5

C.1.1.9 (c) Concept Plan for Construction Sequencing of Drainage Network

The new drainage systems will be installed immediately after pavement demolition and prior to/or during the earthwork operations in each area/phase, with the exception of those areas requiring a large fill.

Due to its phased nature, maintaining positive outflow of stormwater is crucial to the Project. Temporary connections to the existing drainage trunk lines will be required to maintain positive outflow of stormwater off of the traveled roadway and out of the Project work area. Nearly all of the existing cross drainage structures will require a temporary pipe or culvert section to be built to tie into the existing cross drainage. Many of the parallel systems will

require a temporary tie-in to the existing drainage network and temporary inlet and inlet modifications. The drainage structures will be evaluated on an individual basis, and the temporary drainage sized with a minimum two-year event frequency. This temporary tie-in will be removed after positive drainage is constructed in the subsequent phase. Backfill requirements for all drainage systems under roadways require CSB or flowable fill to 1 ft. above the pipe. Backfill requirements for all pipe other than roadway is CSB or flowable fill.

C.1.1.9 (d) Approach for Connecting to Existing Drainage Systems

The drainage flow line elevations at the downstream and upstream edge of the Project ROW match the elevations of the existing drainage system. Within the Project right-of-way, the slope of the cross drainage flow paths is set either to match the existing flow paths or at a milder slope to facilitate the highway profile and reduce flow velocity. All drainage structures within the Project ROW are sized for ultimate development flows. The drainage system components are transitioned to match the existing drainage systems upstream and downstream of the Project.

The proposed condition flow rates leaving the Project ROW are reduced if they exceed the existing condition flow rates. The flow reduction is typically provided through in-line stormwater detention basins. We have planned 17 detention basins that are located at 12 drainage outfalls and providing a total of 26.15 ac. ft. of storage. A box culvert is planned at one location where there is insufficient area for a basin.

Unique drainage systems are located at FM 2499 and Denton Creek, and along SH 114 just west of Business 114 in the upper reaches of Cottonwood Branch. The drainage system along FM 2499 that discharges into Denton Creek includes 40 acres that currently flow eastward from the intersection of Stars and Stripes and FM 2499. This drainage area will be conveyed through a box culvert along FM 2499 and outfall directly into Denton Creek. The 50-year ultimate development condition flows (design) that the box culvert must convey is 375 cfs. Using the USGS Regional Regression Equations for the upstream area, the 100-year flow in Denton Creek is impacted 38 cfs, from 3,840 cfs to 3,878 cfs, as a result of the Stars and Stripes flow. This flow increase will only occur on Denton Creek between FM 2499 and the existing outfall location, a distance of about 3,000 ft. We adjusted the hydraulic computer model to reflect the increased flow rate and determined the potential increase in water surface elevations along Denton Creek will rise at most 0.01 ft. within the affected reach. In comparison, the Flood Insurance Study flows are controlled by Grapevine Lake and not the upstream drainage area. As a result, the 100-year flow from the upstream drainage area is less than the 10-year flow from Grapevine Lake. This means that the increase of 0.01 ft. as a result of re-routing Stars and Stripes will not adversely impact the FIS flows or water surface elevations on Denton Creek, nor will any structure be impacted. Therefore, mitigation for the flow from the Stars and Stripes drainage area is not needed.

The second outfall along SH 114 just west of Business 114 is unique because the flow is conveyed through a box culvert downstream from the Project right-of-way. Our analysis considered ultimate upstream development conditions to size the box culverts across the Project ROW. However, downstream of the Project, the ultimate flows will require an upsizing of the existing box culverts along Minters Chapel Road. Our analysis found that the existing four 10-ft. x 5-ft. box culverts along Minters Chapel Road need to be upsized to five 10-ft. x 5-ft. box culverts. To avoid reconstruction of the recently completed (in 2001) Minters Chapel Road, this additional box will be routed east along the frontage road and then north along the east side of Business 114 (Texan Trail) on a DFW easement. The box culverts across the Project ROW will require the use of five 10-ft. x 5-ft box culverts. The Project will cause an increase in runoff that requires the storage of 0.4 ac.-ft. of water; this volume will be accommodated using a single 8-ft. x 5-ft. box culvert that runs parallel to the five 10-ft. x 5-ft. box culverts across the Project ROW. This eliminates additional ROW acquisition costs and reduces future maintenance costs to TxDOT.

The implementation of ATC 4, Elevated Direct Connector at SH 26, will eliminate the necessity of 5,000+ linear ft. of drainage 40-55 ft. deep to drain the depressed SH 26 section into Big Bear Creek east of William D. Tate Ave. Implementation of this ATC will significantly reduce future maintenance costs for this drainage line.

The implementation of ATC 4, Elevated Direct Connector at SH 26, will eliminate 5,000+ ft. of drainage and significantly reduce future maintenance costs.

C.1.1.9 (e) Temporary Drainage

Temporary drainage is critical and will be part of our detailed planning and work plans. The majority of the drainage system is within the Project ROW and can be installed with minimal disturbance outside the Project ROW. We will

require temporary construction easements for a staging area and for maneuvering equipment during the drainage installation. Depending on the depth and size of the culvert, we will accommodate for the required temporary drainage easements (Appendix D.2.5). NorthGate will restore all disturbed easements and other areas to pre-existing or better condition.

After the new drainage network is tied into the new trunk line and is operational, we will demolish the existing drainage network in that area. We will not remove or fill the temporary connecting pipe or culvert section until after the drainage network for the entire area is complete.

Possible locations of drainage easements are:

- Big Bear Creek Tributary at SH 360 - upstream and downstream easement approximately 100 ft. x 50 ft.
- East side of Business 114 (Texan Trail) on DFW easement in lieu of the easement on Minters Chapel Road.

C.1.1.10 Roadway

The NorthGate Difference

NorthGate completed a comprehensive technical review of the basic configuration, and identified several geometric refinements that provide benefit to the Project in the form of reduced construction cost and impacts, reduced right-of-way requirements and improved constructability, reducing construction time.

Commitment to TxDOT Project Goals Addressed in This Section

(a) **Maintaining mobility through the Project area ...**
NorthGate's roadway design innovations optimize construction sequencing and schedule duration.

(b) **Reducing congestion and improving mobility within the Project area after the construction period**
All roadway components conform to the Basic Configuration detailed in TxDOT's Schematic Design, and comply with the geometric design criteria described in Table 11-1 of Book 2 with respect to horizontal alignment, vertical alignment, cross-section, clear zone, vertical clearance and turning radius. These components are described in this section.

(d) **Securing quality design, construction and capital maintenance services ...**
Our experienced urban corridor, design-build management team provides proven design innovation and construction efficiency.

Added Value Items Included in This Section:

- ✚ **All 13 items of our proposed geometric refinements (Figure C.1.1.10-1) improve constructability, reduce construction impacts and minimize construction duration.**
- ✚ **Extending Bridge 8 to eliminate the south abutment approach walls of the direct connector from WB 114 to SB FM 1709 increases the sight distance at Commerce St.**

C.1.1.10 (a) General Project Roadway Information

Proposed ROW requirements, including drainage and temporary construction easements, functional classifications and design speeds for each roadway, and Project limits for the major corridors (SH 121, SH 114, IH 635, International Pkwy., FM 2499, SH 26 and FM 1709) are provided in Appendix D.2.6.

C.1.1.10 (b) Proposed Refinements of Schematic Design

NorthGate completed a thorough technical review of the Basic Configuration, and identified several geometric refinements that provide benefit to the Project in the form of reduced construction cost, reduced ROW takes, improved constructability and/or reduced construction time. These 13 refinements are described in general terms in Figure C.1.1.10-1, and were incorporated and referenced in Appendix D.2.6.

Figure C.1.1.10–1 Proposed Geometric Refinements

ID	Proposed Geometric Refinement
1	Modify horizontal and vertical geometry of WB SH 114 to SB Spur 97, and WB SH 114 managed lanes to SB Spur 97, to allow existing WB 114 to SB Spur 97 to remain in service while new direct connector is under construction. This refinement also requires modification of WB 114 to NB 121 - horizontal and vertical geometry.
2	Raise PGL of SB Spur 97 near VPI STA 2812+50 to allow existing loop ramp to remain in service and accommodate existing SB Spur 97 to EB SH 114 movement, which will be replaced late in Phase 3A with new direct connector.
3	Shift gore location approximately 290 ft east, and modify horizontal and vertical geometry to allow straddle bent column to be placed between WB SH 114 and ramp from WB SH114 to Texan Trail.
4	Modify horizontal and vertical geometry of exit ramp WB SH 114 to Main Street to allow construction of a two-span overpass structure at Texan Trail. The proposed bents of the five-span structure conflict with existing SH 114 lanes, and there is insufficient width between new and existing bents to allow detouring of existing SH 114 traffic. This modification requires realignment of WB frontage road (shifting north by approx. 3 ft) west of Texan Trail. This modification requires the WBFR to be shifted north approx. 3 ft; no additional ROW needed.
5	Raise PGL of SH 114 / SH 121 mainlanes and SH 114 managed lanes from STA 415+00 to STA 534+50 to balance earthwork quantities and reduce constructability issues. This modification affects vertical geometry of all ramps and direct connectors within the above station limits.
6	Modify horizontal and vertical geometry of NB 121/ EB 114 mainlanes to allow more efficient construction sequencing. This modification affects horizontal and vertical geometry of entrance ramp from Mustang Drive to NB 121/EB 114, and exit ramp from NB 121 to Main Street.
7	Modify horizontal and vertical geometry of exit ramp EB SH114 to Texan Trail, to reduce last span (56 ft) of Main Street overpass structure at south abutment.
8	Modify horizontal and vertical geometry of entrance ramp Texan Trail to SB 121, to eliminate last span of Main Street overpass structure (32 ft) at north abutment.
9	Extend Bridge 8 to eliminate the south abutment approach walls WB SH 114 DC to SB 1709. This increases vehicle sight distance at the intersection and reduces construction time.
10	Raise the profiles of the SH 26 to SH 114 direct connectors to carry traffic over SH 114. This eliminates large drilled shaft walls, difficult trenching with potential utility conflicts, improves construction sequencing/traffic control, and reduces construction.
11	Modify existing off-ramp at SB SH 121 to Stone Meyers, to save ramp and shorten bridges 2-32 and 1-35. If ramp cannot be re-used, shorten proposed ramp to help shorten above bridges.
12	Shorten bridge 47 EB frontage from Texan Trail to EB SH 114. Shorten bridge 1 span on each end – approx. 270 ft.
13	Shift ramps under Bass Pro to shorten Bass Pro bridge. Shift SB 2499 to EB 635 ramp, allowing SB 2499 to SB IPW to move to the east.

C.1.1.10 (c) Plans (typical sections and profiles) of Mainlane, Frontage Road, Interchanges and Crossing Roadways for Schematic Design

NorthGate has developed typical sections for mainlanes, managed lanes, direct connectors, ramps, collector distributor roads, frontage roads and cross streets at select Project locations, all of which are illustrated in Appendix D.2.6. We have also completed proposed profile grade lines for SH 114, SH 121 and IH 635 mainlanes and SH 114 managed lanes, and for individual director connectors, ramps, collector distributor roads, frontage roads and cross streets.

C.1.1.10 (d) Roadway and Interchange Geometry

Roadway and Interchange geometry for mainlanes, managed lanes, direct connectors, ramps, collector distributor roads, frontage roads and cross streets, along with horizontal curve data for each roadway, is presented in Appendix D.2.6.

C.1.1.10 (e) Disposition of Existing Facilities

All mainlane existing bridges and roadway as shown on the Developer's Schematic will be demolished and reconstructed. NorthGate will utilize existing materials, to the greatest extent possible, to conserve resources and reduce construction costs. We will re-use existing pavement and bridges in the form of crushed concrete and recycled asphalt pavement (RAP), generating environmentally-friendly construction materials and reducing Project waste.

Our TCP does not involve closures of existing roadways. Existing bridges incorporated and widened for the Project are located on SH 121 at Stone Meyers and IH 635 at the DART rail line.

C.1.1.11 Managed Lane Tolling Facility Infrastructure

The NorthGate Difference

NorthGate's tolling infrastructure and site design meets or exceeds all roadside safety requirements, and will minimize impacts on the roadway. Our site adaptation plan provides a suitable platform for TxDOT's Electronic Toll Collection System (ETCS) devices and processors.

Commitment to TxDOT Project Goals Addressed in This Section

(c) **Facilitate efficient management and operation of the managed lanes ...**
We will work as a cohesive team to coordinate with TxDOT's ETCS integrator to support the delivery of efficiently operating managed lanes.

(h) **Cooperation and coordination with Stakeholders ...**
Following NTP1, NorthGate will hold partnering workshops with TxDOT and its ETCS integrator to ensure close communication during the design phase to identify key interface items.

(d) **Securing quality design, construction and capital maintenance services ...**
Our Quality Management System will be ISO certified, ensuring compliance.

Added Value Items Included in This Section

- **NorthGate will partner with TxDOT's ETCS provider to deliver integrated tolling infrastructure.**
- **NorthGate will turn over managed lanes to TxDOT early.**

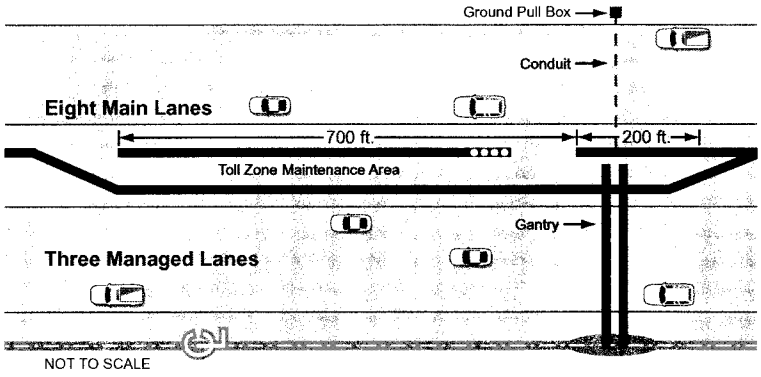
C.1.1.11 (a) Coordination Plan with Toll Systems Integrator

NorthGate team members understand tolling infrastructure integration from other successful project experience. NorthGate's work for this element consists of installing all conduit outside of the general purpose lanes to an agreed-upon location with the tolling systems integrator. We will coordinate the following tolling system design elements with the ETCS integrator: toll gantries, positive protection, foundations, housings and other buildings, communications backbone, power distribution and power systems, and service vehicle and equipment access. To demonstrate our commitment to coordination, TxDOT's ETCS provider will be included in the Project partnering meeting to develop goals and objectives. We will turn over the managed lanes to TxDOT by January 2013, six months ahead of substantial completion.

C.1.1.11 (b) Quality Assurance / Quality Control Approach

NorthGate will follow our detailed QMP, in coordination with TxDOT's ETCS integrator. Our approach involves engaging the ETCS integrator with the appropriate technical task forces at NTP1. NorthGate, the ETCS integrator and TxDOT jointly establish interface protocols and progress can be monitored throughout design. As the ETCS design plan evolves, both designs will be calibrated and integrated to show interface points. We will process the NorthGate plans through the quality systems process to ensure compatibility. As construction is underway for the elements that affect the tolling zone, the QMP protocols will be followed. NorthGate will provide copies of the appropriate quality reports to the ETCS integrator.

Figure C.1.1.11 Toll Zone Maintenance Area



C.1.1.11 (c) Managed Lane ETCS Cross Reference

The table below provides a cross reference of the ETCS requirements and the locations within this proposal that describe NorthGate's integration solutions.

Figure C.1.1.11–1 ETCS Cross Referencing Requirements

Requirement	Proposal Cross Reference
Construct a toll zone maintenance area approx. 900 ft with approx. 700 ft weaving and stopping area for maintenance vehicles entering from the general purpose lanes, protected by concrete traffic barrier and any necessary crash attenuators.	Technical Proposal C.1.1.1; Design and Construction Plan; C.1.1.4 Connectivity; C.1.1.11 Managed Lane Tolling Facility (Figure C.1.1.11) Infrastructure; C.1.1.12 ITS; C.1.1.13 Signing, Delineation; C2.1 Maintenance. Developer Schematic D.2.6 – roll 3 of 13; D2.8 Prelim. Sign Plans sheets 4-9; D.2.9 – Prelim. Electrical/Illumination Sheet 6 of 14
The Developer shall be responsible for all general roadway work through each tolling zone	Technical Proposal C.1.1.1 Design and Construction Plan; C.1.1.4 Connectivity; C.1.1.11 Managed Lane Tolling Facility (Figure C.1.1.11) Infrastructure; C.1.1.12 ITS; C.1.1.13 Signing, Delineation; C.2.1 Maintenance Developer Schematic D.2.6 – roll 3 of 13; D2.8 Prelim. Sign Plans sheets 4-9; D.2.9 – Prelim. Electrical/Illumination Sheet 6 of 14
Furnish and install four four-inch conduits extending from the toll zone maintenance area to edge of pavement outside of the general purpose lanes.	Technical Proposal C.1.1.1 Design and Construction Plan; C.1.1.4 Connectivity; C.1.1.11 Managed Lane Tolling Facility (Figure C.1.1.11) Infrastructure; C.1.1.12 ITS; C.1.1.13 Signing, Delineation; Developer Schematic D.2.9 – Prelim. Electrical/ Illumination Sheet 6 of 14
Developer shall furnish and install a ground box at each conduit terminus	Technical Proposal C.1.1.1 Design and Construction Plan; C.1.1.4 Connectivity; C.1.1.11 Managed Lane Tolling Facility (Figure C.1.1.11) Infrastructure C.1.1.12 ITS; C.1.1.13 Signing, Delineation...; Developer Schematic D.2.9 – Prelim. Electrical / Illumination Sheet 6 of 14
The Developer shall coordinate with TxDOT and the Integrator to determine the exact dimensions of the toll zone maintenance area and the location of all conduits.	Technical Proposal C.1.1.1 Design and Construction Plan; C.1.1.4 Connectivity; C.1.1.12 ITS; C.1.1.13 Signing, Delineation; C.1.1.11; Managed Lane Tolling Facility Infrastructure (Figure C.1.1.11); Developer Schematic D.2.6 – roll 3 of 13; D.2.8 Prelim. Sign Plans sheets 4-9; D.2.9 – Prelim. Electrical / Illumination Sheet 6 of 14
For ETCS integrator responsibilities, Northgate encourages early and ongoing technical task force participation by TxDOT's ETCM integrator to facilitate interface.	Technical Proposal C.1.1.1 Design and Construction Plan; C.1.1.4 Connectivity; C.1.1.12 ITS; C.1.1.13 Signing, Delineation; C.1.1.11 Managed Lane Tolling Facility (Figure C.1.1.11) Infrastructure; C.2.1 Maintenance; Developer Schematic D.2.6 – roll 3 of 13; D2.8 Prelim. Sign Plans sheets 4-9; D.2.9 – Prelim. Electrical / Illumination Sheet 6 of 14
NorthGate encourages early and ongoing technical task force participation by TxDOT's ETCS integrator to facilitate interface.	Technical Proposal C.1.1. Design and Construction Plan; C.1.1.4 Coordinating; C.1.1.11 Managed Lane Tolling Facility (detail) Infrastructure C.1.1.12 ITS; C.1.1.13 Signing, Delineation. Developer Schematic D.2.6 – Roll 3 of 13; D.2.8 Prelim. Sign Plans – Sheets 4-9; D.2.9 Prelim. Electrical / Illumination – Sheet 6 of 14.

C.1.1.12 Intelligent Transportation Systems

The NorthGate Difference

NorthGate's Intelligent Transportation System (ITS) will accurately detect traffic and operational conditions Project wide and clearly communicate current and pertinent travel information to motorists.

Commitment to TxDOT Project Goals Addressed in This Section

(a) **Maintaining mobility through the Project area during construction ...**
Our ITS solution will allow us to monitor traffic flows, communicate changing construction sequences to motorists, detect and mitigate freeway incidents, and safely guide motorists.

(b) **Reducing congestion and improving mobility within the Project area after the construction period; and (c) Facilitate efficient management and operation of the managed lanes ...**
We will install a temporary Traffic Management Center (TMC) to monitor traffic operations. Upon Project completion, the interim TMC systems can be efficiently transitioned to TxDOT.

(d) **Securing quality design, construction and capital maintenance services ...**
Our ITS design incorporates cost-saving innovations and added value implemented throughout the Project's construction and maintenance.

(e) **Safe construction**
ITS components provide tools for improving safety.

(f) **Expediting delivery of Project improvements**
We are providing ITS components early in the Project.

Added Value Items Included in This Section

- **The interim TMC at the Project office will be operational within the first three months after NTP1 to monitor traffic flow and control ITS components.**
- **ATC 8, Efficient Use of Luminaire Poles, reduces costs for RVSD mounting poles.**

Our TCP significantly minimizes the potential congestion-related impact of increased delays, fuel consumption, vehicle stops and emissions, and lost retail revenue. Non-reoccurring incidents and their impacts cannot always be anticipated, however. Therefore, our technical solution for traffic management incorporates an integrated Intelligent Transportation System (ITS).

C.1.1.12 (a) Schematic Plan and Layout of ITS

NorthGate evaluated the technical requirements of Books 2 and 3 based on team expertise in traffic operations, incident management and ITS infrastructure to develop our design approach. The full schematic plan and layout of the proposed ITS design is shown in Appendix D.2.7. It includes the permanent locations for CCTV cameras, Dynamic Message Signs (DMS), traffic monitoring stations and single-line DMS for lane control. Final placement of these devices will be determined after the roadway and drainage infrastructure is finalized. Appendix D.2.7 also identifies the permanent communications infrastructure to support the ITS.

C.1.1.12 (b) Connectivity and Monitoring

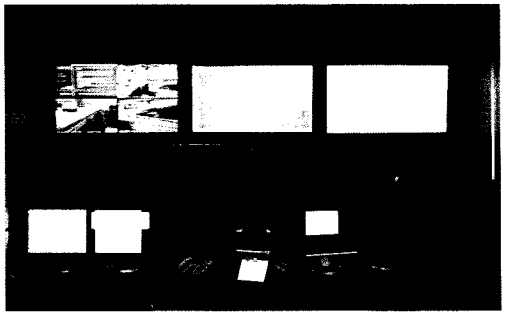
Three months after NTP1, the temporary/interim TMC will be operational, serving as the head-end for the communications network between the field devices and the TxDOT traffic management centers.

Connectivity – ITS Project Devices: NorthGate's permanent communications plan uses both fiber optic cable and wireless communication mediums and a system to support IP over Ethernet. The design provides redundancy in the communication network through a high-count fiber cable between the existing satellite building at the SH 360/SH 121 interchange and the proposed satellite buildings within the Project area. A second fiber cable will run parallel between these facilities and will provide connections to the communication huts onsite. The fiber-optic cable design is augmented with wireless communication links, some of which connect fiber huts to the ITS devices, while

others form links between the communication huts or cabinets. These technologies make it possible to expand the ITS network as capacity is increased along the Project roadways. The ITS network will use hardware and software components that are consistent and compatible with those described in Books 2 and 3.

Connectivity – Traffic Control System: The only traffic control system within the Project limits is a City of Grapevine system that uses Naztec traffic signal controllers under the control of Naztec's Smartways™ central software. We propose adding an IP-based internet connection and wireless communication to the City of Grapevine's traffic control system for temporary support of traffic signal operations and to maintain these temporary connections to the existing signalized intersections until those intersections are converted to our fiber-based communications infrastructure. To make this possible, our traffic management software was specifically developed as an integrated, standards-based system that can interface with ITS devices and with all types of intelligent controllers and central systems that are also based on open industry standards.

Figure C.1.1.12-1 Interim TMC



NorthGate will incorporate a temporary TMC in its Main Street Office.

System Monitoring: NorthGate will incorporate a temporary TMC in the Project office (Figure C.1.1.12-1). The TMC will be operational within three months of NTP1 and will remain operational for the duration of all construction activities. The TMC's developer-provided traffic management system consists of an operator workstation, a video management subsystem, a video display and communication/ application servers, with software including subsystems for monitoring and controlling the CCTV cameras, DMS units (single-line and large signs) and traffic monitoring stations. The software will communicate to the DMS units using the NTCIP communication protocol.

While some vendor-specific software may be used for added control and functionality, the TMC will primarily rely on included traffic management software, commercial off-the-shelf and ready for deployment, to monitor traffic flow and control the ITS components. Key features of this traffic management software include:

- Management of traffic signal controllers
- Management of CCTV cameras and video control systems
- Monitoring of vehicle detector stations
- Management of DMS
- Traveler information system
- GIS-based graphical user interface
- Center-to-center interface
- Sub-surface system diagnostics

The TMC is staffed by trained operators who use ITS components to monitor the traffic flow through the Project limits. CCTV cameras are installed for incident verification and traffic management. The digital video format is compatible with systems already in use by TxDOT. The TMC operators will coordinate with NorthGate's Construction Managers and the Courtesy Patrol to identify to identify incidents in real time and keep current on construction activities that effect traffic flow. The TMC supervisor will clearly communicate relevant and useful travel information to motorists driving through the construction zones. The DMS units within the Project limits will inform motorists of the availability of alternative routes and advise travelers of adverse road conditions and congestion. The TMC supervisor will work with the Public Relations Manager to distribute announcements of traffic flow conditions and planned construction activities via e-mail alerts to TxDOT, the local agencies and the media.

The central software is capable of responding to real-time traffic conditions by allowing the operator to define response plans based on the detection of abnormal traffic conditions. The response plan consists of an audible alert, an automatic camera preset selection to view the affected area and suggested DMS messages. These DMS message commands are implemented only upon verification by TxDOT.

Operators at the interim TMC will be aware of daily construction closures and routings to provide accurate guidance information to motorists. Alternate routing plans will be developed as part of the IMP and ready for deployment in the event of incident-caused congestion with extended clear times.

NorthGate will provide peak-hour Courtesy Patrol service to assist disabled vehicles that impede the flow of traffic. This service will provide towing, gas, flat tire repair and assistance to motorists stranded within the work zone. This program is an integral aspect of the Project's incident management efforts. Both the traveling public and traffic flow are positively impacted by the Courtesy Patrol.

Project Completion: Upon Project completion, the interim TMC systems can be efficiently transitioned to TxDOT. It will continue to serve TxDOT's long-term needs in the area of technology-enabled traffic operations. Migration from the temporary to the permanent TMC installation will be seamless to minimize disruption to freeway traffic monitoring. Upon completion of the fiber network, the communication system will transition to either an all fiber-based network or to a hybrid network of fiber and wireless links. The system functions equally well with either or both types of communication networks operating at the same time.

C.1.1.12 (c) Traffic Information Coordination and Regional ITS Architecture Compliance

The traffic and incident data collected at the interim TMC will be provided to the TxDOT Fort Worth District TransVISION Center through a high-bandwidth fiber optic connection. This data will be encoded according to the existing center-to-center standards that use CORBA and the traffic management data dictionary standards, and is then distributed to other agencies in the area. Conversely, data available to the regional center is also available to operators in NorthGate's TMC facility. Motorists can view traffic conditions within the Project limits online using a link from NorthGate's Project Web site.

NorthGate will organize a task force that will include TxDOT and local agency personnel. They will meet to discuss upcoming events that may affect traffic flow and share ideas to manage traffic conditions within the Project limits and how it impacts local roadways. The Project Steering Committee will also discuss relevant information to be distributed, accommodating alterations in traffic management to the extent possible.

Regional ITS Architecture: Our integrated ITS infrastructure and communications approach conforms to the North Texas Regional Comprehensive ITS Architecture. The ITS components for this Project follow the standards developed for the region relating to hardware, software and communication protocols. The hardware standards allow the different technologies to communicate using a common format. The software standard supports interagency communication between subsystems. The use of open communication protocols facilitates the sharing of data between centers (users). For this Project, the traffic management software shares data with existing regional centers using the published interface control documents ICDs. The data is encoded according to existing center-to-center standards that use XML and to the traffic management data dictionary standards.

C.1.1.13 Signing, Delineation, Pavement Markings, Signalization and Lighting

The NorthGate Difference

This section details an integrated design approach to signing, delineation, pavement marking, signalization and lighting to comply with TxDOT, FHWA and local requirements.

Commitment to TxDOT Project Goals Addressed in This Section

(a) **Maintaining mobility through the Project area during construction ...**
NorthGate places a high priority on maintaining existing traffic signals and traffic flow and minimizing impacts to commuters, residents and DFW Airport-related vehicle operations. Temporary and permanent signal operations will respond to typical daily traffic patterns, special events, phasing detours and freeway incidents.

(b) **Reducing congestion and improving mobility within the Project area after construction**
Elements of the permanent design will be incorporated into the Project early in the construction stage.

(c) **Facilitate efficient management and operation of the managed lanes throughout Project performance**
Advance toll information will be placed before each entrance to the managed lanes.

(h) **Cooperation and coordination with Stakeholders in the development, design, construction and capital maintenance of the Project**
Guide signs were located to avoid conflict with other signs, DMS and bridge structures. We will work with local agencies and DFW Airport to address specific wayfinding needs. Existing wayfinding signs will be relocated to the proposed frontage roads. Coordination with TxDOT on advance signing will minimize traffic congestion within the Project limits.

Added Value Items Included in This Section

✚ **The Project team will work with local agencies and DFW Airport to address specific wayfinding needs.**

C.1.1.13 (a) Signing

Preliminary Signing Plans are included in Appendix D.2.8. The original signing schematic was analyzed with the goal of finding a better way to address operational and construction issues specific to Project. For example, signing for the Glade Road exit was changed from ground-mounted to overhead, to improve sign visibility on the three-lane section of southbound SH 121. The westbound exit for Main Street included signing for SH 26 south; this sign was changed to read "to" SH 26, since SH 26 does not cross SH 121/SH 114 at this location. Several signing structures were added, including a full-span bridge sign structure at the north end of the Project, where it will transition into future work. The westbound IH 635 advanced exit signs were changed to comply with interstate highway signing requirements. A review of DFW airspace limitations revealed airspace infringement at several elevated overhead sign structures. These limitations were resolved in the Preliminary Signing Plans.

Guide signs were located to avoid conflict with other signs, DMS and bridge structures. The final design will ensure that conflicts with lighting and other ITS devices are also avoided. Proposed overhead guide signs will have Clearview 5WR font. Text, symbol and arrow spacing will follow TMUTCD requirements. In some cases, to be coordinated with TxDOT, guide signs on existing or new structures will be installed outside the Project ROW, but within the TxDOT ROW. Advance toll information signs will be placed before each entrance to the managed lanes. The text for the toll fee signs are yet to be determined. All overhead structures, including those designed with single-line DMS, will have a clearance of 21 ft. Several full-span structures will have tower leg foundations in proposed cement-treated base (CTB). The final design of the guide signs will use SignCAD as the design tool. Core bore data will determine overhead sign foundation depths. Temporary overhead signage will be implemented to communicate to motorists throughout the construction phases.

Wayfinding: A critical element of traffic control during construction will be the appropriate placement and usage of wayfinding devices. Two types of signage will be used to direct motorists through and around the Project: directional signs for special or large-scale destinations within the limits, and route redirection signing prior to entering the Project area.NorthGate will work with local agencies and DFW Airport to address specific wayfinding needs. Existing

wayfinding signs will be relocated from the current to the proposed frontage roads. Coordination with TxDOT on advance signing will minimize the amount of traffic congestion within the Project limits. For example, one possible advance message could use a TxDOT DMS and redirect DFW Airport motorists to SH 161 and the southern entrance to the airport.

The proposed design incorporates design requirements identified in Books 2 and 3, Sections 16.3.3 (Project Signs – Outside the Project ROW), 16.3.4 (Advance Toll Information Signs), 16.3.5 (Third-Party Signs), 16.3.6 (Sign Support Structures), 16.4.1 (Permanent Signing and Delineation – Construction Requirements), and 16.5.1 (Permanent Signing and Delineation – Deliverables).

Delineation and Pavement Markings: The proposed design incorporates design requirements identified in Books 2 and 3, Sections 16.3.2 (Permanent Signing and Delineation), 16.3.7 (Permanent Pavement Markings), 16.4.1 (Permanent Signing and Delineations – Construction Requirements), 16.4.2 (Permanent Pavement Marking – Construction Requirements), 16.5.1 (Permanent Signing and Delineations – Deliverables) and 16.5.1 (Permanent Pavement Marking – Deliverables). Pavement markings are consistent with the lane configurations shown on the Developer's Schematic (Appendix D.2.6).

Signalization: NorthGate places a high priority on maintaining existing traffic signals and traffic flow through the construction zones. We will use current TxDOT, City of Grapevine and City of Southlake standards and specifications as a basis for our traffic signal design requirements. Appendix D.2.14 shows the intersections that will be impacted and gives specific information for each intersection. All permanent traffic signal and pedestrian heads used in the Project will be LED. NorthGate's comprehensive plan for minimizing impacts to traffic operations during construction is summarized below.

Coordinated Traffic Signal Timing Plans: Traffic signal coordination is critical to a comprehensive, integrated traffic management system. Signal operation must be adjustable to respond to typical daily traffic patterns, special events, construction phasing detours and freeway incidents. Coordinated traffic signal timing plans can greatly reduce vehicle delays, stops, fuel consumption and vehicle emissions. Currently, all coordinated timing plans affecting Project intersections are operated and maintained by the City of Grapevine. The only exception is the SH 114/ FM 1709 interchange, which is maintained by TxDOT. NorthGate's team includes members with recent experience developing, implementing and fine-tuning the City of Grapevine's signalized intersection timing plans. This expertise in local travel patterns enhances our team's ability to address any necessary traffic signal timing changes.

Once an incident is detected on the mainlanes, traffic can be diverted to pre-arranged detours on the frontage roads and/or parallel roadway facilities to ease mainlane congestion. Special coordinated timing plans will be developed and implemented for mainlane incident diversions. The implementation of these incident timing plans will be coordinated through NorthGate's Traffic Management Center (TMC), TxDOT and the Cities of Grapevine and Southlake.

Temporary Signals: The Project will be constructed in multiple phases as detailed in Section C.1.1.1 Construction Staging, Sequencing and Traffic Management. These construction phases may include shifts in roadway alignment, new approaches, additional capacity and temporary closures at signalized intersections. To minimize the impact of these elements on existing traffic signal operations, NorthGate will design temporary traffic signals to accommodate the various construction phases. The majority of the signalized intersections will require a full temporary design. Existing traffic signal hardware such as signal heads, controllers, cabinets, Video Imaging Vehicle Detection (VIVDS) assemblies and signal poles will be reused to minimize both the impact to traffic and the amount of temporary traffic signal hardware required. NorthGate will also implement permanent traffic signal elements into the temporary design at the earliest possible point to minimize the use of temporary signal hardware. To maintain seamless detection through the various construction phases, VIVDS will be deployed for Project intersections, and existing pedestrian detection will be maintained.

Permanent Signals: Permanent signals will be incorporated at every existing signalized intersection within the Project limits. All permanent signals will be designed with new equipment and hardware. We will incorporate pedestrian and video vehicle detection into the permanent design at locations where these elements are currently provided. As stated above, elements of the permanent design will be incorporated into the system at the earliest possible construction stage, and may be initially used as temporary hardware. As construction at each intersection location ends, the final configuration of the permanent signal will be implemented and the temporary hardware

removed and salvaged. The City of Southlake decorative signal poles at Northwest Highway and Gateway Dr. will be relocated to the new intersection.

NorthGate is committed to incorporating the design requirements identified in Books 2 and 3, Sections 16.3.8 (Permanent Signalization), 16.3.10 (Visual Quality), 16.4.3 (Permanent Signalization – Construction Requirements), and 16.5.3 (Permanent Signalization – Deliverables).

Existing Traffic Control Communications: The City of Grapevine operates and maintains a 900 MHz spread-spectrum radio system to its traffic signals from its Advanced Traffic Management System (ATMS). TxDOT - Fort Worth District communicates to intersections within the Project area using a dial-up modem to TransVISION. During construction and implementation of temporary signal equipment, NorthGate will maintain existing communications to every signal. At any locations without a working connection, NorthGate will provide a wireless communications link. In this way, we will maintain traffic flow and synchronization of traffic signals for the duration of the Project, updating and optimizing timing plans to provide for improved traffic progression through the signals.

In conjunction with the permanent signal designs for the Project, NorthGate will design a new communications link for each operating agency. We will install a temporary TMC to monitor and maintain traffic operations. We will also design a communications link from the temporary TMC to each operating agency's TMC for local access to the traffic signals.

C.1.1.13 (b) Lighting

NorthGate will provide a continuous roadway lighting system for all mainlanes (managed and general purpose), interchanges, ramps, frontage roads and lighting at intersections. The lighting system design will conform to the TxDOT Highway Illumination Manual as well as applicable NEC, FAA, AASHTO and local municipal lighting design requirements, specifications and standards. The lighting system design will include a combination of both conventional lighting and high-mast lighting elements to replace the existing lighting system. High-mast lighting will be restricted to the SH 360/ SH121 S interchange area and the IH-635/SH 121 N interchange area. Conventional lighting will be used in all other Project areas. Lighting agreements will be prepared by NorthGate and executed by TxDOT and the affected agencies. The preliminary Electrical/Illumination Plans are in Appendix D.2.9.

Design Approach: The illumination system photometrics are designed using the AGI 32 CAD-based design platform. A photometrics study is conducted to select the appropriate design luminaire type, mounting height, longitudinal spacing and lateral placement to assure that roadway surfaces are illuminated at levels that conform to standards provided in TxDOT Attachment 16-2. The photometric calculations developed with AGI 32 software ensure that the design meets each of the average illumination levels and uniformity rations on a given area of pavement. The photometric study addressed the influence of the nearby lighting systems immediately adjacent to the Project limits. Consideration will be given to minimizing light trespass beyond the ROW limits and potential DFW Airport glide-path conflicts.

The airspace surrounding DFW consists of various types of surfaces and zones defined in 14 CFR Part 77, Advisory Circular 70, Advisory Circular 120-91, and FAA Engine-Out Procedures. These documents generally define approach and departure surfaces and serve as the basis for establishing vertical limits for obstacles. These surfaces are represented in the TERPS CAD files provided by TxDOT. Appendix D.2.9 shows general locations that will allow high-mast lighting.

Preliminary pole layouts were prepared to verify proper illumination levels and ratios relative to the roadway geometry. Three-dimensional renderings using GeoPAK and AGI 32 data were also plotted to demonstrate the illumination levels and photometric concept. These preliminary layouts and renderings will be submitted to TxDOT and FAA for review and comment before pole layouts are finalized.

The electrical system circuits for roadway lighting will be designed to minimize total circuit length and eliminate unnecessary circuit backtracking. All elements of the lighting circuit will be designed to meet NEC and TxDOT's Highway Illumination Manual. Lighting circuit maintenance access is considered when locating junction boxes, ground boxes and disconnect switches for understructure circuits, which are configured to minimize the need for lane closures during maintenance activities. The locations of electric services will be coordinated with the utility company and available operating voltages verified. Circuit conductors and breaker sizes will be examined to determine the final circuit layouts.

The mounting and placement locations of lighting poles are determined after careful consideration of potential hazardous locations. Lighting support poles/structures are placed on concrete barriers, behind existing or proposed concrete traffic barrier or metal beam guard fence, on traffic signal poles, or outside the clear zone. Davit-arm pole types are used only where permanently-located overhead electric lines conflict with the required pole heights and placement locations. All luminaire poles and breakaway bases will meet AASHTO Governing Standards, and breakaway devices are of a type prequalified by TxDOT. NorthGate determines and designs all foundation types and lengths for all permanent lighting structures. Timber poles will be used only where necessary to provide temporary lighting during construction; no timber poles were used for permanent lighting.

NorthGate will develop an inventory system that includes all poles, ground boxes and electrical services installed within the Project limits and submit it to TxDOT for review and comment. We will also develop a plan for phasing the installation of new lighting equipment and the removal of existing lighting. To the extent possible, we will maintain the existing lighting as temporary lighting during construction. The lighting installation/removal phasing plan will be submitted to TxDOT for review and comment prior to the removal of any existing lighting equipment.

C.1.1.14 Aesthetic Design

The NorthGate Difference

NorthGate Key Personnel are experienced in performing public outreach to develop Project aesthetic concepts. Our PIC Manager, Design-Build Coordination Manager and Deputy Project Director - Adminstration/ Design all worked together to complete a multi-themed corridor outreach program on the I-25 T-REX project.

Commitment to TxDOT Project Goals Addressed in This Section

(d) **Securing quality design ... to optimize the operational life cycle performance of the Project**
Aesthetic and landscape drawings will be reviewed by the PSQRF to ensure constructability and maintainability.

(h) **Cooperation and coordination with Stakeholders ...**
Aesthetic and landscape concepts reflect the unique characteristics of each community and will be presented for additional input.

Added Value Items Included in This Section

- **Ashlar stone as the base finish will be used on walls, exceeding the requirements by providing a more aesthetically pleasing finish.**
- **NorthGate has recent relevant experience performing aesthetic enhancement outreach for a similar, multi-themed corridor.**
- **Aesthetic and landscape concept drawings are in development and will be ready to submit to TxDOT for review at NTP1.**

C.1.1.14 (a) Working with TxDOT to Enhance Design Guidelines and Provide Aesthetic Details

Aesthetics and Landscape Plan Formulation Process: Using the Fort Worth District's Landscaping and Aesthetics Master Plan as a guide, initial aesthetics concept plans are being developed with a coordinated aesthetics theme for bridges, walls, signing and landscaping to provide a clear distinction between communities (Appendix D.2.15). NorthGate will collaborate with TxDOT to continue to refine the design concepts and develop an interactive design and refinement process that will involve the communities. The Master Plan will maximize the use of the $10 million that has been allocated by TxDOT.

The concept plans establish a distinct character using consistent form, surface texture, color, and/or material selections for all new or reconstructed elements on retaining walls, bridges and associated elements, lighting, signage structures, wayfinding systems, toll entrances, fencing, pedestrian pavement, paved medians and rip-rap. Opportunities for landscape planting along the ROW and within larger open spaces at interchanges and intersections will be identified within each concept. The three concepts will provide viable alternatives identifying

enhanced design elements for community and Stakeholder financial participation (Figure C.1.1.14-1). These enhanced design elements provide an opportunity to partner with TxDOT and leverage Project aesthetic funding to the greatest extent possible.

Figure C.1.1.14-1 Example Bridge Enhancement Options: City of Grapevine

These renderings show different treatments for the exterior bridge parapets with enhanced column design.

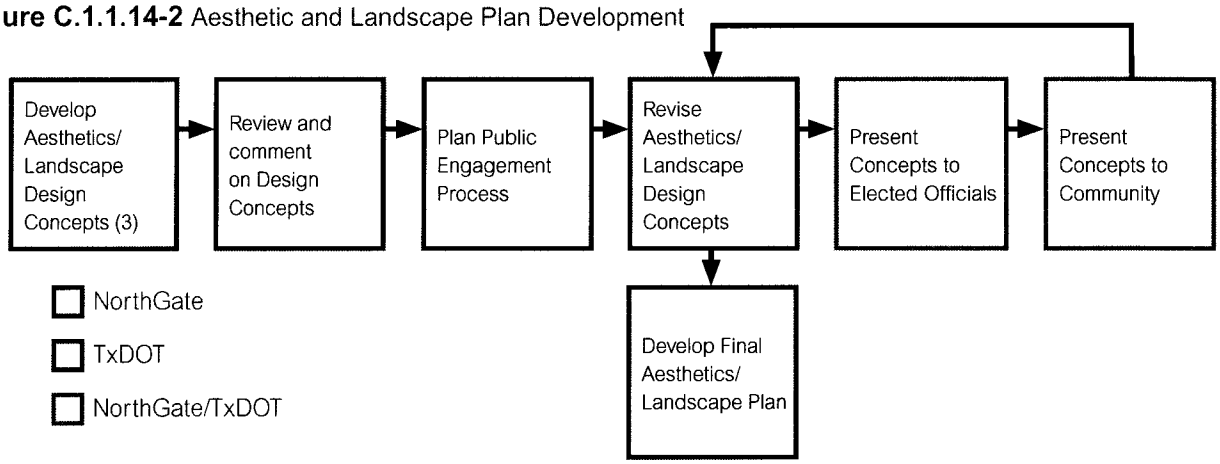
NorthGate will initiate an Aesthetics and Landscape Task Force, consisting of team members from urban design, a Texas-registered landscape architecture firm, and engineering, environmental and TxDOT representatives to refine aesthetic concepts for the Master Plan. The task force will meet within the first 30 days following award and will be a standing committee focusing on design and budget related to the Aesthetic and Landscape Plan throughout the life of the Project including:

- Aesthetics conceptual development
- Landscape conceptual development to include appropriate native plant materials for NASI Z60.1 and rip-rap, which may include stamped and painted concrete
- Final Aesthetics and Landscape Plan formulation and preparation of final design documents in coordination with TxDOT and design and construction teams to review quality and constructability
- Coordination with the construction team to ensure aesthetic design is incorporated and constructed to plan with TxDOT's approval of wall treatments 60 days prior to construction
- Coordination with the Maintenance Team to ensure that all aesthetic elements are designed for easy maintenance – surfaces can be cleaned easily for graffiti removal, landscape materials are appropriate for the conditions, including soil, water, and mowing requirements

C.1.1.14 (b) Coordination with Governmental Entities for Additional Aesthetic Enhancements

Working with Stakeholder Groups: Using the outreach plan described below (Figure C.1.1.14-2), the three concept plans will be presented to the Stakeholders for input.

Figure C.1.1.14-2 Aesthetic and Landscape Plan Development



The final Aesthetics and Landscape Master Plan will include plan elevations, perspectives and isometrics, color schemes and locations, drawings with site-specific locations of elements and demonstrations of the various roadway conditions needed to convey the concept and provide the necessary documents for the engineering and

construction teams to carry out the concept. The Final Aesthetics and Landscape Master Plan will be submitted to TxDOT and the government entities for final review and approval within 120 days of NTP1.

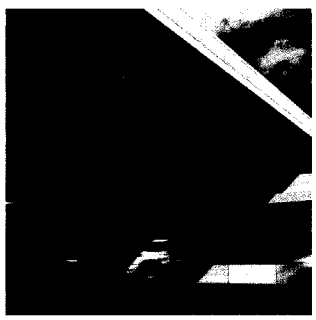
Upon approval of the final Master Plan by TxDOT and the local government entities, NorthGate will conduct a formal presentation of the Plan in each of the communities. This will be conducted in an open house format with an overview presentation followed by one-on-one discussion with task force members. The Master Plan will also be summarized in a newsletter for general distribution and posting on the NorthGate Connections and community Web sites.

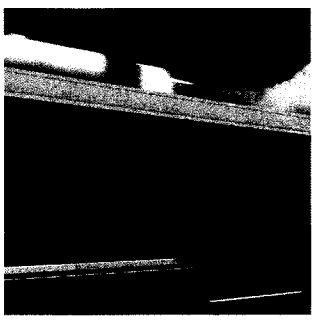
C.1.1.14 (c) Description and Project Drawings of Aesthetic Items

Description of baseline aesthetic items:

Figure C.1.1.14-3 Aesthetic Items

Element	Surface/Color/Texture	Material/Design
Columns	Smooth / Stained	Concrete / rectangular (except tie-ins)
Pier Caps	Smooth / Stained	Concrete / tapered
Walls	Ashlar Stone / Stained	Concrete / MSE, Drilled Shaft Walls, Cast-in-Place
Girders	Smooth / Stained Complementary Color (outside and bottom flanges only) Painted Complementary Color (entire girder)	Concrete / TxDOT standard — Bulb-Tee Steel
Sidewalks	Broom finished Striping for cross-walk marking	Concrete
Barriers and Railing (Bridges only)	Smooth / Stained all one color	Concrete / TxDOT standard slope traffic rail
Abutments	Smooth / Stained	Concrete
Paved Slope Treatment - Riprap	Broom finished / Stained or painted	Concrete / Riprap
Light poles and mast arms Signage – overhead attached and ground-mounted Gantries	Southlake - replaced decorative signal structure at 1709	Galvanized steel
Fencing	N/A	Galvanized / TxDOT / DFW Airport standard
Trees, Shrubs, and Other Plant Materials	N/A	Native species





C.1.2 Maintenance Plan

The NorthGate Difference

NorthGate will provide TxDOT a high-quality design and construction roadway network consistent with Project goals. The Capital Maintenance Program establishes methodologies for inspecting and repairing Maintained Elements while continuing to maximize mobility and public safety. The Maintenance Management Plan (MMP) establishes the processes and protocols to inspect, document and repair the Maintained Elements to ensure an optimal operational life cycle performance.

Commitment to TxDOT Project Goals Addressed in This Section

(c) **Facilitate efficient management and operation of the managed lanes ...**
Maintenance work requiring lane closures will be performed off-peak and at the lowest volume periods.

(d) **Securing quality ... capital maintenance services ... at fair and competitive prices ...**
Our ISO-certified quality program is designed to verify that all elements meed TxDOT expectations.

Added Value Items Included in This Section

- **The Maintenance Manager and Maintenance Quality Manager (with over 20 years of experience each) will participate as team members during design and construction and will transition to lead maintenance as substantial completion for the CDA is initiated.**
- **The maintenance team will maintain an office near the Project, with access to the Kiewit Texas office/ yard just northwest of the Project along SH 170, and the Zachry office just east. Substantial resources are available at these locations to support the Northgate Capital Maintenance Program and respond to Category I – Hazard Mitigation for Maintained Elements and/or emergencies.**
- **Our crisis management plan will be coordinated with TxDOT.**
- **We have identified DBE opportunities for maintenance work to exceed the DBE goal.**

NorthGate's MMP follows the design, construction, traffic management, quality, safety and communication plans described throughout this proposal. The keys of this MMP include the integration of a GIS-based Maintenance Management Information System (GIS-MMIS), scheduled inspections, quality-based documentation, partnering with TxDOT, consistent communication, and resources of local facilities. This means that the Project will be serviced by the NorthGate principals (Kiewit and Zachry), which collectively have provided Texas with quality highway construction services for more than 100 years; all inspectors and maintenance personnel are locally based; equipment is locally available; and senior managers are nearby as a resource to the maintenance team and TxDOT. These commitments will ensure that the design life of each asset (pavement, bridges, walls, slopes and drainage) will comply with TxDOT CMA requirements.

The framework for the MMP is the GIS-MMIS, which will record inventory, asset descriptions, maintenance activities, failures, repairs and inspections. It will also track costs, schedule inspections, conduct maintenance, prioritize work and provide real-time information. This comprehensive system will record each maintenance activity and will facilitate TxDOT's transition to the capital maintenance activities upon completion of NorthGate's obligation.

C.1.2 (a) Transitioning to the Capital Maintenance Program

The transition to the CMA will begin on the first day after Notice to Proceed (NTP1) of the CDA – as NorthGate commits to delivering a high-quality design and construction product that meets or exceeds the requirements of the CDA for both the design and useful life of Project elements. We will maintain continuity between the CDA and CMA requirements by committing to a leadership structure for the maintenance team that includes managers with key roles in the design and construction of the Project – Tom Ross and Anthony Crockett. Upon notification that TxDOT intends to execute the CMA, NorthGate will transition these two managers and other appropriate support personnel to capital maintenance activities. Their initial action items will include updating and finalizing the MMP and preparing the required pre-submittals for the start of the maintenance period. They will have thorough knowledge of the

Project's assets and will integrate their understanding of construction details into our approach for meeting capital maintenance requirements. Additionally, they will work with IT personnel to complete the implementation of the GIS-MMIS, and will be able to utilize established relationships with TxDOT and Project Stakeholders to help roll out the MMP.

Early in this transition period we will schedule a series of coordination meetings with TxDOT to discuss our action plan for initiating the CMA to ensure that TxDOT has input for the transition plan and the final MMP. As TxDOT is beginning the process for Substantial Completion, NorthGate's maintenance team will also begin to inspect the Project to document and record the condition of the Maintained Elements. During this phase, we will perform a field survey of each element and begin to record and catalog the assets through a photo/video record. Asset identification numbers will also be logged in for each element to verify and record the data in the GIS-MMIS.This process will establish a baseline for each of the elements as the transition to the CMA occurs. From this point forward, every activity that occurs for this maintenance activity will be recorded in the GIS-MMIS.

During the transition phase, NorthGate will also prepare the appropriate MMP submittals for TxDOT review and approval including the following:

- Maintenance organizational chart
- Maintenance Communications Plan
- Project Maintenance Baseline schedule
- Traffic Management Plan
- Record Drawings with calculations and details
- Revised version of Attachment 1
- Maintenance Safety Plan
- Maintenance Quality Management Plan

NorthGate will also begin to collaborate with TxDOT, stakeholders and contractors who may be impacted by capital maintenance activities. The Maintenance Manager will establish an outline and overview of our MMP presenting the initial planned activities for inspections, safety, maintenance and renewal works, traffic control, coordination with other agencies and contractors in the work zone, special events and notifications. We will seek input and comments on our plan and approach and will consider the input from this group as we work closely with TxDOT to ensure a proactive and successful Capital Maintenance program is undertaken.

The NorthGate maintenance management team will be focused on facilitating a seamless transition from construction to the capital maintenance program. The Maintenance Manager and Maintenance Quality Manager will continue to be engaged with important roles throughout design, construction and final punch list inspections as they transition to their capital maintenance roles. TxDOT, the stakeholders, the traveling public and NorthGate will benefit from this continuity of personnel and the intimate understanding of the Project, the area and the roadway network that this "cradle to grave" approach will bring.

C.1.2 (b) Maintenance Plan and Reporting

NorthGate's MMP for annual capital maintenance includes the following activities for Maintained Elements:

- Transfer quality records, acceptance testing and CDA punch list information to the GIS-MMIS
- Establish performance requirements, measurements and threshold values for Maintained Elements
- Implementation of a regimented and detailed inspection to identify and document asset conditions
- Perform scheduled maintenance on the Maintained Elements
- Conduct both scheduled and Defect (Category 1 and 2) repair work
- Detailed and redundant documentation of all maintenance activities performed under the CMA
- Follow processes in the approved MMP for quality, safety, traffic management and communication
- Develop a crisis management plan to establish support protocols with TxDOT

The Maintenance Manager will establish the yearly revised Capital Asset Replacement Work (CARW) schedule submittal based on the data established from the inspection process found in Figure C.1.2-1 and our assumed replacement cycles provided in Figure C.1.2-2.

The inspections and documentation of work activities associated with NorthGate's capital maintenance program will be under the direction of the Maintenance Quality Manager who will have full-time, appropriately certified inspectors on staff. He will also deploy the services of bridge inspection, pavement analysis, wall inspections, slope and geotechnical and drainage reviews from within the design team including the local offices of Parsons Brinckerhoff, Bridgefarmer and other certified professional inspection firms. Material testing will be conducted with appropriately trained/certified personnel and using certified testing and material laboratories.

For reporting NorthGate recognizes that ongoing communication and reporting during the capital maintenance term is vital to demonstrating that expectations are aligned, requirements are being met, and continuous improvement in efficiencies for service and performance are evaluated. Once TxDOT and NorthGate have finalized the initial CMA-specified MMP submission approvals, reporting will include ongoing daily communications, scheduled (weekly) meetings and reporting required by the CMA documents.

Regular (daily) communication between TxDOT and the maintenance management team will occur as the scheduled work is taking place. The Maintenance Manager and/or the Maintenance Quality Manager will submit a brief "24-hour Activity Report" for each working day (Monday – Friday) via email to the appropriate TxDOT representative. This communiqué will generally plan activities for the next 24 hours and provide a brief overview of any unique and/or emergency type activities from the previous day for the Maintained Elements – a telephone conversation and/or electronic communication may transpire based on this Activity Report. All Project-related communication will also be logged into the GIS-MMIS system along with the inspection and reporting data.

Weekly maintenance meetings will be more detailed to provide a structured progress update. It is intended that the attendance for this meeting will include a combination of TxDOT Project personnel, TxDOT roadway maintenance supervision, involved Stakeholders (including the tolling system provider for the managed lanes) and the NorthGate maintenance management team. A recommended agenda for weekly meetings will be mutually agreed upon but will likely include the following items:

- A review of the previous week's activities including safety and quality reports
- Review of any noted deficiencies and/or Defects requiring attention
- Maintenance and renewal work activities and three-week look-ahead schedule
- Traffic control, coordination with TxDOT, other agencies and contractors in the work zone

During the maintenance term, we will submit annual reports that include the both the CARW planned for the upcoming year and the CARW work that was completed the previous year. Under the CMA, the timing of these two reports is to be staggered between 120 days before and 60 days after the CMA anniversary date period. However, with our Planned CARW report for the upcoming year we will include a detailed schedule that also provides information on inspections, maintenance activities, Traffic Management Plan (TMP) revisions and planned activities, team meetings, submittals, quality and safety program reports, subcontractor information and Key Performance Indicator (KPI) -Measurement Records that will be monitored throughout the year.

Monthly quality reports submitted to TxDOT and NorthGate principals will consist primarily of reporting measures generated directly from the GIS-MMIS system following the Quality Management Plan, including a review of how the quality policies and objectives were implemented throughout the NorthGate organization. A narrative demonstration of our senior management's commitment to implement and continually improve the maintenance quality management system and specific quality records includes the following:

- Management reviews and resources allocated
- Measurement of customer satisfaction through the NorthGate KPI reporting
- Control of nonconforming products and services
- Internal audit reports and corrective actions
- Processes to seek continual improvement of the Quality Management Plan

We will maintain a high degree of accuracy to ensure that all maintenance meets CMA requirements and that the status of each asset is current. The process for continual updating to the GIS-MMIS will allow for enhanced decision-making in capital maintenance planning. NorthGate's reporting process establishes a flag to document conditions and defects that may require Category 1 or 2 maintenance attention. Procedures for managing records of inspection and maintenance services will include and provide for protected duplication of records. Inspection and maintenance records will be enacted and includes scheduled electronic backup and storage of the GIS-MMIS server. All reports, communication and information will also be stored in hard copy and redundant electronic platforms.

C.1.2 (c) Transfer of Capital Maintenance Responsibility

The Maintenance Manager and Maintenance Quality Manager (with over 20 years of experience each) will participate as team members during design and construction and will transition to lead maintenance as substantial completion for the CDA is initiated.

NorthGate will transfer all maintenance records, assets and processes in full compliance with the CMA. In addition to the ongoing progress reports and progress status meetings, we will initiate a turnover and transition task force approximately 12 months before the transfer date of maintenance services to TxDOT. This will ensure that TxDOT is fully engaged with the plan for transferring of capital maintenance responsibility and can advise, direct and participate in a transition process that is compliant with the CMA requirements and suited to the TxDOT organization and methodologies.

At least 180 days prior to transfer of maintenances services under the CMA, Northgate will formally submit a maintenance transition plan to TxDOT addressing the following items.

- A right of entry permit for performance of corrective action immediately prior to transfer
- A maintenance transition punchlist, status of equipment warranties, and vendors' test reports
- A duplicate copy of all test reports, CMA as-built drawings, maintenance records (including NBIS records), copies of warranty and service contracts, and spare parts purchased as part of the CMA
- Coordination for the maintenance transition punchlist that includes completion dates, responsible party, and other priority items that must be completed prior to maintenance transfer
- A plan to administer and complete all items on the maintenance transfer punchlist
- A safety certification testament that maintenance services were performed in accordance with the terms of the CMA, governmental Approvals and applicable law
- Certification that there are no Hazardous Materials located within, on, in or under the Project ROW due to the actions, omissions, negligence, willful misconduct, or breach of applicable law or contract by NorthGate
- Certification that there is no litigation pending regarding the CMA maintenance services or the Project by NorthGate and/or any of its subcontracts or suppliers

Additionally, TxDOT personnel will be fully trained on the GIS-MMIS. All photographs, videos, cameras and recording equipment will be transferred to TxDOT. An additional inventory of specialized equipment will be made for transfer to TxDOT. This will include hand-held field inspection recording units, software and hardware (GIS-MMIS server and laptops) and cell phones (or latest technology) used to implement the NorthGate capital maintenance program.

C.1.2 (d) Management Tools

NorthGate will develop and implement the GIS-MMIS and protocol manual that will be used as the platform for recording all activities associated with the approved MMP, including inspections, quality reporting, asset condition assessment, material and subcontractor warranties and other documentation of the maintenance activities. We will establish this GIS-MMIS platform based on the current available software and hardware technology circa 2012 reflecting advancement and innovations on the proven systems of 2008. A Quality/IT task force will be established at the 12-month period prior to the anticipated substantial completion of the CDA work to complete the platform development of the GIS-MMIS. Throughout the term, NorthGate will evaluate updates and technological advances to ensure that we are taking advantage of proven tools, which could include:

- Scheduling software, resource-loaded and updated monthly as part of progress payment requests
- Advanced modeling and design software
- GIS-based Maintenance Management Information System to efficiently manage assets, personnel and equipment
- Web-based document control and communication processes
- Hand-held field data recording and communications devices with direct wireless links to the GIS-MMIS and real-time messaging and communication to TxDOT, NorthGate and others as appropriate
- Safety, quality and environmental management training for employees, subcontractors and others engaged with the Project. TxDOT is welcome to participate in Project-specific training programs

- Pre-activity meetings to ensure that work plans, hazard/environmental hazard analysis, traffic control, Stakeholder notifications, permits, right of entry and other pre-work checklist requirements have been planned, undertaken and accounted for prior to beginning any field activities
- Daily, weekly, monthly, quarterly, annual reporting and meetings with TxDOT to communicate activities, progress, issues, advance notice and status
- Employee tracking that includes plans for ongoing inspection certification training for employees
- Strategic communication and Crisis Management Plan coordinated with TxDOT
- Computers, servers, digital cameras, global positioning systems cell phones, blackberries and/or two-way radios to facilitate information gathering, dissemination and communication

C.1.2 (e) Traffic Control and Operations

As part of the TMP submitted to TxDOT for approval, our overarching approach will be to perform capital maintenance activities that require lane closures and traffic restrictions during non-peak hours, including nights and weekends, to minimize disruption to travelers and as a safety measure, except as required in emergency situations.

All traffic handling will comply with CMA Exhibit 2, Section 1800, Traffic Management and appropriate TMUTCD standards and will include the development of detailed traffic control plans that provide for maintenance services, including switching procedures. The traffic control plans will include details for detours, traffic control devices, striping and signage applicable to each capital maintenance activity. Information included in the traffic control plans will be of sufficient detail to allow verification of design criteria and safety requirements, including typical sections, alignment, striping layout, drop-off conditions and temporary drainage. The traffic control plans will clearly designate all temporary reductions in speed limits. Before implementing any changes to posted speed limits, NorthGate will seek approval from TxDOT.

NorthGate will notify TxDOT of all lane closures with advance notification and work will be properly coordinated with other construction activities to maximize lane closures. Traffic control personnel will be scheduled as needed; appropriate signage will be put in place; and police will be notified or hired as required for safety. In summary, every maintenance activity that requires the implementation of traffic control, such as lanes that need to be closed to divert traffic for inspections, will be pre-planned and properly notified to minimize impacts and provide a safe work zone for Project personnel.

C.1.2 (f) Inspection and Testing

Inspections will be conducted at designated frequencies to detect and rectify defects within time periods specified in the CMA. The processes detailed for each capital maintenance element category as provided in CMA Maintenance Specification Exhibit 2, Attachment 1 will be further developed and detailed in the MMP. The inspections will be performed by the quality control staff with appropriate certifications and/or Texas professional engineers with certifications for the required inspection services, under the direction of the Maintenance Quality Manager. The maintenance inspection plan will define the schedule, level of inspection and corresponding priorities of each asset. The Maintenance Manager will oversee all aspects to ensure accuracy and completeness. Schedule flexibility will be incorporated into the MMP to provide for unforeseen conditions such as emergency response, weather or work by other contractors in the area. Inspections will be conducted as specified in the CMA and detailed in the MMP. Additionally, TxDOT Audit Inspections will be conducted at least quarterly on a random basis to provide a statistical sample appropriate to predict the conditions of 100% of the assets within a 4% margin.

Specialized inspections will be overseen by the Quality Maintenance Manager, who will be certified in the State of Texas, and carried out by qualified in-house staff and/or subcontractors. Pavement will be inspected on an annual basis for evidence of rutting, degradation of skid resistance and ride quality. At a minimum, structures will be analyzed in accordance with CMA requirements and to meet FHWA frequencies and requirements for NBIS inspections. Drainage, walls and slopes will receive visual inspections on a scheduled basis or after significant rain events. If instrumentation is installed (per section C.1.2), the instruments will be monitored and the data collected. Anticipated inspection activities are shown in Figure C.1.2-1.

Figure C.1.2-1 Anticipated Inspection Activities

Inspection	Anticipated Activities/Inspected Items	Frequency	Conducted By
Specialist Inspection - Pavement	+ Measurement of IRI + Inspection for and measurement of rutting + General condition assessment	Annual	Qualified in-house staff or specialty subcontractor
Specialist Inspection - Structures	+ Joint condition assessment + Parapet condition + Component functionality + Access point functionality + Structural integrity + Overall condition of bridges + Sign gantry condition + Culvert structural integrity	Bi-Annual	Specialty subcontractor (professional engineer, certified bridge inspector)
	+ Routine post significant events	Semi-Annual	In-house staff
General Inspections	+ Drainage + Walls + Slopes	Periodic and after significant rain events	In-house staff

Inspection procedures will conform to TxDOT and other regulatory standards and will use existing standard reporting and assessment forms.

Based on the findings of each inspection, all Defects discovered will be categorized as requiring hazard mitigation or permanent remedy, as part of Category 1, or permanent repairs, as part of Category 2. Response actions will be taken based on these categorizations and in accordance with the time requirements of the CMA. Testing for rehabilitation and repair will comply with the approved Maintenance QMP.

C.1.2 (g) Record and Document Control Plan

NorthGate's GIS-MMIS will ensure the Project is operated and managed efficiently and cost-effectively throughout the maintenance term. During the transition phase between the CDA and the CMA, as-built drawings for the work performed in the CDA will be transferred to the GIS-MMIS database with appropriate Maintained Element identifications (IDs) consistent with those descriptions and units of measure used by TxDOT. The system will serve as the platform to track costs, schedule inspections and maintenance activities, prioritize the work and provide real-time information for each capital maintenance element.

During the capital maintenance period, the Maintenance Quality Manager will ensure that inspections, repairs or other condition information is recorded in a timely manner into the GIS-MMIS system. All reports, inspections designs and CAD drawings will be entered and transferred to TxDOT upon transition of capital maintenance services. The Maintenance Manager will ensure that data reflects all known information on each Maintained Element and that the CARW schedule is updated to meet any repair needs that are identified. This process will be audited and managed by the Maintenance Quality Manager and conform to the Maintenance Quality Management Plan.

C.1.2 (h) Capital Maintenance Prioritization

Prioritizations for deviations from planned activities will be based on routine and specialized inspections and notifications of asset damage or deterioration as directed and approved by TxDOT. Inspection and maintenance personnel will schedule the maintenance activities and provide the equipment and personnel for emergency response. Prioritizations will occur based on the following protocol:

- Immediate safety hazards as a result of accidents or subsurface conditions
- Repairs, if not addressed, that could lead to more extensive asset damage
- Deterioration or damage in accordance with response times as described in CMA Attachment 1

Rectification to Category 1 Mitigation of Hazards will be acted on immediately upon identification and/or notification. As stated, a benefit of the Northgate's MMP is ready access to the Kiewit Texas and Zachry resources including a large equipment fleets and hundreds construction professionals almost contiguous with the Project in North Tarrant County.

C.1.2 (i) Capital Maintenance Program

Initially scheduled capital maintenance and rehabilitation work will be based on anticipated service life and minimization of whole lifecycle costs. As the CMA term progresses, maintenance and rehabilitation work will be

evaluated on a continual basis as inspections provide current information of asset conditions. NorthGate's MMP will demonstrate our approach for capital maintenance, including the timing, scope and nature of work that we propose during each year for which the Maintenance Services apply. Our MMP approach includes budget to effectively maintain, repair and rehabilitate the Maintained Elements, and we have identified DBE maintenance work to exceed the DBE goal. The proposed capital maintenance schedule assumptions for Maintained Elements are shown below.

Figure C.1.2-2 Anticipated Maintenance Activities

Category	Anticipated Maintenance Activities	Frequency
Pavement (Concrete)	Crack sealing of 400-600 linear ft. of crack sealing per lane mile per year Joint sealing of 600-900 linear ft. of joints seals per lane mile per year Spall repair of 500-1000 sq. ft. per lane mile every four years Full depth patching of spall repair areas as required during term 3 Spot diamond grinding of 2-5% of surface area during the final two years of term 3	Annual / Periodic
Curb	Replace 0.5% of curbs per year	Annual
Travelway Water Hazards	Travelway water hazards are preventable if drainage devices are maintained, shoulders are cleaned and vegetation growth is maintained to the ditch line, pavement depressions will be corrected to prevent ponding.	As Needed
Pipe and Channel	Clean 10-25% of catch basins and 2-5% of culverts each year	Annual
Flow Regulators	No routine replacement of devices is anticipated during the maintenance contract, but an allowance for visits to flow control devices to rectify clogging or other malfunctions has been made	Annual
Structures	Bearing cleaning and repairs of 30-50% of bearings will require cleaning and repair during the final two years of term 3. Crack sealing of 150-250 linear ft. of crack sealing per lane mile per year (three years following a pavement renewal) and 300-500 linear ft. of crack sealing per lane mile per year (four or more years after a pavement renewal). Replace 5-10% of bridge deck joints and abutment joints at approximately year 10 and 3-5% during the final two years of term 3. Seal 10-20% of concrete deck surfaces per year from year 6 of service life onward Spall repair of 1000-2000 sq. ft. per lane mile every four years Full-depth patching of 10-20% of spall repair area during the final two years of term 3 Spot diamond grinding of 2-5% of surface area during the final two years of term 3	Annual / Periodic
Slope Maintenance	3 to 1 slopes or greater – reseeding/re-vegetation or 5-10% of all slopes, annually Less than 3 to 1, monitoring will occur to ensure that the original design cross section is maintained and any corrective action is be taken to meet CMA requirements and ensure the structural integrity of the cut or fill slope is maintained. Monitoring will be incorporated as part of regular maintenance patrols, with specific inspection required within 12 hours of any significant rain event	As Needed after significant events
Walls	MSE walls – misc repair 1-2% of wall area every 5-year maintenance period Concrete retaining walls - 0.5% of wall area every 5-year maintenance period Other walls – .5-1% of wall area every 5-year maintenance period	Annual/ periodic

The approach is designed to reduce the total costs over the life of each asset. By conducting maintenance activities aggressively, we anticipate that more costly repairs can be eliminated and the life of the asset can be maximized. The Capital Maintenance Plan is designed to deliver optimal value to TxDOT over the life of each asset.

C.1.3 Preliminary Baseline Schedule

The NorthGate Difference

Our Preliminary Baseline Schedule minimizes construction duration to 1,464 days from the Begin Project Construction milestone (when major roadway demolition and reconstruction starts) to Substantial Completion. Additionally, we minimize construction impacts by delaying traffic control plan implementation 150 days after NTP2, while still achieving Substantial Completion 29 days ahead of schedule.

Commitment to TxDOT Project Goals Addressed in This Section

(a) **Maintaining mobility through the Project area during construction ...**
Our "Smart Start" approach, explained in this section, exceeds this goal by significantly reducing the number of days of construction impacts.

(b) **Reducing congestion and improving mobility within the Project area after the construction period**
Our maintenance schedule is committed to maintaining mobility.

(c) **Facilitate efficient management and operation of the managed lanes ...**
Turn over the managed lanes January 2013, six months prior to Substantial Completion.

(e) **Safe construction**
Safety planning and execution is accounted for in all schedule activities.

(f) **Expediting delivery of Project improvements.**
Substantial Completion deadlines are met through a reduced construction duration of 1,464 days.

Added Value Items Included in This Section

- **Our Schedule is a direct result of our traffic sequencing approach to minimize construction impacts on adjacent businesses and communities, and reduce motorist inconvenience by maximizing work areas.**
- **The "Smart Start" strategy allows us to adequately progress development and planning activity prior to beginning new roadway reconstruction.**
- **NorthGate will achieve Substantial Completion in 1,705 calendar days from NTP1, 29 days ahead of schedule.**

Our schedule strategy is based on our understanding of the work, and our commitment and allocation of the personnel, equipment and materials necessary to complete the Project ahead of the required timeframe. Our Preliminary Baseline Schedule (Preliminary Schedule) (Appendix D.3.1) is a direct result of developing an efficient traffic sequencing approach to maximize work areas, minimize construction impacts on adjacent businesses and communities, and reduce motorist inconvenience. The Preliminary Schedule was developed by:

- Identifying schedule activities corresponding with the optimized sequencing plan within each phase and stage
- Applying quantities to the scheduled activities
- Applying a systematic resource analysis to identify the required upper limits of resources to exceed the Project's Substantial Completion and Final Acceptance commitments.

A key strength of NorthGate is the depth of its resources to ensure Substantial Completion milestones are met. We are dedicating our team's managers and staff, company-owned equipment and financial strength to exceed TxDOT's Project goals.

NorthGate's approach to exceeding TxDOT's goal of minimizing construction impacts includes implementing significant schedule strategies, in addition to our plan and commitment to effectively communicate, cooperate and coordinate with Stakeholders. From prior to submission of our Qualifications Submittal through proposal preparation, we have further refined the Project's three segments (West, North, Middle) into 15 discrete sections referred to as "blocks." These 15 blocks are contiguous work areas within each of the Project's segments.

- West Segment includes Blocks 1 through 8
- Middle Segment includes Blocks 9 through 11
- North Segment includes Blocks 12 through 15

Our schedule strategy to minimize impacts to the businesses and communities affected by frontage road reconstruction is to acquire or have possession-and-use agreements in place for ROW parcels; and complete utility relocations for a contiguous block of work before affecting traffic within that block (for example, Block 1 - SH 114 WBFR reconstruction could proceed when cleared, without having Block -1 SH 114 EBFR cleared). This strategy minimizes the duration of construction impacts, yet allows for efficient construction and mitigation of ROW and utility delays. It also significantly reduces the risk of delaying Substantial Completion and meets TxDOT's goal by minimizing the amount of time each business entry is exposed to disrupted frontage road and driveway access.

Our commitment to proceed with work in blocks is supplemented with our "Smart Start" roadway reconstruction schedule to mitigate impacts to businesses, communities and motorists. The "Smart Start" strategy allows us to adequately progress development and planning activity prior to beginning new roadway reconstruction. NorthGate's target "Smart Start" date for roadway reconstruction is June 1, 2009, which is the Preliminary Schedule milestone Begin Project Construction (BPC) – the date when "cone zones" become the rule rather than the exception, and major roadway demolition and reconstruction activities begin. What this means to businesses and communities is that development activity required to prepare new ROW and utility relocations will occur in contiguous blocks. This reduces the overall duration of detours and temporary roadways. The table below shows the duration of frontage road construction impacts directly affecting business and community access.

Figure C.1.3-1 Frontage Road Construction Schedule Durations

Area	Description	Block	Begin Station	End Station	Duration
W1	SH 114 WBFR	1 (east)	315+00	346+00	5 months
W1	NW Hwy east of SH 114	1 (east)	315+00	346+00	5 months
W1	SH 114 EBFR	1 (west)	315+00	346+00	6 months
W1	FM 1709 west of SH 114	1 (west)	315+00	346+00	9 months
W1	SH 114 WBFR	2 (east)	346+00	372+00	3 months
W1	SH 114 EBFR	2 (west)	346+00	372+00	3 months
W2	SH 26 WB	3 (north)	386+00	428+00	6 months
W2	SH 26 EB	3 (south)	386+00	428+00	5 months
W2	W.D. Tate NB	4 (east)	89+00	112+50	6 months
W2	W.D. Tate SB	4 (west)	89+00	112+50	6 months
W2	SH 114 WBFR	5 (north)	372+00	445+00	12 months
W2	SH 114 EBFR	5 (south)	372+00	445+00	8 months
W3	W.D. Tate NB	6 (east)	547+00 8579+00	585+00 8615+00	3 months
W3	W.D. Tate SB	6 (west)	547+00 8579+00	585+00 8615+00	3 months
W3	SH 121 NBFR	7 (east)	478+00	547+00	12 months
W3	SH 121 SBFR	7 (west)	478+00	547+00	8 months
W3	SH 360 NB Direct Conn. and CDs	8 (east)	250+00	295+00	No Impact
W3	SH 360 SB Direct Connector - No Impact	8 (west)	250+00	295+00	No Impact
M1	SH 114 WBFR	9 (north)	445+00	490+00	3 months
M1	SH 114 EBFR	9 (south)	445+00	490+00	6 months
M1	SH 114 WBFR	10 (north)	490+00	525+00	6 months
M1	SH 114 EBFR	10 (south)	490+00	525+00	6 months
M2	SH 114 WBFR/IPFR	11 (east)	1788+00	1841+00	7 months

Area	Description	Block	Begin Station	End Station	Duration
M2	SH 114 EBFR/IPFR	11 (west)	1788+00	1841+00	3 months
N1/N2	SH 121 NBCD	12 (east)	1841+00	1911+00	10 months
N1/N2	SH 121 SBFR	12 (west)	1841+00	1911+00	7 months
N2	IH 635 WB exit ramp to Bass Pro Drive	13 (east)	100+00	155+00	4 months
N2	IH 635 EB entrance from Bass Pro Drive	13 (west)	100+00	155+00	3 months
N2	SH 121 NBFR	14 (east)	1911+00	1955+00	3 months
N2	SH 121 SBFR	14 (west)	1911+00	1955+00	6 months
N3	FM 2499 NBFR	15 (east)	3995+00	4055+00	6 months
N3	FM 2499 SBFR	15 (west)	3995+00	4055+00	4 months

"Smart Start" Strategy Description: Based on lessons learned from past urban transportation design-build projects, proper and thorough planning has proven to be the key to efficient implementation of construction operations. NorthGate implements a 12-step planning process as part of our Project Management Plan and to meet the Project's technical requirements. Graduation from the planning process is required and achieved only after all required items are completed and approved by the management team. The incorporation of our standard 12-step process is central to implementing our "Smart Start" schedule strategy. "Smart Start" provides the necessary durations required to progress the initial aspects of the Project's planning, design and development activities to maximize efficiency, thereby reducing impacts to Stakeholders by eliminating inefficient execution of development, design and construction activities.

The 12-step planning process includes:

1. Project Organization
2. Safety
3. Environmental
4. Quality
5. Project Administration
6. Contract Administration
7. Schedule
8. Budget, Cost and Revenue
9. Construction Plan
10. Subcontractors and Suppliers
11. Maintenance and Equipment
12. Financial Planning and Project Goals

Our Smart Start strategy begins immediately after Conditional Award by the Commission. We will start mobilization of the Main Street Office, design team mobilization, finalization of the Project Management Plan's Parts A and B, and the Orthographic Aerial Flight and Document Management System setup. Appendix D.3. provides a detailed activity schedule for Project Mobilization and "Smart Start" activities.

At execution of the CDA and CMA (NTP1 - October 2008), our scheduled activities include SUE investigation within current ROW, development of the final aesthetics concept plan, negotiating master utility agreements, continued geotechnical investigation, initial survey, site investigations for conditions and access, hazardous materials investigations, Governmental Approvals, and Bonds, Guarantee and Insurance.

At NTP2 – January 2009, all requirements will be in place to begin construction, although application of our "Smart Start" planning will provide construction impact mitigation by holding-off construction until the BPC milestone. During this time, we will utilize resources to continue progressing all ROW demolition activities and utility relocations prior to initializing Project Traffic Control Plans and the BPC milestone. This reduces the potential for inefficient progression of frontage road construction and reduces potential business and community access disruption by five months. Concurrently with implementing our Traffic Control Plans, our Public Information and Communications team will take an active role in business and community outreach, while continuing to coordinate with Stakeholders to mitigate any disruptions to property access.

ROW Acquisition Schedule Impact Mitigation: Five separate ROW acquisition packages are planned to be submitted to TxDOT. The initial package with 25 critical parcels identified will be submitted at NTP2, and the four remaining packages will be submitted in the subsequent 60 days. The critical parcels are based on our team's experience with those property owners most likely to not settle through negotiations. We developed our Preliminary Schedule by analyzing scenarios and assigning durations for other ROW parcel requiring eminent domain

proceedings and its effect on our Substantial Completion commitment. This approach substantially reduces ROW delay risk to the Substantial Completion milestone.

C.1.3 (a) Description of Proposed Execution of Work

The following paragraphs describe the general execution of the work for each segment, which is included in the Preliminary Schedule. The Preliminary Schedule is provided in Appendix D.3, along with a Schedule Summary.

NorthGate has assembled a highly qualified team to accomplish the Project's ROW acquisition and relocation, and utility relocation and adjustment activities. These will be accomplished in an efficient and collaborative manner with TxDOT, Stakeholders and the utility companies. Our planning has already begun and we are working toward the goal of having all available ROW and utility work for the Project completed within the first year of NTP1.

West Segment: Work in the West Segment Area 1 (following anticipated acquisition of the DFW Airport parcels and completion of the "Smart Start" planning period) includes realignment of the FM 1709 new bridge, the SH 114 WBFR and the SH 114 EBFR from Industrial road to the DART rail line.

Figure C.1.3-2 West Segment Work Descriptions

Work Description	Start Date	End Date
Area 1		
FM 1709 realignment begins with building the new SH 114 overpass	Feb. 2011	Jul. 2011
SH 114 WBML to FM 1709 direct connector	Mar. 2011	Sep. 2011
FM 1709 remaining pavement reconstruction	Feb. 2010	May 2011
SH 114 EBFR from Industrial Blvd. to the DART rail line	April 2010	July 2010
SH 114 WBFR from the DART rail line to the Northwest Hwy.	Feb. 2010	July 2010
All West Segment SH 114 mainlane work	June 2009	Oct. 2012
Area 2		
SH 114 WBFR and EBFR from DART rail line to Main Street	Feb. 2010	Dec. 2010
Completion of ramp work and gores	June 2011	Aug. 2011
NorthGate's ATC 4, Elevated Direct Connector at SH 26		
William D. Tate Bridge	July 2009	July 2011
William D. Tate roadway work: detour pavement will be used extensively throughout to maintain access to commercial properties.	July 2009	Oct. 2012
Mustang Drive over SH 121	July 2009	May 2010
EB SH 114 to SB SH 121 direct connector	Jan. 2011	Nov. 2011
NB SH 121 to WB SH 114 direct connector	Mar. 2010	June 2012
SH 114 Main Street overpass	Oct. 2009	Sept. 2010
SH 121 mainlane work	June 2009	June 2012
Area 3		
SH 360 to SH 121 Collector distributors and direct connectors	Aug. 2009	Nov. 2010
SH 121 over Stone Meyers Bridge	Aug. 2010	Nov. 2010
Associate frontage road work at Stone Meyers over Bear Creek	June 2011	July 2012
SH 121 mainlane work between Stone Meyers to SH 114	Nov. 2009	May 2013

Middle Segment: Work in the Middle Segment begins after the anticipated acquisition of the DFW Airport parcels and the completion of the "Smart Start" planning period. DFW Airport parcel acquisition opens large areas of the Project to construction – most importantly, Area 2, the SH 114 SH 121/ International Parkway interchange.

Figure C.1.3-3 Middle Segment Work Description

Work Description	Start Date	End Date
SH 114-SH 121/ International Parkway interchange. Construction of the EB SH 114 to NB SH 121 direct connector. Completion of SB SH 121 to WB SH 114 direct connector marks end date	Sept. 2009	May 2012
Texan Trail Bridge will be demolished and a new bridge constructed	Nov. 2009	Aug. 2010
SH 114 managed lane pavement	Nov. 2009	Jan. 2010
SH 114 general purpose lanes	May 2011	Mar. 2012
SH 114 general purpose lanes at International Parkway interchange	Mar. 2012	May 2013
SH 114 EBFR from Metro Circle to Texan Trail	Feb. 2010	Aug. 2010
Texan Trail to Freeport Parkway	July 2010	Mar. 2011
SH 114 WBFR from SH 121/International Parkway to Texan Trail	Feb. 2010	July 2010
SH 114 WBFR from International Parkway to Texan Trail	Nov. 2009	Jun. 2010
SH 114 WBFR from Texan Trail to Trinity Parkway frontage road	May 2011	Aug. 2011
WBFR from Texan Trail to trinity Parkway frontage road	Aug. 2011	Feb. 2012

North Segment: Work in the North Segment Area 1 (following anticipated acquisition of the DFW Airport parcels and completion of the "Smart Start" planning period) includes the SH 121/IH 635 interchange, Bass Pro bridge, the SH 121 SBFR and SBCD (including the DART railroad overpasses) and the SH 26 to NB SH 121 direct connector.

Figure C.1.3-4 North Segment Work Description

Work Description	Start Date	End Date
Area 1		
SH 121/IH 635 interchange begins with direct connectors	Phase 1	Nov. 2011
Bass Pro Drive	Nov. 2009	Mar. 2012
SH 121 SBFR and SBCD (including the DART railroad overpasses)	Sept. 2009	Jun. 2012
SH 26 to NB SH 121 direct connector	Aug. 2009	Apr. 2010
Area 2		
SH 121 NBFR ramp bridge to NB SH 121	July 2010	Jan. 2011
SH 121 mainlanes	Nov. 2010	Aug. 2012
All remaining final ramp connections	July 2010	Sept. 2013
Area 3		
FM 2499 NBFR	July 2010	Apr. 2011
FM 2499 SBFR	July 2011	Oct. 2011
Stars and Stripes / Grapevine Mills bridges	Apr. 2011	Aug. 2011
Denton Creek Bridge	Apr. 2011	May 2012
FM 2499 cut section work	Oct. 2011	July 2013

At completion of CDA Work, NorthGate stands ready to provide capital maintenance services for TxDOT at its option.

C.1.3 (b) Description of WBS

The five level work breakdown structure contained in the Preliminary Schedule(s) are:

Level 1 – Project

Level 2 – Segment: West, Middle, North

Level 3 – Work group: Environmental, Grading/Drainage, Paving, Utilities, Structures, other Professional Services

Level 4 – Activity: Individual activities by Work Group

Level 5 – Sub-activity: Labor, Equipment, Material, Cost

C.1.3 (c) Description of Maintenance Key Activities and Milestones

Our Preliminary Maintenance Schedule is in Appendix D.3.2. Figure C.1.3-5 highlights the key activities contained in the Preliminary Maintenance Schedule.

Figure C.1.3-5 Preliminary Maintenance Schedule Key Activities

Key Activity or Milestone	Description
Maintenance NTP 1	A minimum of 180 days prior to Substantial Completion
MMP submittal approval	90 days after effective date of the CMA/Yearly
Maintenance Service Annual Report	Yearly
Report Tangible Net Worth	Yearly
Review Slopes	Duration: 4 days/Completed Quarterly
Revised Capital Asset Replacement Submittal	Yearly
Repair Slope	Duration: 8 days/Completed Yearly
Pavement Condition Survey- YEAR 1	Duration: 10 days/Completed Yearly
Repair Pavement- YEAR 1	Duration: 20 days/Yearly- if needed
Routine Bridge Inspections	Duration: 10 days/Yearly
Repair and Clean Structures	Duration: 60 days/Yearly- if needed
Drainage Inspection- YEAR 1	Duration: 10 days/Yearly
Clean Drainage- YEAR 1	Duration: 30 days/Yearly
TxDOT Review of MMP	Duration: 30 days/Yearly
Submit Capital Asset Replacement Report	Yearly

C.1.3 (d) Description of Substantial Completion Achievement

Our development, design-build commitment is to achieve Substantial Completion in 1,705 calendar days from NTP1. With the application of the "Smart Start" approach, our actual construction impact equates to 1,464 calendar days from BPC to Substantial Completion, evaluated as 1,705 (contract duration) – 241 (NTP1 to BPC, which includes "Smart Start" activity duration of 150 days) = 1,464 (actual construction duration). This approach reduces the available float for construction, but is presented for its value to the Project, businesses, communities and motorists in reduced construction impacts. Form P is provided following this page as required by ITP Exhibit B 4.1.3.

COMPLETION DEADLINE — Form P

Description	Substantial Completion Date
TxDOT Last Allowable Date for Substantial Completion	NTP1 plus 1734 calendar days
Proposal Commitment Date for Substantial Completion	NTP1 plus 1705 calendar days

Project Management Plan

NorthGate Constructors

C.2

Project Management Plan

C.2 PROJECT MANAGEMENT PLAN

C.2.1 General Project Management

The NorthGate Difference

NorthGate's Executive Committee has committed Texas-based senior management to exceed TxDOT's goals and achieve Project success.

Commitment to TxDOT Project Goals Addressed in this Section

(a) Maintaining mobility through the Project area during construction ...
The NorthGate Traffic Control Manager will work with the Public Information and Communications (PIC) team to provide timely and accurate messages and coping strategies.

(h) Cooperation and coordination with Stakeholders ...
NorthGate's PIC team will lead NorthGate Connections, our centralized communication plan, to coordinate with Stakeholders and the public.

(i) Use of public-private partnerships ...
Within our Project Management Plan (PMP) approach, our commitment to exceed Project goals is in the public interest.

Added Value Items Included in This Section

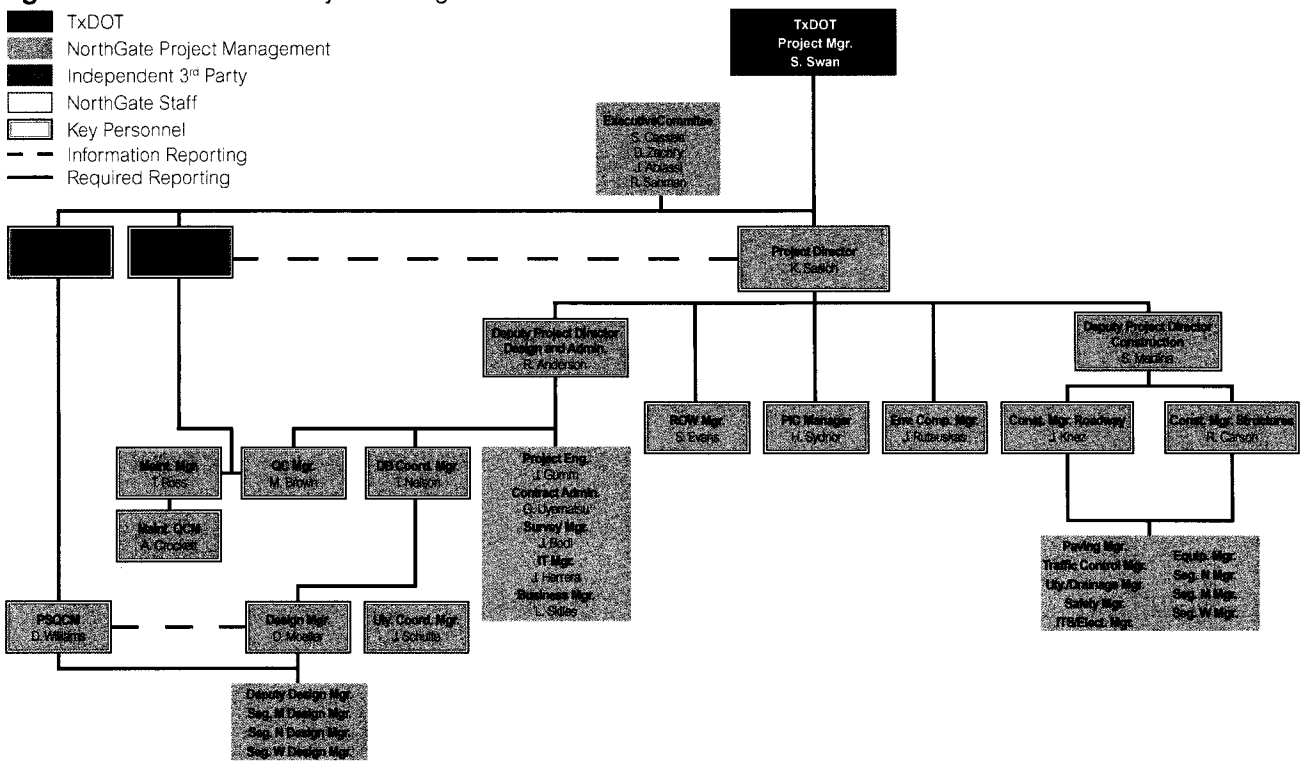
- Keith Sasich, President of Kiewit Texas, has been committed as Project Director.
- Top executives Bill Murphy, Tom Howell, Joe Wingerter and Dan Ryan – all with urban design-build mega-project experience – will provide critical mobilization and management start-up support.
- Our on-site Traffic Management Center will monitor Project roadways during construction.
- CentricProject, a Project-specific collaborative Web site integrated with other software applications, is used to verify communication and documentation control among NorthGate's management team.
- Technical Discipline Task Forces produced numerous Alternative Technical Concepts, design refinements and design innovation in responding to the Project's challenges.
- Our ability to mobilize equipment needed to self-perform critical path activities reduces TxDOT's risk of not meeting schedule commitments.
- A Kiewit innovation, the position of Design-Build Coordination Manager coordinates construction, design and maintenance to verify compliance with CDA requirements for the Project's design.
- Task forces enable an integrated approach with the owner for achieving and exceeding CDA requirements.

NorthGate Constructors (NorthGate) has assembled a dedicated team of design, construction, right-of-way, utility, communication and professional services personnel drawn from two highly respected, Texas-based companies with more than 25 years of experience in the DFW area: Kiewit Texas Construction L.P. and Zachry Construction Corporation. NorthGate members are committing nationally recognized key management and staff experienced on design-build projects and experienced on highly-travelled urban corridor reconstruction such as the "High Five," I-15 and I-25 T-REX. These managers understand the ramp-up and construction pace required to meet aggressive schedule commitments and exceed TxDOT and Stakeholder expectations for communication, mobility and access.

Additionally, NorthGate's Key Personnel are committed to communication and coordination through design, construction and maintenance using NorthGate Connections, the team's centralized communication plan. This plan is explained fully in Section C.2.5 Public Information and Communication Plan. Key Personnel identified in our proposal are dedicated full-time to the Project. Commitment letters are provided in Volume B Proposer

Information, Certifications and Documents. Figure C.2.1-1 highlights the Key Personnel of the NorthGate team and its management structure:

Figure C.2.1-1 General Project Management



C.2.1 (a) Communication and Documentation Methods Within Proposer's Team

Discipline task force meetings, segment meetings and weekly look-ahead meetings will bring NorthGate team members and TxDOT representatives together on a regular basis to discuss progress and coordinate activities. Schedules and activities will then be communicated to the NorthGate Connections team, which will use the Web site and other communication tools to inform Stakeholders, businesses, communities and motorists of relevant Project information. Having the Public Information and Communication team involved in task forces facilitates public dissemination of the Project's technical solutions.

Project-Specific Web Site and Software Applications: Success for the DFW Connector Project will be the result of effective coordination among diverse participants representing different companies, technical skills and geographic areas. CentricProject, a Project-specific collaborative Web site integrated with other software applications, is used to verify communication and documentation control among NorthGate's management team. CentricProject enables the team to communicate among task force groups for each discipline and track task assignments and activities, along with documenting communications from the regularly scheduled Project meetings discussed in this section. CentricProject integrates with several compatible software applications including ProjectWise, MicroStation, GeoPAK, INROADS and Primavera Project Planner P(3) v6 to provide a centralized, comprehensive and seamless communication platform.

ProjectWise is the primary method for design collaboration and file management, enabling each team member, including TxDOT, to access the latest version of design data and documentation within a secure environment. This software can track revisions, control access and ensure the latest design revision is being used. Project work spaces within MicroStation and criteria files within GeoPAK and INROADS are used to enforce uniform CADD standards. Primavera P(3) v6 will be used to communicate and document scheduling and for tracking progress and earned value. P(3) v6 was chosen for its enhancements in providing earned value management and its application for payment purposes.

Regularly Scheduled Project Meetings: Important to any effective communication plan, regular meetings are required to ensure proper control of communication and documentation of issues (Figure C.2.1-2). The Project Management Look-Ahead meetings proved effective on the I-25 T-REX project in Denver, where senior management from the owners and the design-build team met to unify key messages to Stakeholders.

Figure C.2.1-2 Regularly Scheduled Project Meetings

Meeting/Attendees	Frequency/Location	Output
PROJECT MANAGEMENT LOOK-AHEAD		
TxDOT Project Mgr., Project Director (PD), PIC Mgr., Traffic Control Mgr. and others as required	Weekly/Main Street Office\	Direction for PI and Communications, traffic handling, mobility and construction impacts (including TMSRs). Collaborative decisions made in the best interest of the Project through partnering.
PROJECT STEERING COMMITTEE		
TxDOT Project Mgr., Project Director, Project Quality Mgr., Deputy PD Design/Admin. and Deputy PD Construction	Weekly/Main Street Office	Direction for changes, quality, utility and ROW.
PROGRESS / SCHEDULE UPDATE		
TxDOT representative, PSQRF representative, Deputy PD Construction, Deputy PD Design/Admin., Quality Mgr., Construction Mgr. Roadway, Construction Mgr. Structures, DB Coordination Mgr., Design Mgr. and PIC Mgr.	Monthly minimum during design and construction period/ Main Street Office	Required approvals by TxDOT/PSQRF for changes, earned value and schedule activity completion percentages.
MAINTENANCE of TRAFFIC		
TxDOT representative, Traffic Control Mgr., Traffic Control Superintendents, Construction Mgrs., Segment Mgrs. and PIC Mgr.	Weekly/Main Street Office	Lane closure and detour notification requirements; pending submittals; pending coordination; schedule; and status of pending maintenance of traffic control devices.
DESIGN / CONSTRUCTION COORDINATION		
As Required by Section 2.7	Weekly/Project or segment office	Monitor and control of design deliverables.
TASK FORCE		
TxDOT and Stakeholders as appropriate Discipline Mgrs. as appropriate (See Task Force Meeting description below this table)	Weekly/Main Street Office	Design and construction requirements, value engineering.
SUBCONTRACTOR PRECONSTRUCTION/SERVICE		
NorthGate management team and subcontractor representative	Prior to beginning work/ Project or segment office	Definition and monitoring of subcontractor objectives and performance.
MAINTENANCE STATUS		
TxDOT representative, Maintenance Mgr. and Maintenance QC Mgr.	Quarterly minimum/ Project office	Further information requests by TxDOT or modifications to maintenance procedures.

Task Force Meetings: The most widely applied meeting used to reach TxDOT's goal of "Cooperation and coordination with Stakeholders" is task force meetings staffed with representatives from the appropriate NorthGate team members, subcontractors, TxDOT, Professional Services Quality Review Firm (PSQRF), North Texas Tollway Authority (NTTA), and other consultants and Stakeholders, as appropriate. Task forces enable an integrated approach to achieving and exceeding CDA requirements using NorthGate's proven Project controls and best management practices.

To meet Project objectives, our task force approach was to optimize design, reduce design-build costs and minimize schedule duration, while maintaining high-quality infrastructure with economical whole-life cost. For each component identified, a life cycle cost analysis was applied to develop technical solutions to meet CDA requirements. The Technical Discipline Task Forces produced numerous Alternative Technical Concepts, design refinements and design innovation in responding to the Project's challenges.

Global Task Forces were implemented throughout the preparation of our Qualifications Submittal and continued through the preparation of this proposal. These task forces and others will continue through development of final design to ensure successful Project completion.

In summary, task forces provide the following benefits to final design:

- Allow the team to finalize details for construction impact mitigation
- Facilitate effective partnering and a "one team" approach
- Improve constructability and maintainability
- Unify the design deliverable schedule with the construction schedule
- Enhance a high-quality, cost-efficient design
- Reduce field changes and design modifications during construction

The Task Force Steering Committee consists of design, construction and maintenance Key Personnel and provides timely, unified decision-making and issue resolution during design and construction. The people involved in NorthGate's proposal and preliminary design will continue to work on Project delivery under the CDA. Section 2.7(c) Design, Construction and Maintenance Personnel Interface also discusses the use of task forces for executing final design.

Technical Discipline Task Forces
Traffic Control and Phasing
Aesthetics and Landscape
Bridges and Walls
Pavement
Grading and Drainage
Electrical/ITS
Maintenance
Global Task Forces
Right of-Way (ROW)
Utilities
Public Information
Environmental
Quality

C.2.1 (b) Management Plan and Methods

NorthGate will be co-located with TxDOT team members and will provide TxDOT with the equipment to allow consistent communication and coordination. As work develops and needs arise for input and consultation from relevant federal, state and local agencies, these agencies will be included in discussions. NorthGate will work with federal, state and local governments to comply with applicable laws and to receive requisite permits prior to starting work. Project schedules and costs will be maintained on CentricProject and will be reviewed by the Project management team on a regular basis.

The Project involves a variety of agencies and customer groups. The Project Management Plan includes communication and coordination processes to keep everyone current on activities and construction plans. Subcontractors will participate in planning and scheduling meetings, as well as having a Subcontractor Mentor to enhance communication. Subcontractors will have as-needed access to CentricProject to upload work plans and daily reports. The scheduling and monitoring process will include a review of affected utilities and customer groups including railroads and commuters.

Personnel, Facilities and Equipment: NorthGate's Joint Venture Executive Committee (Scott Cassels, Randy Sanman, David Zachry and Jean Abiassi) has committed the resources to achieve successful Project completion. This commitment is represented by naming Keith Sasich as Project Director. Keith has more than 25 years with Kiewit and has served as President of Kiewit Texas Construction L.P. for over 10 years. Keith will be committed solely as Project Director for the Project. Keith's management and support staff were selected based on a combined pool of NorthGate's best personnel. This commitment of experienced personnel is a significant benefit to TxDOT, because the identified people (185 positions) are all currently employed within NorthGate firms. This organization provides NorthGate the ability to meet the Project's rigorous start-up requirements and immediately advance the work. Additionally, a team of highly experienced design-build executives will assist with Project mobilization, Project Management Plan implementation and design finalization to meet requirements and exceed TxDOT's expectations for performance. This combination of resources and experience provides the following:

- Management personnel with bid-build and design-build projects at a national and local level
- Successful completion of design-build mega-projects similar to the DFW Connector
- Local personnel familiar with TxDOT and Stakeholder requirements
- Familiarity with local resources to successfully complete the Project

Effective mobilization and start-up activities are critical to meeting our aggressive schedule commitments. As added value, four highly experienced design-build managers will provide oversight during the first year.

Bill Murphy has 25 years of construction engineering and management experience. Bill is a skilled project manager with experience in budget and schedule control, quality assurance and control, agency and utility coordination and permitting. Bill has led the design and construction of several award-winning design-build projects and has received the prestigious 2007 *Engineering-News Record* Newsmaker Award presented by McGraw-Hill Publishing and the 2001 Beavers Supervision Award for Outstanding Achievement in Heavy Engineering Construction.

Tom Howell served as Deputy Project Manager/Project Manager and led the mobilization team on the $1.3 billion I-25 T-REX project. He knows how to rapidly build a cohesive organization for delivering a design-build mega-project ahead of schedule and below budget.

Joe Wingerter brings experience from I-25 T-REX in Public Information and Communication (PIC) strategic planning and outreach. He will provide the leadership to effectively establish a PIC Steering Committee among the Project's Stakeholders, establish quarterly Stakeholder briefings and presentations on the Project's progress, and facilitate industry-leading incident and emergency management outreach.

Dan Ryan has 16 years in the environmental industry. He has managed environmental compliance requirements, including investigations, permitting, reporting and documentation, field oversight and compliance auditing. Dan has extensive knowledge to contribute to start-up planning based on his experience on the I-25 T-REX project.

Facilities Integration: Facilities and equipment will maximize management efficiency and provide co-location and Project access. NorthGate and TxDOT management personnel will be located at the Main Street Office; other supervisory personnel will be located in segment offices:

- Main St. Office – Frontage road between Main Street and Texan Trail (180 full-time-equivalent employees (FTEs))
- North Satellite Office – Segment office at SH 121 SBFR at SH 26 just south of FM 2499
- West Satellite Office – Segment office at SH 121 NBFR just south of Mustang Road

The Main Street Office includes space for TxDOT and is supplied with computers, peripherals and software to efficiently interface with Project team members.

Major Equipment Integration: A key NorthGate strength is the breadth of company-owned equipment and the depth of financial recourses. Our combined fleets ensure that adequate equipment will be available for proper execution of the work. If required, additional equipment will be purchased or rented to meet peak capacity demands. Current equipment ownership eliminates the risk of the North Central Texas construction market becoming oversaturated and equipment availability becoming scarce. Our ability to mobilize the equipment needed to self-perform critical path activities reduces TxDOT's risk of not meeting schedule commitments (Figure C.2.1-3):

Figure C.2.1-3 NorthGate Equipment Dedicated to DFW Connector Project

Qty.	Description of Equipment Currently Dedicated	Proposed Location
1	Fixed concrete plant (Erie Strayer MC11C – 300 cubic yards per hour)	Adjacent to Main Street office
1	Mobile concrete plant (Hagen Redi-mix –300 cu. yd. per hour dry batch concrete)	Moved 10 times during paving to optimize concrete haul distances
1	Concrete recycling and crushing plant (BearClaw W200)	Texan Trail and SH 114 WBFR
30	Wheel loaders IT-28 to 980	Texan Trail and SH 114 WBFR
4	Gomaco pavers (2600, 2800, 4000, Commander 3)	Mobile
15	100-ton - 275-ton crawler cranes	Mobile
12	RT cranes	Mobile
1	Base spreader and compaction machine (ABG Hi Density)	Mobile
2	Aerial concrete pump	Mobile
16	Bulldozers (D-8, D-7, D-6, D-5, D-4)	Mobile
19	Excavators (3 CY, 4 CY, 5 CY, 6 CY)	Mobile
5	Off-road trucks (35-ton and 40-ton articulating)	Mobile
2	Scrapers 623	Mobile

Qty.	Description of Equipment Currently Dedicated	Proposed Location
24	Super 18 on-road end-dumps	Mobile
9	Motor graders 140H-14H	Mobile
24	Compactors	Mobile

Control and Coordinate Subcontractors: NorthGate considers subcontractors key partners in its approach to Project management. Integrated subcontractors provide input on design development and constructability reviews, and perform specific activities following design advancement. Large fixed-price contracts require scrutiny in defining scope and pricing during subcontract negotiations and management, as demonstrated by our experience on the I-25 T-REX project which required over 230 unit price subcontracts. Our project management approach to integrate specialty design, ROW and utility subcontractors is accomplished by assigning Key Personnel positions for these specialty roles, along with incentivizing our subcontract terms for quality, partnering and performance.

Deputy project managers, construction managers, segment managers and field superintendents all play active roles in managing subcontractors. Prior to award, the construction managers and segment managers will meet with each subcontractor's management personnel to discuss work scope, manpower, quality, cost control, schedule and safety requirements.

Each subcontractor has a field/office engineer assigned to monitor its work and provide assistance in reporting and communicating within the segment management team. Schedule and updates include submittal dates, long-lead procurement items, task durations and costs. Additional requirements are adherence to Project safety, quality and environmental policies including mandatory attendance at Project mass safety meetings and three-phase environmental inspections.

Interface with Applicable Railroads and Utility Owners: Direct coordination with DART and FWWR will continue to satisfy Project requirements. We also conducted an extensive utility investigation and engineering program to establish protocols with affected utilities (Appendix D.2.12).

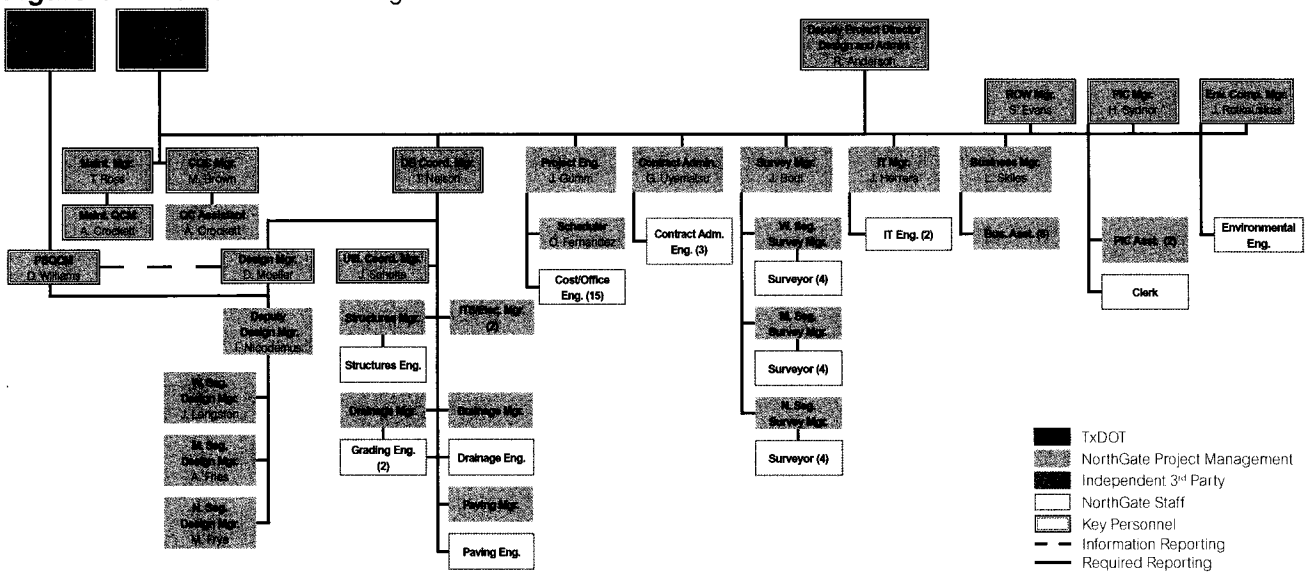
Control Project Schedules and Minimize Project Costs: The Project schedule is the primary tool used to evaluate, manage, monitor and control activities. The schedule details and integrates all Project elements to effectively control execution and facilitate timely decisions for Project completion. The schedule integrates environmental compliance, submittal requirements, Stakeholder interaction, ROW acquisition, utility coordination and relocation, design deliverables and construction activities. Scheduling control methods including daily, three-week rolling, 90-day look-ahead and updates complement the Project schedule. Following Project award NorthGate will continue to develop design innovations to reduce costs and durations.

Compliance with Applicable Laws: NorthGate has conducted extensive due diligence of its legal obligations and has established comprehensive checklists to monitor compliance. Monitoring and reporting compliance issues are the ultimate responsibility of the Project Director. The quality managers, environmental compliance manager, ROW manager, utility coordination manager and the segment managers will be responsible for reporting on compliance to the Project Director, TxDOT and federal, state and local authorities as applicable. All personnel will undergo appropriate orientation training and continuing education for specific obligations imposed by the CDA and relevant federal, state and local laws.

C.2.1 (c) Plan for Managing Permitting, Third-Party Coordination and Approvals

NorthGate's managing of permitting, third-party coordination and approvals is the primary responsibility of Rob Anderson, Deputy Project Director – Design and Administration. These functions are a combination of contract administration and project engineering management: The Contract Administration Manager identifies the requirements and the Project Engineer identifies what, who and how the requirements will be met. The administration organization is shown in Figure C.2.1-5. Third-party coordination assistance is provided through feedback from the organization and NorthGate Connections, our interactive Project Web site.

Figure C.2.1-5 Administration Organization



Permitting responsibilities are divided into categories such as environmental commitments, compliance, governmental, DFW Airport permitting, construction facilities and plant permitting. The single point of responsibility for Project permitting through the Contract Administration Manager provides effective management for verifying all permits are identified, tracked and approved in a timely manner consistent with the Project schedule.

C.2.1 (d) Organization Chart

Our detailed project organization chart is provided in Appendix D.2.16.

C.2.1 (e) Description of Key Personnel Function, Role, Responsibility and Availability

NorthGate has developed a streamlined organization by appointing highly qualified individuals for each of the Key Personnel positions. The individuals shown in Figure C.2.1-6 will be dedicated solely to this Project.

Figure C.2.1-6 Key Personnel Roles and Responsibilities

Name/Position	Role and Responsibility
K. Sasich/PD	TxDOT's primary point of contact and NorthGate's responsible party for Project-related policies, procedures, resources, cost, schedule, quality and accountability.
S. Medina/Deputy PD – Construction	Manage design-build construction and primary point of contact for major subcontractors.
R. Anderson/Deputy PD – Design and Admin.	Manage Project administration including survey, design, schedule, cost and contract administration.
D. Moeller/Design Mgr.	Overall design quality, scope, schedule, and budget.
T. Nelson/Design-Build Coordination Mgr.	Primary responsible party for coordination of construction, design and maintenance to verify compliance with CDA requirements for the Project's design.
H. Sydnor/Public Relations Mgr.	Primary point of contact between NorthGate and the public. Facilitates communication among Developer, TxDOT personnel (including TxDOT's Public Information Officers), and customer groups. Represents the Project at public meetings and other occasions. Leads the production, implementation, audit, quality control/ quality assurance and updates for NorthGate Connections.
S. Evans/ROW Acquisition Mgr.	Perform ROW acquisition services and management of parcels required on behalf of TxDOT and NorthGate.
J. Schulte/Utility Manager	Perform NorthGate's obligations with respect to utility adjustments and relocations management.
J. Knez/Construction Manager - Roadway	Responsible to deliver a high-quality, safe Project in the most efficient manner. Ensure that all disciplines are coordinated, scheduled, trained and provided the proper equipment, tools and supplies to perform the work.

Name/Position	Role and Responsibility
R. Carson/Construction Mgr. - Structures	Responsible to deliver a high-quality, safe Project in the most efficient manner. Ensure that all disciplines are coordinated, scheduled, trained and provided the proper equipment, tools and supplies to perform the work.
D. Williams, PE/Professional Services Quality Control Mgr.	Primary responsibility for the implementation and enforcement of the design QC plan.
M. Brown, PE/Construction QC Mgr.	Primary responsibility for implementation and enforcement of the Project's construction QC plan.
J. Rutkauskas/Environmental Compliance Mgr.	Primary responsibility to prevent, minimize and/or correct any violation of or noncompliance with environmental approvals and other environmental compliance required by the CDA.
R. Hayden, PE/Ind. Professional Services Quality Review Mgr.	Provide administrative and management oversight for the professional services quality program including design, environmental, ROW, utilities and survey.
R. Arizola, PE/ R. Schenck, PE/ Independent QA Mgrs.	Provide management of construction acceptance testing for the construction QA program.

C.2.1 (f) Detailed Description of Unified Approach to Quality, Design, Construction and Maintenance

Our approach to proposal development included identification of Project goals, co-location in Kiewit Texas' Fort Worth office and task forces to develop Project elements. This approach proved successful on the I-15 Corridor Reconstruction in Salt Lake City and the I-25 T-REX project in Denver, which rank as two of the largest transportation projects in the United States. Task forces will continue after Project award to unify design and construction while reducing maintenance requirements; the same team that developed the proposal will deliver the Project under the CDA.

TxDOT will be co-located with NorthGate at the Main Street Office to provide timely decision-making and issue resolution. Co-location allows TxDOT to attend task force meetings, provide over-the-shoulder reviews and participate in the Project's ongoing development, design, construction and maintenance.

NorthGate Connections, the Project's centralized communications plan, provides protocols for interaction among team members, and information dissemination to the public and media. NorthGate's Public Information Managers will attend scheduling, planning and task force meetings to provide input and relay appropriate information.

NorthGate personnel will self-perform capital maintenance functions and also be represented on design and construction task forces.

The Design-Build Coordination Manager co-chairs design task force meetings to coordinate construction, design and maintenance to verify compliance with CDA requirements. The task force process also requires action-item completion schedules and issue-resolution procedures to expedite decision-making and design deliverables. TxDOT's involvement in the process will expedite over-the-shoulder reviews and reduce the number of interim design submittal reviews and changes.

A significant benefit to TxDOT is the combined experience of NorthGate's team members with mega design-build project development. NorthGate Key Personnel who are participating in the task forces are experienced in the following:

- Developing and managing complex design-build transportation projects
- Partnering at all levels with the owner's organization
- Developing and executing quality management programs
- Minimizing construction impacts on corridor users
- Developing whole-life operations and maintenance programs

C.2.1 (g) Description of Team Decision Process and Dispute Resolution

The Project Director, Keith Sasich, has authority to make all decisions on behalf of NorthGate. The process for major decisions and dispute resolution includes consultation and directives received from NorthGate's Executive Committee.

Dispute avoidance begins with a facilitated partnering session involving relevant entities. Using the processes developed during this session, we will identify potential early issues and "rocks in the road," and develop mitigation strategies. Personnel will be empowered to resolve issues at the lowest possible level. For example, as a result of partnering on the I-25 T-REX project, more than 350 change orders were required and executed with no claims or issues escalated to the Disputes Review Board.

Disputes that arise within task forces will be resolved through the Task Force Steering Committee, which includes TxDOT appointees, the Design Manager, Design-Build Coordination Manager, Deputy Project Director – Design and Administration and the Deputy Project Director – Construction.

The benefits realized from the partnering process will be invaluable for delivering the Project on time and exceeding TxDOT and community expectations. Team building, timely communication and effective coordination are vital to the success of this Project. Partnering builds trust and cooperation, and facilitates timely resolution of Stakeholder concerns. All participants must commit to support the process. This will be accomplished through a "Partnering Charter," which states the group's common goals and establishes the basis for dealing with Project issues. Past partnering sessions have included the following commitments:

- Treat each other fairly – All parties must treat each other fairly and participate in the process
- Emphasize openness – Project meetings are open to NorthGate and TxDOT attendance
- Delegate decision-making – The power to resolve issues at the lowest level possible must not be held by a few managers, but delegated across the organization
- Communicate openly – Managers must be open-minded, willing to listen and honest

Avoidance of adverse cost, schedule and quality impacts are also accomplished through NorthGate's Joint Venture Agreement, Section 12.1, which is consistent with CDA Section 19.7: "for any team-related disputes to continue with the performance of the work and obligations, including any disputed work or obligations, diligently without delay, in accordance with the CDA, except to the extent enjoined by order of a court or otherwise agreed to by TxDOT."

C.2.1 (h) Major Training Programs

Initial training and continuing education programs required by NorthGate personnel for the Project include appropriate:

- General Work Zone Safety
- Proper Lifting/Pinch Points
- Fall Protection
- OSHA Requirements
- Crane Safety
- CentricProject
- Business Ethics
- Crisis Communication
- Confined Spaces
- Quality Inspection/Hold Points
- Environmental Compliance
- Emergency Response
- Excavation/Trench Safety
- DBE Training
- Media Contacts
- Quality Reporting

C.2.1 (i) Current and Projected Workload and Backlog (including Major Participants)

NorthGate is a newly formed joint venture of Texas-based transportation construction companies created specifically for providing the necessary resources for this Project. NorthGate's capacity to perform the work far outweighs the Project's requirements, as demonstrated in our Qualifications Submittal. NorthGate and its Executive Committee commit to TxDOT to provide the necessary resources to complete the Project.

C.2.1 (j) Safety Plan

NorthGate's approach to Project safety incorporates "designed-in" safety requirements and actions required to protect Stakeholders, motorists and the communities, as well as Project personnel. Through ATC 3, Temporary 11-Ft. Lane Widths, we are providing break-down or pull-off areas in the work zone, as well as a Courtesy Patrol to assist motorists in distress and first responders.

Managing Motorist and Community Safety: Traffic control and maintenance of traffic activities will be performed by NorthGate management and personnel. Traffic control and motorist safety is addressed in every operation on a daily basis. To demonstrate our commitment to traffic control and motorist safety, the maintenance of traffic man-hours in our estimate total over 12% of the Project's total man-hours.

The Traffic Engineering Manager (TEM) will incorporate into the Traffic Control Plans (TCPs) safety information from the task force meetings such as proper geometric layouts to maintain safe lane shifts, and temporary drainage phasing to eliminate excess ponding during interim construction. TCPs will include safety information from outreach with the Cities of Grapevine, Southlake and DFW Airport. Input from first responders and emergency service providers is specifically incorporated into the design from the Incident Management Plan (IMP) and Emergency Response Plan (ERP) outreach conducted within 90 days of NTP1 or prior to NTP2, whichever is first. During design

development, designers and the construction staff work to maximize work zones while minimizing traffic switches. Limiting the number of traffic switches and phases increases motorist expectations and safety.

Once construction begins, the Traffic Control Manager (TCM), Isaac Klem, will verify proper implementation of the TMP and oversee daily traffic control and traffic maintenance activities. Maintaining safety of the traveling public will be the primary focus and objective during implementation of the TCPs. All detours and closures will be in strict compliance with the established TMP guidelines. Active in-place traffic control devices will be inspected every day, and barricade logs will be prepared daily with copies submitted weekly to TXDOT. The TCM will provide oversight of the development of work zone traffic handling plans, the placement of work zone traffic control devices and implementation of traffic management programs.

Our plan integrates motorist and community safety into traffic control and traffic maintenance elements that are primarily managed through the traffic control meetings identified in Figure C.2.1-2. Meeting results will provide strategies and solutions to ensure smooth and safe passage for motorists through the construction zone while minimizing congestion, delays and inconvenience.

The TCM will work closely with the Public Information (PI) Manager to provide timely and accurate messages and coping strategies. Dynamic Message Signs (DMS) are an important communication device to motorists. DMS messages will be updated daily to verify their accuracy, inform motorists of upcoming detours and closures, and communicate construction progress. Through our added-value interim Traffic Management Center, we will have the ability to monitor traffic and rapidly respond to areas of need.

The TCM will be involved in the initial outreach with first responders and emergency management personnel to develop the Incident Management Plan (IMP) and Emergency Response Plan (ERP). The plans will contain contact information for local emergency providers and procedures for informing them of detours and routing. Courtesy patrol coordination and locations of current break-down areas are added-value benefits to law enforcement and emergency personnel.

The TCM will oversee daily Project safety tours and will document these tours in the a barricade log. Photos will be taken of any incidents, followed by full reports. The TCM will conduct a weekly tour with TXDOT staff personnel and the TEM to address safety concerns and implement any necessary changes. A traffic control maintenance crew will perform routine maintenance on all traffic devices (replacing damaged units, cleaning, changing bulbs on light boards, reinstalling missing channeling devices, etc.) during regular working hours. A 24/7 on-call response team will respond to emergency repair or replacement requirements.

Our PI Manager will attend weekly traffic control meetings and will interact with TXDOT's PI Coordinator to provide current information for public distribution. The PI Manager will report directly to TxDOT's designated PI Coordinator and NorthGate's Project Director to ensure a high priority is placed on achieving Project safety and maintaining community goodwill.

Project-Specific Safety Plan: NorthGate team members have industry-leading safety records and are innovators in preventing jobsite injuries (Figure C.2.1-7). Continual improvement is inherent in our Project safety policy. The Safety Plan includes auditing OSHA requirements and task-specific hazard analyses, and features an innovative leading indicator program to identify areas where accidents are most likely to occur. NorthGate team members have used their experience to develop a Safety Plan that will exceed the CDA's requirements and benefit the Project. Refer to Form D Industrial Safety Record in Volume B for complete safety statistics.

Figure C.2.1-7 NorthGate Team Member Safety Records

Project Name/Location	Year Completed	Total Man-hours	Recordable Injuries	Lost Time Cases	Lost Time Days	Fatalities
I-25 T-REX/Denver, CO (Kiewit)	2006	6,299,312	28	5	543	0
SH 45 Interchange/Williamson County, TX (Kiewit/Zachry)	2006	138,359	1	1	11	0
Loop 1/Travis County, TX (Kiewit/Zachry)	2006	202,703	1	0	0	0
IH 30 Tom Landry Freeway/Dallas TX (Kiewit)	2006	515,897	2	0	0	0
IH 635 High Five Interchange/Dallas, TX (Zachry)	2007	2,440,368	16	0	0	0

NorthGate's Safety Plan is included in Appendix D.2.A Project Safety Plan. Upon award, this plan will be ready to submit and exceed Project safety requirements.

C.2.2 Risk Management

The NorthGate Difference

NorthGate's risk mitigation strategy focuses on providing TxDOT maximum value while minimizing impacts.

Commitment to TxDOT Project Goals Addressed in this Section

(f) Expediting delivery of Project improvements
ROW risk is mitigated through weekly meetings of experienced, integrated team members. Commodity escalation is mitigated through specified indexing and pricing. When available, futures and hedges were evaluated to provide the lowest cost solution to escalation.

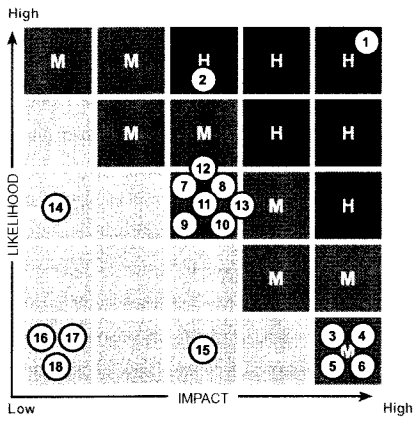
Added Value Items Included in This Section

- Mitigation of identified risks reduces the likelihood of Project delays.
- Plotting risks on a scatter graph to show their relationships led to identification of ROW acquisition and commodity escalation as having the highest potential for likelihood and impact.

To effectively allocate risk and responsibility, NorthGate is committed to working with TxDOT in a collaborative manner that considers the Project's goals and objectives. Risk will be assigned to the party in the best position to manage and mitigate it. We anticipate taking responsibility for Project development, design and construction and, if TxDOT exercises its option, maintenance.

We have plotted identified Project risks on the scatter graph in Figure C.2.2-1 to show their relationships and associated likelihoods and impacts. Right-of-way acquisition and commodity escalation have the highest potential for likelihood and impact. We have effectively mitigated these and other risks as outlined in Figure C.2.2-2.

Figure C 2.2-1 Project Risk Relationships



Likelihood

Low - Slight chance that the condition or event will occur and/or mitigation is readily available to prevent the event from occurring

Moderate - There is a reasonable chance that the condition or event may occur. There may not be available mitigation to prevent the occurrence

High - The condition or event will most likely occur

Impact (if not properly mitigated)

Low - Minor cost and/or schedule impact. Recovery is attainable and there is slight risk of project delivery delay

Moderate - Increased cost and possible delay in project delivery. Recovery will take re-sequencing and added resources to avoid delay in project delivery

High - Substantial cost and schedule impact. Recovery may not be possible and a delay in project delivery is likely

Figure C.2.2-2 Project Risk Matrix

No.	(a) Risk Catagories/ Allocation	(b) Impact Consequences /(c) Likelihood	(d) Risk Sensitivity Analysis/(e) Mitigation
1	Right-of-Way Acquisition/Shared	High/High	Using our ROW acquisition consultant, NorthGate identified and classified required parcels. Critical parcels were scheduled and priced for condemnation proceedings. The subsequent work was scheduled to account for this.

No.	(a) Risk Catagories/ Allocation	(b) Impact Consequences /(c) Likelihood	(d) Risk Sensitivity Analysis/(e) Mitigation
2	Escalation of Commodities/ Developer	Moderate/High	NorthGate performed a detailed study of key material escalation indexes and forecasts for major Project commodities including fuel, structural steel, reinforcing steel, cement, lime and wages. This study applied quantity and schedule information to ensure proper escalations were applied. Additionally, where available, futures and hedges were evaluated to provide the lowest cost solution to escalation.
3	Design Acceptance/ Developer	High/Low	Through joint task forces NorthGate and PB have reviewed the CDA requirements and all references to ensure the team has a thorough understanding of design requirements. Where design innovation or clarity was required, the team submitted ATCs and formal questions to TxDOT.
4	Design Liability/ Developer	High/Low	Design will be completed within CDA requirements and "Good Industry Practice." NorthGate's QMP will ensure that all requirements are achieved during design advancement. If not enough, NorthGate has secured a Project-specific Professional Liability Policy.
5	Equipment Shortages/ Developer	High/Low	NorthGate has a detailed equipment schedule and has identified all critical pieces to execute the Project. Critical equipment is currently owned by the NorthGate entities and is available for the Project.
6	Traffic Control/ Developer	High/Low	Through extensive effort NorthGate developed its TCP to maintain current traffic capacity, facilitate accelerated construction, reduce impacts to adjacent businesses and provide increase capacity at the earliest available time.
7	Governmental Approvals/Shared	Moderate/ Moderate	A review of the NorthGate-required and TxDOT-provided Governmental Approvals was performed to ensure a clear understanding of requirements. NorthGate's PMP, quality plans and work plans will include processes to assure compliance.
8	DBE Participation/ Developer	Moderate/ Moderate	NorthGate held a DBE Outreach Meeting during the proposal phase with over 110 firms and has actively solicited quotes from qualified firms. Where scope was too large, NorthGate requested major subcontractors to use DBE firms to meet overall Project goals.
9	HazMat Conditions/ TxDOT	Moderate/ Moderate	Adequate due diligence was performed early through Phase I investigations.
10	Utility Conflicts/ Relocates/Shared	Moderate/ Moderate	NorthGate has advanced the TxDOT-provided SUE Report. All utilities requiring relocation were identified. Meetings with each utility reduces the likelihood of unidentified utilities. NorthGate's plan and schedule account for anticipated duration required for utility agreement and relocation activities.
11	Labor Shortage/ Developer	Moderate/ Moderate	With potential for large infrastructure projects occurring simultaneously in the Metroplex, NorthGate has analyzed the number of qualified personnel to complete the Project using a resource-loaded schedule. NorthGate has all key staff, supervisors and core craft staff to execute the Project. To attract the supplemental craft required, additional wage premiums may be required and are accounted for in the Proposal.
12	Weather Delays/ Developer	Moderate/ Moderate	NorthGate's schedule uses work calendars from historical weather data. Project's phasing accounts for adequate temporary drainage to protect work areas, allowing for accelerated access to the work areas after an event.
13	Project Quantity Growth/Developer	Moderate/ Moderate [Low]	NorthGate and PB have worked together in task forces to advance the TxDOT schematic design. These task forces have used lessons learned from previous design-build projects to ensure quantities are accurately developed from the level of design achieved. Upon award, these task forces will continue to meet during design. Their continuous involvement will ensure a seamless advancement of design within NorthGate's price.
14	HazMat in Structures to be Demolished/ Developer	Low/Moderate	NorthGate analyzed existing structures on ROW to be acquired and accounted for the risk of encountering hazardous substances.
15	Archeological, Endangered Species/TxDOT	Moderate/Low	Under the NEPA process, investigations were performed to identify potential archeological, paleontological and endangered species. NorthGate, working in partnership with TxDOT, will review findings of these reports and provide sufficient notice if an unanticipated find occurs.

No.	(a) Risk Catagories/ Allocation	(b) Impact Consequences /(c) Likelihood	(d) Risk Sensitivity Analysis/(e) Mitigation
16	Geologic Conditions/Shared	Low/Low	NorthGate performed additional geotechnical investigation to enhance the TxDOT-provided Geotechechnical Report.
17	Environmental Compliance/ Developer	Low/Low	Work plans will address environmental commitments and plan for compliance. Environmental Compliance Manager will audit plans and regularly inspect the Project to ensure all procedures are followed and permits are adhered to.
18	Design Cost Overrun/Developer	Low/Low	PB prepared a detailed design estimate based on past project costs. NorthGate prepared an independent estimate of design cost based on previous design-build experience. Each estimate was compared and used to develop the design cost estimate.

C.2.3 Construction and Traffic Management During Construction

The NorthGate Difference

NorthGate's traffic management and construction mitigation measures are structured to reduce both traffic impact duration and inconvenience to the surrounding businesses and communities.

Commitment to TxDOT Project Goals Addressed in This Section

(a) Maintaining mobility through the Project area during construction ...
Our "Smart Start" approach uses the initial nine months following NTP1 for outreach, planning, engineering and development activities to maximize construction efficiencies and reduce the duration of construction impacts. We have planned laydown and staging areas within work areas to maintain mobility.

(e) Safe construction; and (i) Use of public-private partnerships ...
Our plan mitigates traffic congestion, which is in the public interest and improves motorist safety.

(f) Expediting delivery of Project improvements
We are significantly reducing "cone zone impacts" to 1,464 days overall, which minimizes impacts for completion of the business access frontage roads.

Added Value Items Included in This Section

- Traffic Management Strategy Reports (TMSRs) detail the steps required for each major traffic switch and are communicated to our Public Information team for accurate and timely public dissemination.
- Our Courtesy Patrol decreases congestion in the work zone through a proactive response to motorists in distress.
- Pull-outs or "break-down areas" enhance motorist safety and mobility through the work zone.
- Portable, automated wheel-washers prevent mud and dirt from entering the roadway.
- Our Project Traffic Management Center (TMC) monitors traffic to gather and distribute real-time traveler information, and to remotely operate dynamic message signs and other ITS devices. Additionally, the TMC is available to local law enforcement to aid in enforcing speed limits, as well as rapidly responding to accidents.
- We located our work/laydown yards in the middle of the corridor, which eliminates the need to merge more than 60,000 truckloads into traffic.

NorthGate is committed to partnering with Stakeholders to minimize impacts to traffic while aggressively pursuing critical Project milestones. Our construction zone Traffic Management Plan includes strategic outreach to emergency responders to incorporate Project-specific protocols in the IMP and ERP. Our approach to traffic management incorporates ATC 3, Temporary 11-Ft. Lane Widths, which include pull-outs or "break-down areas" in tight work zones and a Courtesy Patrol.

C.2.3 (a) Schedule and Sequencing to Minimize Construction Impacts

NorthGate has continued to refine the Project sequencing plan submitted with our Qualifications Submittal (evaluated as "exceeding TxDOT's requirements") to expedite construction and minimize impacts. This proactive approach accomplishes three goals:

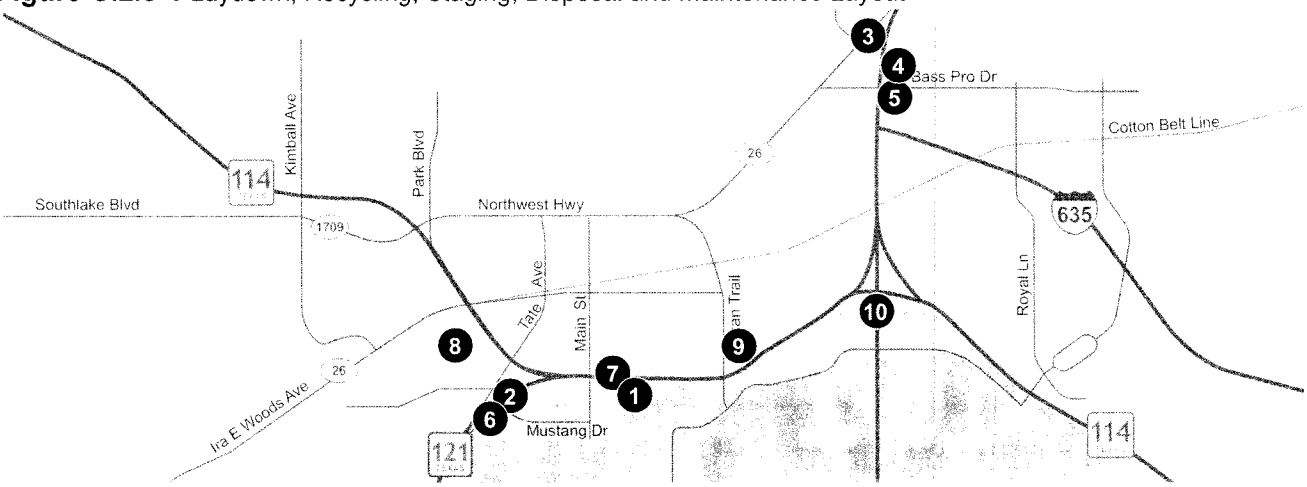
- Reduces the length of time construction impacts business access
- Provides work areas to maximize construction efficiency
- Maintains mobility by not reducing existing capacity on controlled access roadways

Our schedule approach is a direct result of our traffic sequencing plan to minimize construction impacts and maximize work areas. Three independent management groups over several months repeatedly refined and optimized the phasing scenarios. A systematic resource analysis provided requirements to exceed Substantial Completion and Final Acceptance. Our "Smart Start" approach to new roadway construction uses the initial nine months following NTP1 to accomplish early development activities such as design, ROW acquisition and utility relocation. This approach maximizes work areas and reduces sequencing to complete each Project element, thereby reducing the construction "cone zone" impact to 1,464 days from the Begin Project Construction milestone to Substantial Completion. Additionally, our schedule and sequencing plan minimizes frontage road construction impacts by performing utility and ROW work in continuous blocks to maximize construction operation efficiency.

C.2.3 (b) Description of Laydown, Recycling, Staging, Disposal, and Maintenance Areas

The facilities shown in Figure C.2.3-1 are numerically related to the descriptions provided below and highlight NorthGate's planned execution of construction.

Figure C.2.3-1 Laydown, Recycling, Staging, Disposal and Maintenance Layout



No.	Layout	Proposed Facilities
1	Laydown/ Maint.	Main Street Office and Yard: 20 acres. 2 acres for hub office and parking; 13 acres for laydown and 5 acres for maintenance. All-weather access to laydown areas and an all-weather maintenance facility will be provided. Centrally located, all aspects of construction and traffic control maintenance will be serviced primarily from this location.
2	Laydown/ Maint.	West Segment Office: 1.6 acres. Located towards southwest portion of the Project near Mustang Drive and SH 121, this satellite office will provide additional storage for West Segment construction.
3	Laydown/ Maint.	North Segment Office: 3.4 acres. Located between SH 26 and SH 121 southwest of Grapevine Mills, this satellite office will provide additional storage for North Segment construction.
4	Staging	Plant Site: 4.6 acres. Located on northeastern corner of SH 121 N entrance and Bass Pro Drive, this site will be used for concrete or asphalt plant production.
5	Staging	Plant Site: 2.9 acres. Located on southeastern corner of Bass Pro Dr. and SH 121 N entrance ramp directly across Bass Pro Drive from Plan Site 4, this site will be used for concrete or asphalt plant production.
6	Staging	Plant Site: 7.2 acres. Located between SH 121 and SH 121 N access road just southwest of Mustang Drive, this site will be used during Phases 1A, 1B and 2A for concrete or asphalt plant production.

No.	Layout	Proposed Facilities
7	Staging	Plant Site: 3.4 acres, 130-ft. wide. Located in the median on northwest side of SH 121 just before SH 121/SH 114 interchange, this site will be used during Phase 2A for concrete or asphalt plant production.
8	Staging	Plant Site: 2.4 acres, 150-ft. wide. Located on the northern side of SH 114 between Ira E Woods Ave. and William D Tate Ave., this site will be used for concrete or asphalt plant production during Phase 2A.
9	Staging	Crusher/Recycling Site: 4 acres. The site is located near the center of the Project at north side of SH 121 east of Texan Trail/SH 114 so that all recycling needs can take place to minimize transporting materials.
10	Staging	Plant Site: 1.9 acres, 135-ft. wide. Located in the median of International Pkwy., this site will be used during Phase 2A for concrete or asphalt plant production.

Demolished Project elements, including all concrete and asphalt, will be recycled into the new work. Other demolished elements, such as steel and aluminum, will be recycled at local salvage companies. Embankment spoils will be eliminated through adjustment of vertical profiles and slope volumes to balance earthwork throughout the corridor.

C.2.3 (c) Construction Impact Mitigation Measures

NorthGate will address mitigation measures through daily work planning and monitoring all commitments. NorthGate will keep communities informed of construction impacts and will establish a collaborative partnership with community organizations as a first measure of successful mitigation. NorthGate Connections contains specific programs and measures to address Stakeholder notification and feedback regarding construction impact mitigation measures.

One of the most frequent and enduring challenges during construction is to minimize mud-covered and dusty roadways near commercial areas, such as restaurants, retail outlets and auto dealerships. Automated tire and wheel-wash stations will be set up in strategic locations to effectively mitigate dirt on the roadway. In addition to this proactive approach, our standard best management practices (BMPs) for construction impact mitigation are discussed In Figure C.2.3-2.

Figure C.2.3-2 NorthGate BMP Mitigation Measures

Impact	Mitigation Measures
Erosion control / runoff	A comprehensive, Project-specific SWP3 will be the primary tool to manage erosion and sediment control. Upon NTP1, NorthGate will develop a SWP3 and submit an NOI and notify Gravevine and Soutlake (MS4) seeking coverage under the TPDES permit before the start of construction activities. BMPs include structural and non-structural measures. Structural BMPs include installation of silt fence and placement of engineered sediment filters at storm sewer inlet structures, runoff diversion away from disturbed areas and construction of runoff detention ponds. Non-structural BMPs include material placement away from water resource areas (wetlands, streams, storm sewers), sound waste storage and disposal practices and spill prevention methods. The SW3P will be issued to all disciplines, operations and subcontractors who will integrate procedures to minimize erosion and sedimentation. Requirements of the Construction General Permit will be met, including scheduled and post-precipitation inspections, inspection documentation and correction of inspection findings within allowed time intervals. When final stabilization requirements are achieved and field-verified, NorthGate will provide Notice of Termination (NOT) to TCEQ, TxDOT and MS4 owners.
Dust mitigation	Temporary and permanent seeding and mulching applied to cover bare soil and prevent wind and water erosion. Application of engineered mulch products such as tackifiers will help retain soil and are more wind resistant than conventional straw mulch. They also allow sunlight to better penetrate the mulch layer, accelerating seed germination and vegetation. Wind barriers such as solid board, burlap and snow fence control air currents and airborne dust. Barriers placed at right angles to prevailing wind currents with strategic height and spacing are effective in controlling wind erosion. Soil surface watering will be a primary dust prevention technique and will be used on a consistent basis. This technique is especially effective for haul roads and tall stockpiles. Frequency will vary with existing soil moisture content, wind velocity, ambient air temperature and traffic level on haul roads. Portable, automated wheel-wash stations or stone or rock mud tracking pads will be installed at construction exits to prevent mud and dirt from leaving the site. Machine street sweepers will be used to maintain street pavements.
Access to ROW/ properties	Mitigation is addressed under the NorthGate PMP traffic management section and will minimize delays and maintain access to surrounding businesses.

Impact	Mitigation Measures
Mobility/ local road damage	Application of sound engineering and construction practices. Construction impact reduction resulting from refinement of Schematic Design profile grades reduces 120,000 truck loads across the Project and through adjacent roads. Road damage will be mitigated by limiting truck haul weights on adjacent roadways to those allowed by local laws. Placing laydown areas within the work zones eliminates 60,000 truck loads across the Project.
Noise	Community coordination for scheduling work hours in noise-sensitive areas and strict adherence to muffler maintenance.
Vibration	Mitigation will be used primarily for rock excavation to minimize potential excess vibration. Techniques include equipment size and type selection, along with time-of-day and location considerations.
Light	Construction operations will be sequenced to optimize efficiency of activities that minimize impact times. Fugitive light during night construction will be controlled to minimize light from escaping onto adjacent properties and oncoming traffic.

C.2.3 (d) Coordination with Connecting Facilities

Coordination with connecting facilities is part of our Project Management Plan and is performed under the direction of Rob Anderson, Deputy Project Director – Design and Administration. He will coordinate stakeholder and public information with the design management group. Section C.2.1(c) Plan for Managing Permitting, Third-Party Coordination and Approvals and C.1.1.4 Connectivity/Interconnections explain the administration organization, affected parties and coordination procedures.

C.2.3 (e) Description of Application for Traffic Management and Traffic Control

Traffic management is the responsibility of NorthGate's Traffic Control Manager, Isaac Klem. Isaac's recent experience on the I-25 T-REX urban reconstruction project in Denver positions him for high success n this important Project role.

The Traffic Management Plan (TMP) will be developed under the direction of Kimley-Horn, consistent with the requirements of Section 18 of the Technical Provisions, and will submitted to TxDOT for approval prior to completion of released-for-construction Traffic Control Plans, and in no circumstances prior to the start of construction activities. Kimley-Horn has recent experience working with traffic management in nearby communities and has intimate knowledge of the traffic management strategies of those cities. Key elements of the TMP include:

- An overview of the construction phases and stages
- Approval process for detour routes
- Traffic control coordination with Stakeholders
- Traffic Control Plan (TCP) requirements
- Traffic Management Strategy Reports (TMSRs)
- Public Information Coordination (PIC) requirements
- Signal coordination requirements
- Traffic control device maintenance

Over 230,000 cars traveled through the T-REX construction zone on a daily basis. An effective MOT plan was instrumental in the project receiving a 93% public approval rating.

An important component of our TMP is the integration of traffic control, traffic control devices and TMSR information into NorthGate Connections. As added value, TMSRs are developed in task forces and required by the TMP, and contain the steps required during each major traffic switch. These TMSRs were integral in gaining a 93% public approval rating for traffic control on the heavily travelled I-25 T-REX project. Traffic control and TMSR coordination procedures and requirements are provided in Section C.2.5 Public Information and Communications.

In addition, based on experience performing traffic management on large, urban design-build transportation projects, we are providing the following added-value TCP components to minimize congestion and construction impacts:

- Isaac Klem as Traffic Control Manager, with relevant urban transportation design-build experience
- Project Traffic Management Center available for law enforcement use
- Pull-outs or "break-down areas" in work zones
- Courtesy Patrol
- Weekly maintenance of traffic and management look-ahead meetings

C.2.4 Schedule and Cost Control Management

The NorthGate Difference

NorthGate team members have proven experience delivering fast-paced, urban design-build transportation projects ahead of schedule and within budget.

Commitment to TxDOT Project Goals Addressed in this Section

(d) Securing quality design, construction and capital maintenance services ...
NorthGate's Preliminary Baseline Schedule and Developer's Price are accurate and attainable based on past project experience and due diligence efforts.

(h) Cooperation and coordination with Stakeholders ...
NorthGate's process and Project controls are developed and implemented to meet all reporting requirements to complete the Project ahead of schedule.

Added Value Items Included in This Section

- CentricProject, a Web-based information management system, integrates with the capital maintenance GIS database.
- Primavera P(3) v6 scheduling software and training will be provided to TxDOT, which facilitates accurate earned value reporting and progress.
- Our earned value approach for deliverables motivates designers to stay on schedule.

C.2.4 (a) Description of Cost Control, Document and Schedule Management System

NorthGate has proven schedule management and cost control processes developed on other fast-tracked, high-volume cash-flow design-build projects. For example, the I-25 T-REX project had 350 owner-directed changes and enhancements, and was still delivered ahead of schedule, with no claims and under the owners' budget.

Cost Control System: The foundation of NorthGate's cost control system is the Developer's Price submitted with this proposal. Two independent estimates were completed and reconciled to develop our cost for use in the Project Baseline Schedule and control budget. These costs are accurate, representative and attainable based on past project experience. NorthGate's management team will monitor cost versus budget and track Project expenditures using Kiewit's customized Construction Management System (CMS).

CMS takes time worked data from timecards for all ongoing activities and generates cost reports. The Labor Distribution Report compares the actual amount of labor required to complete a task versus the level estimated to complete it. The Daily Cost Report summarizes cost versus budget using categories such as labor, equipment, small tools and supplies. The Project management team will review these reports on a weekly basis, allowing the team to review the Project's trends and status. Project staff will identify opportunities for increased efficiencies in design and construction. The management team will use these reports to complete projections and identify activities on or off the critical path that are affecting Project completion.

Document Management: NorthGate uses CentricProject®, a Web-based information management system, to perform document management. This collaborative Web site has been used on other design-build projects to coordinate and control communication and tasks among project participants. Owners have expressed high praise for the system and its functionality. All Project information, including plans, agendas, minutes, maps, photography, database information, spreadsheets, CADD drawings and correspondence (e.g., RFIs, NCRs, survey requests, permits, etc.) will be available to Project participants.

Three pedestrian bridges were added to the T-REX project scope with no impact to the schedule.

Schedule Management: NorthGate's schedule management approach discussed in Section C.2.4 (b) will be used to coordinate Project activities and Stakeholder input during development, design, construction and maintenance. The Project Baseline Schedule is resource-loaded and leveled based on the number of crews and equipment available for each work discipline. NorthGate will use Primavera Project Planner P(3) v6 to create the Project Baseline Schedule and use its enhanced features for earned value tracking. Scheduling software and training will be provided to TxDOT. The Project Engineer will manage, maintain and update the schedule. Field/office engineers will perform data and quantity collection for updates.

Schedule Management During Design: The Design Manager will ensure that all design packages and design milestone dates are achieved to meet schedule requirements. Control-level schedules will be developed to track each construction package and define all required deliverables, schedule start and finish dates, and for use as the basis of design status and progress reporting.

Weekly construction coordination meetings co-chaired by the Design-Build Coordination Manager and the Design Manager will include TxDOT and will serve to coordinate and determine the status of construction packages. The Design Manager and design discipline managers will attend these meetings with representatives from the construction team, focusing on the progress of construction packages and upcoming requirements. Meeting minutes will be developed and forwarded to the affected parties and filed on CentricProject.

Schedule Management During Construction: NorthGate's approach to building work uses a higher number of field engineers to support the superintendents and foremen. This approach provides proper implementation of our Project control systems. NorthGate field engineers work directly with construction superintendents on a one-to-one basis. Together, they complete the pre-work planning, analyze risks and set goals. As the work is completed, labor, equipment and material costs are coded to the activity items, and the field engineers report quantities and progress schedule activities.

Field engineers will coordinate monthly progress to the Project Engineer to progress the Project Schedule. The Project Schedule update is based on actual work completed. The earned value is automatically calculated based on the predetermined cost resources assigned to the activities. Functionally, the schedule is updated by progress, not value.

The Project Engineer is responsible to reach agreement on progress with oversight counterparts from TxDOT. Once they reach agreement by a set date each month, the resulting earned value will be processed for payment. Outstanding issues will be addressed in the partnering process. Past experience has demonstrated that a strong commitment to partnering will enable the process to work smoothly and not interfere with Project operations.

Each month TxDOT and the NorthGate Project management team will hold a Progress Status Meeting to review and discuss monthly progress estimates and required reporting information.

Schedule Management During Maintenance: The Maintenance Schedule in Appendix D.3.2 shows the annual major maintenance requirements and illustrates the anticipated work profile to maintain the assets consistent with performance and to meet the Maintenance Transition requirements. NorthGate will monitor and update the Maintenance Schedule on a monthly basis.

C.2.4 (b) Description of Project Schedule Methodology and Cost Control Approach

System Used for Preparing and Updating the Project Schedule: Updating the Project schedule is an important part of the planning and building process and for monitoring progress performance. We take a proactive approach to developing and monitoring schedules on daily, weekly and monthly intervals.

In addition to the monthly schedule update, NorthGate will use a variety of methods to monitor schedule performance. This will ensure that our schedule reflects field realities and provides timely opportunities for supervisors to review actual versus planned performance. These methods include pre-activity meetings, daily, weekly and monthly cost reports, time studies and cost and production trend charts. If a negative trend is identified, a review of the operation will be performed to determine the cause and make adjustments, which may involve a method analysis to develop a recovery plan.

Our schedule management system allows for schedule adjustments, which may include a change order for additional scope. Potential changes will be properly identified in the Project schedule and narrative. We use the following types of schedules to carefully plan our work during the design and construction phase:

90-Day Schedule – The Project schedule is updated monthly and activities viewed for the next 90 days. This allows focus on upcoming long lead-time items and coordination mitigation for critical path impacts.

Three-Week Schedule – These schedules are updated weekly to provide an immediate appraisal of schedule status on a task-specific basis and are prepared separately for each segment by the corresponding superintendent, foreman and subcontractors.

Daily Schedule – After determining clear direction for the upcoming week's activities from the three-week schedule, each superintendent prepares a schedule of activities on a daily basis for the next seven days. This schedule is a key element of our approach, allowing us to successfully manage work according to plan. Every worker's name, every piece of equipment and every key material are written on the schedule whiteboard each day. Superintendents and key subcontractors will meet to discuss this plan and verify they are following the three-week schedule. Safety, quality, equipment maintenance, resource allocation and coordination items are discussed during these meetings.

System Used for Preparing and Updating Schedule of Values: Our experience on T-REX, a heavily travelled, fast-track, urban reconstruction project, proved the value of project control task force weekly meetings to establish reporting requirements. Once requirements are established, monthly meetings will be held to provide reports and discussions to verify TxDOT requirements are being met.

The calculation of the Project's earned value is important for monitoring progress as well as for payment. Earned value is estimated from actual design and construction quantities as reported and maintained in CMS. Field and office engineers will update quantity books based on actual field production. The quantities are kept by cost code in CMS and will match activities in the Project schedule. As engineers report actual quantities, CMS allocates the budget based on predetermined rates. CMS computes percent complete two ways: budget earned compared to the total budget and quantity complete compared to budget quantity.

NorthGate cost control engineers progress detailed activities based on quantities complete. The quantities complete are used to generate earned value. For example, the Project schedule activities and CMS cost codes are both progressed by completed quantities and represent the lump sum breakdown of the Project Baseline Schedule.

As part of our design Project control, design progress completion is calculated on design earned value. In addition, design cost information is downloaded monthly from corporate cost accounting systems and uploaded to each of the schedule activities to calculate the actual cost of work performed.

Proposed Plan to Integrate Subcontractor Activities into Scheduling and Reporting System: Incorporating subcontracted work into the Project schedule is important for accuracy and reporting. Subcontractor work involves a variety of scopes, and often these specialized services can affect critical components. Therefore, subcontracted work scopes are updated the same as self-performed activities. Subcontractors are contractually required to attend the weekly schedule meetings to provide accurate progress updates for incorporation into the Project schedule. The segment superintendents are responsible to verify subcontractors are meeting their schedules.

Approach for Calculating Progress Performance and Preparing Payment Requests: Our Project Schedule forms the basis for progress payments from the pricing that formed the Developer's Price and Payment Curve. As the design is progressed and quantities updated, the Project Schedule is updated with final design quantities. As the Project progresses, the schedule will be updated on a percent-complete basis. The percent complete will be calculated on the basis of actual quantities of work completed compared to the updated final design quantity in the schedule. The percent complete correlates with the Developer's Price and Payment Curve from the schedule to the schedule updates, establishing monthly progress payments.

Rescheduling Approach: The method of calculating schedule performance described above ensures that our schedules reflect field realities and provide frequent opportunities for field supervisors to review actual versus planned performance and detect negative trends. If a negative trend is identified, a review of the operation will be performed to determine the cause and possible adjustments, which may involve a method analysis to develop a recovery plan

Number of Full-Time Equivalent Personnel to Perform Scheduling, Reporting, Invoicing and Other Project Controls Functions: As shown on the Project Organization Chart in Appendix D.2.16, scheduling and reporting functions are the responsibility of 20 full-time-equivalent (FTE) scheduling and field/office engineers. Invoicing is performed by 21 FTE business managers. Other document control and contract administration functions are performed by four FTE administration personnel.

C.2.5 Public Information and Communications

The NorthGate Difference

NorthGate Connections, our communications program, will provide Stakeholders accurate and timely Project information. Using NorthGate Connections, Metroplex residents, commuters and visitors will know "the road is open.".

Commitment to TxDOT Project Goals Addressed in this Section

(a) **Maintaining mobility ... through effective communication, cooperation and coordination ...**
The Public Information Team will communication information about construction activities and how to navigate through the corridor.

(b) **Reducing congestion and improving mobility within the Project area after the construction period**
The protocols for communication during construction will be continued during maintenance.

(e) **Safe construction**
Communication to the public will provide information on how to move safely through the corridor and will provide advance notifications of pending traffic switches.

(h) **Cooperation and coordination with stakeholders ...**
NorthGate Connections is the program for coordinating early and often with Stakeholders, providing avenues for input to the design and construction teams.

(i) **Use of public-private partnerships ...**
Our experience and past successes in community relations and outreach are proven to be in the public interest.

Added Value Items Included in This Section

- **NorthGate's "in-house" public information team has large urban design-build project experience combined with Tarrant County Stakeholder outreach experience.**
- **Oldfield Davis, Inc. participated in the successful "High Five" public relations program.**
- **Innovative communication tools will provide Project updates to Stakeholders.**

From our initial outreach during proposal preparation, communicating that "the road is open" is important to travel, convention and retail industries in the Cities of Grapevine and Southlake, as well as to DFW Airport travelers and employees. NorthGate Connections will be used to connect, cooperate, coordinate and communicate with Stakeholders.

C.2.5 (a) Approach to Positively Managing Community Relations

NorthGate Connections will be developed by experienced personnel who are committed to teaming with TxDOT to provide public information with "one voice." Due to the fluidity of design-build construction projects, a well-designed communication plan is essential to address changing information needs during design, construction and maintenance. The Connections team will be the conduit for information between the Project teams and external sources, including TxDOT, motorists, elected officials, residents, emergency service providers, businesses, tourists and other public agencies. These and other Stakeholders will have current information to travel the corridor, and will be made aware of changes in configuration and access.

NorthGate Connections includes an informative, user-friendly Web site to communicate specific information: advance notification of lane closures and detours; Project maps; aesthetic drawings; and a feedback outlet. For those who need more information or do not have access to the internet, community meetings will be held to allow for face-to-face interaction along with an information phone line. Elected officials will be updated regularly, enabling them to answer questions and connect with constituents. NorthGate Connections will provide innovative outreach tools as well as continue the use of previously successful tools put forward by TxDOT.

The Connections team is committed to keeping all involved agencies and Stakeholders updated by coordinating, collaborating, cooperating and communicating to make the Project efficient and safe, and to promote positive support from the community.

Description of Public Information Approach: The NorthGate Connections team approaches public information with a commitment to maintain mobility and minimize inconvenience to the community, motorists and the public, using interactive communication to:

- Effectively communicate Project information with "one voice" to all Stakeholders in partnership with TxDOT
- Provide Stakeholders with accurate and timely information using multiple communication tools
- Connect Stakeholder input with design and construction plans

NorthGateConnections

Coordination•Collaboration•Commitment•Cooperation

Our team's Public Information and Communication Program meets the Project's goal of effective communication through cooperation and coordination with Stakeholders.

Proposed Public Information and Communications Plan: NorthGate Connections, our Public Information and Communications Plan, will include the following elements:

- Engage Stakeholder groups — businesses, tourism, commuters, elected officials, residents, emergency service providers, other local agencies/utilities, property owners and transportation entities — early in the process and promote continuous involvement on appropriate issues
- Provide quality information along a timeline of proposed activities and public meetings throughout design, construction and maintenance
- Hold public meetings and open houses in coordination with TxDOT to educate customer groups about design; construction timelines and processes; impacts including utilities, traffic management and ROW; environmental concerns such as noise and dust; and DBE outreach
- Make information accessible to impacted Stakeholders in advance of activities according to the contract, such as lane closures, utility shutdowns, environmental concerns and ROW
- Provide communication tools for design, construction and maintenance information, including exhibits, aesthetics, technical information on slopes, grading, drainage and ROW to be accessed and distributed via Web site, e-mail notifications, newsletters, Project tours, signage, information hotline, speakers bureau, special events, HCRs, advertising, earned media and other printed materials
- Offer a location where design, construction and maintenance information is available to the public and act as the central information repository for Project maps, plans, detour routes and alternate commutes, distributing information in the correct form to the correct audience
- Develop procedures to collect feedback from the public to be incorporated into design, construction and maintenance, as feasible
- Produce a public inquiry response system to track inquiries and responses
- Track public support/quality of outreach program for the Project with baseline, mid-term and completion surveys
- Create the NorthGate Connections Web site, with design, construction, traffic, FAQs, Project and detour maps, event calendars and additional information
- Coordinate an approach for media relations using TxDOT's existing resources by providing appropriate media kits, public service announcements, press releases and advertising to local media
- Actively manage Stakeholder and public expectations by anticipating state-wide and local concerns and developing positive media relations that demonstrate efficient Project management
- Coordinate with traffic operations and ITS to provide timely travel information
- Implement a contingency/crisis communications (roadway or environmental incidents) plan and hold mock drills for unanticipated events
  - Develop a contact list of emergency service providers, elected officials, utilities, media, etc.
  - Notify TxDOT and all Stakeholders in a timely manner using any and all communication tools available, such as signage, media, e-mail, fax and HCR. Notifications will continue until the crisis is resolved and the Project team can continue as normal

- Supply a flexible plan within 60 days of NTP1 to reflect all contract requirements, co-location/office, communication protocols for NorthGate with TxDOT and other Stakeholders, coordinate public comment/input management (database), etc.
- Take meeting minutes to be approved by TxDOT

2.5 (b) Preliminary Public Information and Communications Plan (PIC)

Qualifications and Experience of Key PIC Staff: Given the high visibility of this Project and the importance of the public information component, our PI team will be led by Hunter Sydnor, who will be responsible for the daily activities associated with internal and external communication. As Community Relations Manager on the $1.3 billion I-25 T-REX project, Hunter worked with many stakeholders including elected officials, residents, businesses, commuters and the media during the five-year project. She also worked closely with the internal teams on ROW, environmental, aesthetics and traffic management. This experience on a design-build urban project will be applied and adapted to meet the needs of TxDOT and the DFW Connector Project. The team will incorporate the experience of local DBE firms, including Judy Meyer from Public Information Associates and Rachel Davis of Oldfield Davis, Inc., as well as other third-party firms with similar expertise.

Addressing Community and Stakeholder Concerns: Community and Stakeholder concerns will vary during the different phases of design, construction and maintenance. NorthGate Connections is the coordinating tool between the community, Stakeholders, and the construction and maintenance crews. Community and Stakeholder input will be encouraged through the Web site, information hotline, public meetings and at the Public Information Office. The team will collaborate to resolve concerns among the community, changing schedules if necessary to accommodate public events and holidays such as GrapeFest; accommodate weekday church services and holiday shopping hours; or provide additional signage for community events.

Proposed Communication Strategies: Today's communication strategies and tools will change to adapt to current technologies. In turn, Stakeholders look for tools that work best to meet their needs. Communication tools for each Stakeholder group include the following:

Figure C.2.5-1 Stakeholder Communication Strategies

Community/ Stakeholder	Representative Activity	Types of Communication Methods
All Stakeholders	Mobility Impacts	Static signage, DMS, weekly e-mail notifications, weekly closure press release, Web site, information hotline, HCRs, detour maps and media/electronic and print
Commuters, commercial, emergency services	Lane size reduction, closures, shifts (2 weeks in advance for closures more than 1 day; 24 hours in advance of 1-day closures), access change, new signage, incident	E-mail to cell phone, dedicated radio frequency, coordination with GPS providers and presentation to organizations
Businesses	Access change,new signage and traffic congestion	Business walks, presentations to business organizations and information to large employers to distribute to employees via internal media
Tourism, retail businesses	Access change, traffic congestion	E-mail to cell phone, dedicated radio frequency, coordination with GPS providers, DFW Airport signage, updates in Rental Car Center and in cars, to taxis, limousines, tour busses, hotel rooms and concierges
Residents	Access change, new signage, incident, noise/dust, utility shut-offs, ROW, haul routes	Door hangers, neighborhood walks, e-mails, HOA meetings, direct mail, stickers on newspapers
Elected officials	Lane size reduction, closure, shifts, noise/dust, ROW, utility shut-offs, haul routes, access change, new signage, incident	Attendance at constituent meetings, elected officials briefings, direct mail, newsletters
Utilities, railroads, transportation authorities	Lane size reduction, closure, shifts, noise/dust, ROW, utility shut-offs, haul routes, access change, new signage, incident	Newsletters, participation on task forces, personal meetings

Methodology for Capturing and Resolving Issues from the Public: To monitor the success of the Project and to be responsive to the public, a current database of all public contacts will be maintained. All questions, comments or complaints received will be entered into the database, along with the response and plan of further action as needed. Additionally, all contacts with the Stakeholders will be recorded, including meeting minutes, correspondence and phone conversations. Reports will be provided to TxDOT and reviewed for lessons learned, needed changes to communication tools and updates to the NorthGate Connections program.

Methodology for Working with the Media: Media, whether print or electronic, is the most efficient tool to communicate to Stakeholders. Developing a positive relationship with the media will encourage more media coverage, providing a greater opportunity to inform the public and increase public support of the Project.

A project of this magnitude will create pubic interest; therefore, NorthGate Connections will provide weekly construction schedule and closure press releases. Additional press releases and media kits will be sent to encourage media coverage of milestone events. In collaboration with TxDOT PI, Project tours and "earned media" stories will be offered and key Project team members will receive media training. Advertising will be created on an as-needed basis using the most effective and efficient media outlets for each audience. The NorthGate Connections team is committed to developing a positive relationship with the media, providing them with accurate and timely information. All media releases and media contacts will be approved by TxDOT, and all media-initiated contacts will be documented and forwarded to TxDOT.

Innovative Added Value Outreach Tools: Providing accurate and timely information to the public with a consistent message that "the road is open" is the goal of the NorthGate Connections program. The team will use innovative added value outreach tools such as:

- Dedicated radio frequency
- Mirror hangers for rental cars with construction/detour information
- Posters with information at DFW baggage claim, rental car lobby, hotels and shopping centers
- Stickers on newspapers
- Information to GPS providers
- Participation/booths at community events
- Speakers bureau
- School programs
- E-mail alerts to cell phones
- Video/photo documentation of Project progress

Reviewing public comments and surveying annually will allow the team to update the communications plan and ensure a high level of public support. Everyone in the Metroplex will have information to navigate through the corridor and will consider this Project a resounding success and money well spent.

C.2.6 Environmental Management

The NorthGate Difference

NorthGate will implement a proven process to maintain high standards for environmental quality and preservation, while minimizing construction impacts.

Commitment to TxDOT Project Goals Addressed in this Section

(d) Securing quality design, construction and capital maintenance services ...; and (i) Use of public-private partnerships ...
We have integrated our Quality Management Plan and Environmental Compliance Plan through ISO 14001 standards and implementation.

(f) Expediting delivery of Project improvements
Proper compliance measures and reporting eliminate Project delays for environmental non-compliance.

Added Value Items Included in This Section

- We will perform quarterly audits for compliance.
- Our plan involves recycling 1.3 million tons of concrete and asphalt to minimize impacts to local landfills.
- Through efficient trucking logistics, we will reduce diesel emissions by 100,000 gallons.
- An environmental hazard analysis is incorporated into daily work plans.
- Environmental commitments will be coordinated through design, construction and maintenance using our ISO 14001-compliant and TxDOT-approved Environmental Compliance and Mitigation Plan.

Our Environmental Compliance Plan is the responsibility of John Rutkauskas, Environmental Compliance Manager (ECM), reporting to Keith Sasich, Project Director. This ensures that the team is proactive in preventing, minimizing and correcting noncompliance with environmental approvals to achieve our goal of zero environmental violations. The success of this plan is based on:

- Incorporating environmental compliance in the design
- Incorporating environmental compliance in construction work plans
- Ongoing training of all staff and subcontractors to ensure environmental compliance
- Establishing a good working relationship with regulatory staff and inspectors
- Quarterly audits for compliance

C.2.6 (a) Environmental Management Approach to Environmental Compliance, Permitting, Applicable Laws, Rules, and Regulations

Primary permits and our approach to meeting environmental laws and regulations are shown in Figure C.2.6-1. Early identification of these required permits will enable NorthGate to proceed with agency coordination immediately following Notice of Award.

Figure C.2.6-1 Environmental Permitting Requirements

Permit Description	Issuing Agency	Approach
TPDES(1) Stormwater	TCEQ (2)	Upon NTP1, NorthGate will develop a stormwater pollution prevention plan and submit a Notice of Intent (NOI) seeking coverage under the TPDES permit.
TPDES Stormwater	Southlake and Grapevine "MS4"	Upon NTP1, notify MS4 prior to commencement of construction activities.
Excavation dewatering discharge permits	TxDOT; local municipalities	NorthGate to provide.
Clean Water Act, Section 404 and 401	USACE(3)/TCEQ	TxDOT responsible. NorthGate to provide preconstruction notification and comply with 401 BMP, particularly at Grapevine Creek and Cottonwood Branch NWP 14-PCN.

Permit Description	Issuing Agency	Approach
Clean Water Act, Section 402 (TPDES)	TCEQ	NorthGate to provide.
Archaeology/Historic preservation	SHPO (4)	If needed, TxDOT provides with supporting technical reports from NorthGate.
Asbestos Abatement Permit	TCEQ; possible local municipalities	On all utilities and/or properties where asbestos-containing material (ACM) is identified, NorthGate will provide abatement permitting prior to remediation.
Investigation/remediation of other discovered contamination	TCEQ	14 possible locations where contamination may reside were identified. Following NTP1, investigations will delineate areas of concern prior to disturbance.
Off-Site Disposal	TCEQ	Prior to transporting materials to off-site disposal location, NorthGate will conduct a site assessment to verify and document the facility meets regulatory approval.
Variance to Noise Ordinance	Cities of Grapevine and Southlake	Prior to start of any work requiring variance to city noise ordinances, NorthGate will meet with city regulators to ensure compliance.
Air Emission Permits	TCEQ	Concrete, asphalt or crushing plants will have required air emission permits. NorthGate will comply with non-attainment issues associated with permits.

(1) TPDES: Texas Pollution Discharge Elimination System, (2) TCEQ: Texas Commission on Environmental Quality, (3) USACE: United States Army Corps of Engineers, (4) SHPO: State Historic Preservation Office

C.2.6 (b) Planning Commitment Integration Methods

To achieve zero environmental violations, we will use our Quality Management Plan (QMP) as a framework to verify and document that services and products conform to the contract, design drawings, Project specifications and applicable environmental rules and regulations during design, construction and maintenance. NorthGate will use the following methods to ensure environmental compliance:

Figure C.2.6-2 Environmental Compliance Steps

Project Phases	Environmental Compliance Steps	
Design	Database development of environmental commitments, training of design team on environmental database content and task force cross-discipline interface.	Incorporation of environmental requirements, verification of implementation, environmental sign-off of plan sets issued for construction.
Construction	Work plans incorporating environmental commitments, Indoctrination and continued training of employees and subcontractors.	Audits and inspections of construction activities to ensure compliance, documentation of processes and closure of environmental permits.
Maintenance	Monitor assets for continued compliance and maintenance work plans to ensure compliance.	Notify TxDOT of impacts jeopardizing their compliance.

Environmental Protection and Training Plan: Environmental professionals will instruct all construction personnel, including subcontractors, in the areas committed to by TxDOT in the NEPA process, permitting and other agreements. They will have an understanding of not only what is proposed to be constructed but the parameters within which construction must comply with prior approvals. Environmental compliance will be emphasized to maintain quality and the construction schedule.

Environmental Compliance Manager: The ECM will be the focal point for all compliance monitoring activities and will be the single point of contact for issues related to commitments. The ECM will be the bridge between the commitments made in the NEPA document, permits and any MOUs/MOAs by TxDOT and compliance with those commitments during design and construction. All reports of non-compliance with those commitments will be made on a daily basis in parallel with such incidents being reported to the resident engineering staff.

To ensure that all federal, state and local regulations are implemented, NorthGate has dedicated an experienced team to implement environmental processes throughout design, construction and maintenance.

C.2.7 Design Management

The NorthGate Difference

Our design management plan and organization efficiently delivers a design-build product adaptable to construction constraints and continual improvement. This approach incorporates flexibility and creativity in achieving Project goals.

Commitment to TxDOT Project Goals Addressed in This Section

(a) Maintaining mobility through the Project ...
Early design packages maximize quick, safe movement of traffic through the construction zones.

(d) Securing quality design, construction and capital maintenances services ...
NorthGate designers interface with construction personnel through task forces to integrate constructability and durability into the design.

(f) Expediting delivery of Project improvements
Co-locating TxDOT, the Professional Services Quality Review Firm, designers and construction personnel efficiently completes the design in two years.

(h) Cooperation and coordination with Stakeholders ...
Designers interact with the Public Information team to stay informed of community interests and concerns.

Added Value Items Included in This Section

- An experienced Design-Build Coordination Manager conducts constructability reviews and ensures compliance with quality and environmental commitments.
- Our design and construction team has over 25 years of mega design-build and DFW regional project experience.
- Our core design-build management team that developed the proposal's technical solutions, including our "Smart Start" strategy, is dedicated to continuing through Project completion.
- Task forces enable an integrated approach with the owner for achieving and exceeding CDA requirements.

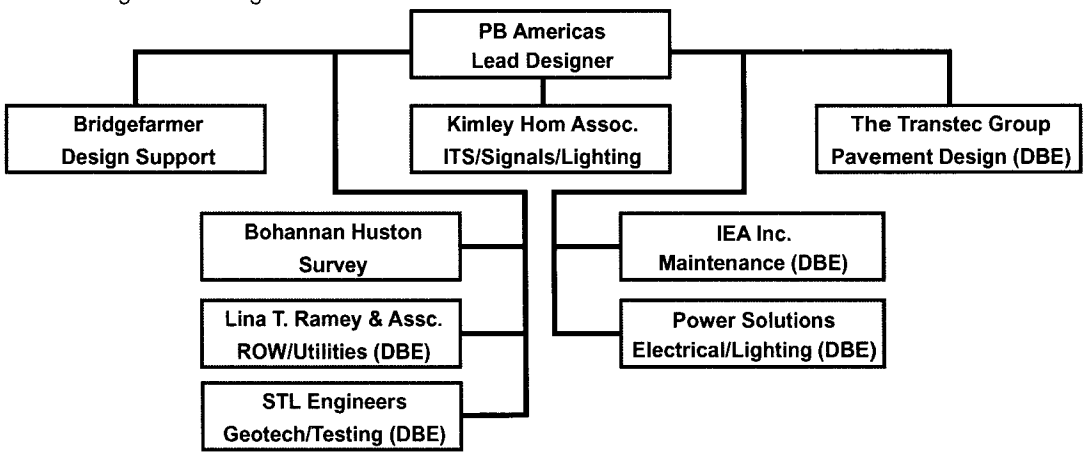
NorthGate's design organization is structured to deliver the design on time, incorporate lessons learned from previous projects and provide the best value to TxDOT with the least impact to the public. Our approach will incorporate TxDOT goals to reduce congestion, enhance safety, expand economic opportunity, improve air quality and increase the value of transportation assets. NorthGate provides the following expertise:

- Knowledge of TxDOT's standards and specifications
- Efficient delivery of design packages
- Design team with ISO 9000 certification
- Ability to work closely with Stakeholders
- Proven ability to complete the design on time and meet the construction schedule
- Post-design services to incorporate field changes

C.2.7 (a) Managing Development and Coordination of Design

The design team was integrated into the NorthGate team during due diligence and design development during the proposal process. The design effort is led by Dale Moeller, P.E., Design Manager. Dale is supported by Ivan Nicodemus, P.E., Deputy Design Manager. Three design managers are responsible for each of the three segments. These managers are supported by a design team and key subconsultants: Bridgefarmer (civil and structures), Kimley-Horn (ITS, signalization, signage and lighting) and TransTec (pavement). Other design subconsultants will complete the team (Figure C.2.7-1).

Figure C.2.7-1 Design Team Organization



Tim Nelson, Design-Build Coordination Manager, coordinates the design and constructability effort. He will be fully engaged with the design team and the design coordinators (Figure C.2.7-2). Tim and Dale will co-chair management and design meetings and involve task forces to ensure that CDA requirements and TxDOT interests are incorporated into the design documents. Management of the design effort is based on a detailed design schedule that is integrated with the construction schedule. The design effort will be complete within the first two years of the Project.

Figure C.2.7-2 Design Management Organization.

Discipine/Segment	Construction Lead	Design Lead	Discipine/Segment	Construction Lead	Design Lead
D-B Coordination	Tim Nelson	Dale Moeller	ITS/Electrical/Signage	Jeff Whitehead	Brian Shewski
West Segment	Bill Massingill	Jim Langston	Geotechnical	Jason Gumm	Hugh Kelly
Middle Segment	Randy Martin	Andy Fries	Utilities	John Schulte	Dick Grice
North Segment	Rich Westerheid	Mark Frye	Drainage	Fred Polivka	Dick Kraus
Quality	Mark Brown	David Williams	Right-of-way	Steve Evans	Ivan Nicodemus
Paving	Curt McMillian	Richard Rogers	Environmental	John Rutkauskas	Becky Blatnica
Structures	Paul Powers	Osama Sharaway	Traffic Control	Isaac Klem	Brian Shewski
Grading	Preston Bowin	Hugh Kelly	Survey	Jim Bodi	Ivan Nicodemus

Design of Connecting Projects, Right-of-Way, Survey, Environmental Permitting, Utilities, Community Relations and Safety Issues: The design and construction discipline task force leaders will meet together on a weekly basis to discuss interdisciplinary issues arising from management meetings. The weekly meetings will serve as the key communication process to properly incorporate all issues into the design, bringing issues from each segment into the process. The surest way to provide consistency of design is to:

- Establish and document standards and procedures
- Coordinate over-the-shoulder reviews with TxDOT
- Communicate all requirements to the full team
- Limit variability among team members
- Expect high quality and inspect results

The methods in Figure C.2.7-3 ensure that key issues will be addressed:

Figure C.2.7-3 Design Coordination

Design Issue	Planned Approach
Connecting Projects	Meet with the management team weekly to learn of connecting projects. This information will be incorporated into the design schedule (Section C.1.1.4).

Design Issue	Planned Approach
Right-of-Way	Designers will use aerial flights to establish ROW and surveyors to establish monuments and boundaries. This will ensure that accurate data is incorporated into design documents (Section C.1.1.5).
Survey	Aerial flights will establish data for a base map. This information will be entered into 3-D modeling software. Surveyors will shoot lines for roadway surface, gutter, and drainage of adjacent properties to ensure accurate tie-ins..
Environmental Permitting	The environmental team will incorporate areas of concern, such as wetlands and potential ground contamination (Section C.1.1.8).
Utilities	Designers will use Level A SUE to establish utility coordinates (Section C.1.1.6).
Community Relations	Designers will interact with the PI team to stay informed of community interests and concerns (Section C.2.5).
Safety	Safety will be incorporated into the design (Section C.2.1 (j)).

C.2.7 (b) Approach for Delivering Design

Based on our construction schedule, a design schedule was developed to identify submittal packages for TxDOT approval. We have identified those packages that must be constructed early to maximize quick, safe movement of traffic through the construction zones. Weekly scheduled meetings to discuss design status ensure that the team is working on the same construction priorities.

Location of Designers: The design management staff and the Professional Service Quality Review Firm (PSQRF) will be co-located in the Project hub office with TxDOT and the construction staff. This will ensure that communication among team members is accomplished on a daily basis, enabling design conflicts and constructabliity issues to be discussed and resolved quickly.

Other Design Firms/Design Office Integration and Coordination: The design management staff is supported by local design offices – 60% of our design offices are located in Texas. The remaining design will be performed in offices in the U.S. and will be linked by state-of-the-art communication and drawing control systems.

NorthGate's Web-based document management system allows collaboration and communication among disciplines to support the design effort. ProjectWise, a CADD drawing control system, provides electronic check-in and check-out, and is used to post designs for Web-based review of drawings and design concepts. Online availability of designs reduces the overall time required for reproducing document sets for quality control, interdisciplinary and other reviews.

The Design Quality Management Plan (DQMP) will serve as a tool to define quality requirements using checklists to be incorporated into the design documents. All subconsultants will be required to follow the project DQMP. (Appendix D.2.B Project Quality Plan).

David Williams, P.E., Design Quality Control Manager, will lead the design quality effort. Located in the Project hub office, he will manage the quality of plan presentation, with assistance from CADD staff members who will prepare drawings in accordance with the DQMP. Design managers will conduct interdisciplinary reviews of each design package, including a compliance review of commitments made and restrictions identified in the environmental documents. Once design packages meet the requirements of the DQMP, they will be passed on to the PSQRF as directed by TxDOT.

The PSQRF will provide certification of compliance reviews on selected intermediate design packages, which are then submitted to TxDOT for over-the-shoulder review and back for Final design preparation. The PSQRF will provide certification of compliance reviews for all Final design packages before submittal to TxDOT for review and release for construction.

Summary of Level of Completion at Each Design Review Stage: The interim, revised and Final reviews of each design package will be progressively completed. The following requirements will be observed:

- A quality control checklist will ensure compliance
- Proposed designs will be constructible and maintainable

Task forces were developed in the proposal phase and will continue and expand as design progresses. They are responsible for:

Linking project participants
Tracking issues and schedules
Contract compliance
Constructability input
Design consistency

- Specific TxDOT standards will be incorporated
- Final quality control review will verify that the design meets the DQMP

The DQMP will control all design functions and processes and serves as the guiding document to ensure compliance with design parameters and TxDOT standards and specifications.

C.2.7 (c) Design, Construction and Maintenance Personnel Interface

Designers will interface with construction personnel through task forces. NorthGate established 12 task forces during the proposal effort to optimize design and constructability. Upon award, these same task forces will meet weekly to integrate constructability and durability features into the design. Off-site designers will participate in meetings via teleconferencing and will visit the site on a scheduled basis. The Design-Build Coordination Manager will conduct constructability reviews and ensure compliance with quality and environmental commitments.

Along with NorthGate's design and construction staff, TxDOT representatives will be involved in task force meetings. The task forces will ensure that the construction and management approach to roadway, drainage, structures, aesthetics, traffic, utilities and traffic control follows Project goals.

Each discipline task force will have a task force leader from the design team. A design-build coordinator from the construction team will interface on a daily and weekly basis to provide constructability input to ensure that the design meets CDA requirements. The design-build coordinators are superintendents with experience in constructing their specific work discipline. They will conduct constructability reviews of all design packages and provide comments to the designers during each submittal phase. Task force functions change as the Project moves from the design phase into construction. When both design and construction are active, the team benefits from superintendent input to make design adjustments and produce a better product. Maintenance will extend the processes used during design and construction.

C.2.8 Maintenance and Traffic Management During Maintenance Period

The NorthGate Difference

Our Maintenance and Traffic Management Plan will facilitate efficient management and operation of the roadway and the managed lanes throughout the maintenance period while ensuring motorist safety.

Commitment to TxDOT Project Goals Addressed in This Section

(b) Reducing congestion and improving mobility within the Project area after the construction period
We will maintain traffic flow by scheduling pavement and bridge inspections at off-peak times. Advance notification and proper coordination of all lane closures will be performed.

(d) Securing quality design, construction and capital maintenance services ...
Our MMP includes a database to prioritize and schedule work, to document improvements and obtain TxDOT approval. This will ensure that the roadway and structures are maintained for maximum use and life cycle optimization.

(h) Cooperation and coordination with Stakeholders ...
NorthGate's maintenance management team will establish relationships during the construction period.

Added Value Items Included in This Section

- **Local resources will be deployed efficiently and quickly, with large construction operations within 10 minutes of the Project.**
- **Quality and maintenance staff will transition from construction to the capital maintenance program.**
- **An experienced maintenance manager performed warranty work on the I-25 T-REX and I-15 projects.**

C.2.8 (a) Approach to Interfacing and Coordination

NorthGate will implement a CMA inspection and maintenance program to conduct inspections and repairs throughout the maintenance period. We will undertake these activities during off-peak hours when operations least

impact traffic. All non-emergency lane closures and traffic interruptions will be implemented only after the schedule has been discussed and the plan has been agreed to during the weekly maintenance meetings. All non-emergency maintenance and/or Category I Defects repair work will be presented in the approved annual Capital Maintenance Schedule. An approved TMP will provide the procedures and processes to follow, and individual TCPs with specific details will be submitted to TxDOT and affected local agencies at least two weeks prior to any operations requiring lanes or shoulders to be taken. These plans will be reviewed on the look-ahead schedule at the weekly maintenance meetings as well. The communications and notifications tools identified in Section C.2.5 Public Information and Communications will also be implemented to ensure that work is coordinated with the toll provider for the managed lanes, local agencies, business groups, other Stakeholders and TxDOT prior to implementing traffic control measures. Protocols, policies and specific TCP procedures for emergency events will be pre-planned, agreed to and implemented as detailed in the TMP and the NorthGate Incident Management Plan.

The Maintenance Manager and Maintenance Quality Manager (with a combined total of 45 years experience) will participate as team members during design and construction and will transition to lead maintenance activities as substantial completion for the CDA is initiated.

C.2.8 (b) Traffic Control and Management during Term of Capital Maintenance

Coordination with other contractors may include sharing a lane closure to minimize impacts to the traveling public. Ongoing communication between TxDOT, the tolling provider for other jurisdictions, stakeholders and maintenance personnel will ensure that those affected by construction will be aware of planned work. We will be proactive in providing information to other stakeholders and the public when they are impacted.

Work either in closed lanes or otherwise adjacent to moving traffic will be conducted in compliance with federal, state, and local work safety regulations and in accordance with best industry practices. When appropriate, local and state police may be used to maintain traffic flow and the safety of workers.

C.2.9 Mentoring and Job Training

The NorthGate Difference

NorthGate is committed to implementing an aggressive Mentoring and Job Training Plan to allow subcontractors/DBE firms to grow their businesses and work on this and subsequent TxDOT construction projects.

Commitment to TxDOT Project Goals Addressed in This Section

(d) **Securing quality design, construction and capital maintenance services ...**
NorthGate's subcontracting program brings skilled and qualified firms specializing in needed disciplines.

(e) **Safe construction**
All subcontractors will receive Project safety training and specialized safety training for their discipline.

(g) **Facilitating participation by DBEs, women-owned business enterprises and minority business enterprises ...**
Continued outreach, participation in TxDOT's LINC and Texas Business Opportunity and Workforce Development (TBOWD) programs and our mentoring and training program encourage DBE participation.

(i) **Use of public-private partnerships ...**
Our mentoring and job training constitute industry-leading D/SBE processes.

Added Value Items Included in This Section

- NorthGate's education/training programs help D/SBE firms grow and enhance their services.
- We will exceed the Project's DBE goal by attaining 13% DBE participation.
- NorthGate personnel bring proven experience from their involvement on the $200 million T-REX DBE program.
- We identify work that can be packaged into subcontracts sized for D/SBE capabilities and capacity.

On April 17, 2008, NorthGate held a Business Opportunity Briefing for Disadvantaged Business Enterprises (DBEs), women-owned business enterprises and minority business enterprises, which attracted 112 firms. Also in April, we

launched the NorthGateConstructors.com Web site to provide the community with information about the Project, the NorthGate team and subcontracting opportunities. More than 100 DBE firms have submitted information through the Web site. NorthGate's outreach will continue throughout the design, construction and maintenance phases of the Project. Part of that outreach effort is our Mentoring and Job Training Program. NorthGate personnel bring proven experience from their involvement on the I-25 T-REX DBE program.

C.2.9 (a) Approach to Utilize and Train DBEs

NorthGate's approach to ensuring participation from small and disadvantaged firms is to provide sufficient bidding information, including a clear understanding of the work package and all scope requirements. Assistance and training will be provided on how to submit a compliant and cost-effective proposal and successfully execute a subcontract. Through our outreach and mentoring/training programs, we are confident we will achieve 13% DBE involvement. On the T-REX project, we implemented a subcontracting program which paid out more than $200 million to the local DBEs, women-owned business enterprises and minority business enterprises.

Standard Subcontracting Methods to Effectively Manage Subcontractor Performance: All subcontracts will be managed and approved by TxDOT using standard subcontracting methods based on best practices and expertise gained on previous projects. Our methods and procedures are compliant with the guidelines set forth in 49 CFR Part 26. There will be a designated person who will monitor subcontractors, administer contracts and provide reporting. To meet TxDOT's goal of maximizing DBE, women-owned business enterprise and minority business enterprise participation opportunities, bid packages are divided into economically feasible units, based on specification requirements, estimated quantities, traffic control requirements, schedule constraints and other information. Before beginning work, all employees and subcontractors must provide proper identification and work authorization documentation, and successfully complete drug and alcohol screening.

Outline of DBE Work Areas: There are many excellent DBE firms, women-owned business enterprises and minority business enterprises in the Metroplex as well as in the state that can provide quality work on this Project. Areas currently identified as subcontracting opportunities for DBE firms are shown in Figure C.2.9-1. NorthGate will develop additional subcontracting, service and supply opportunities throughout the Project's design, construction and maintenance phases.

Figure C.2.9-1 DBE Participation Opportunities

Scope of Services	% of Total Value	Scope of Services	% of Total Value
Diesel fuel supply	100% (60% for supply)	MSE walls	35%
Electrical subcontractor	20%	Utility relocation	25%
Design	15%	Building demolition	70%
Hourly trucking	50%	Traffic control supply	15%
Aggregates	60%	Fencing	50%
Reinforcing installation	100%	Flat work / curb and gutter	100%
Reinforcing F&I	100%	Roadway sweeping and cleaning	50%
Professional services QA	100%	Printing and copying	50%
PI Web site development	100%	Painting	100%
PI consultation	100%	Guardrail	100%
Janitorial services	100%	Pavement markings/striping	100%
Catering services	50%	Erosion control	100%
Pre-cast barrier	30%	Landscape seeding	100%
Pre-cast coping	30%		

Training and Continuing Education

All craft, administrative personnel, management staff, subcontractors and their employees will receive Project orientation training before commencing work. This new hire training, available in both English and Spanish,

communicates our safety, quality and environmental policies, procedures and practices, along with job-specific information.

NorthGate is committed to providing continuing education for DBEs, women-owned business enterprises and minority business enterprises and their employees that will enable them to grow their businesses and gain new skills. Educational topics for workshops may include contracting, proposal writing, estimating, financial management/budgeting, document control, procurement, enhanced safety and marketing. Instruction for training and educational programs will be provided by local business leaders and construction professionals.

Klewit and Zachry are leaders in partnering with TXDOT on DBE business development programs, Texas Business Opportunity and Workforce Development programs (TBOWD) and the TxDOT Small Business LINC.

Environmental and Site-Specific Training: Scheduled training on environmental and site-specific topics will be available to all NorthGate employees and subcontractor personnel throughout the Project. These topics include:

- Understanding environmental protection commitments
- Proper lifting and pinch points
- Fall protection
- OSHA requirements
- Preparation of operational Hazard Analysis
- Confined spaces
- Quality inspection and hold points
- Specific safety topics
- Excavation and trench safety
- General work zone safety

C.2.9 (b) Plan for DBEs and Small Business Mentoring

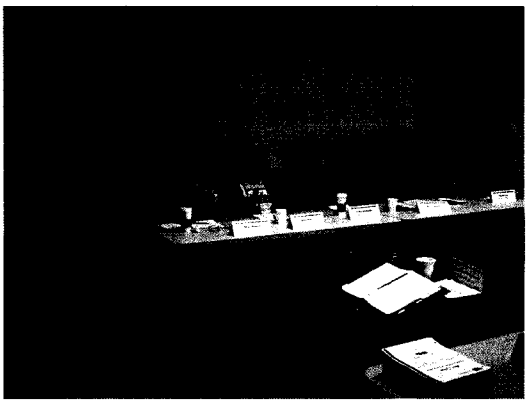
The mentoring plan provides an experienced construction professional to assist and guide DBE and Small Business Enterprises (D/SBE). The plan also provides training and continuing education workshops. Every D/SBE on the Project will be assigned a mentor upon contract execution. This mentor, an experienced NorthGate professional, will serve as a guide, providing relevant information and working with the D/SBE to ensure quality work is performed safely and efficiently.

Program Goals: Our mentoring program will enable D/SBE partners to successfully complete their work on time and on budget, while meeting the Project's quality standards and without accidents or significant incidents. The program will be in place throughout the design, construction and maintenance phases. The goal is to improve D/SBE work skills, business management and capacity to grow their business.

Mentoring Program for Educational Workshops: In addition to the training and continuing education outlined above, NorthGate's mentoring workshops provide additional training/education in targeted technical disciplines such as:

- Crane safety
- Control room operations, including Intelligent Transportation Systems
- Compliance – administrative and contractual requirements of TxDOT's CDA programs
- Working within environmental constraints – e.g., air quality, hazardous ground materials and water

Workshop topics and frequency will be flexible and determined in accordance with the feedback, requests and observed needs and wants of the D/SBEs and their employees, and in partnership with TxDOT. Short-term workshop goals include addressing immediate, observed needs for skill-sets and/or information. The long-term goal of the workshop is to raise the knowledge level of our D/SBE partners on a range of topics from "beginner" to "advanced." Workshops will be available to all registered D/SBE firms and advertised through local organizations and TxDOT.



More than 5,000 people attended the free business training programs funded by the I-25 T-REX project.

Workshops for Bonding and Insurance Requirements: Workshops explaining Project insurance coverage and performance and payment (P&P) bond requirements will be offered to the entire DBE community throughout the life of the Project, as we anticipate

an ongoing need for new D/SBE firms. These workshops allow interested D/SBEs an opportunity to ask questions, review subcontract quotations and improve their ability to obtain insurance and/or bonds. NorthGate may consider waiving the P&P bond requirements to give some D/SBE firms an opportunity to participate.

Procedures and Methodologies for Dividing Work into Economically Feasible Units: NorthGate will divide work into package sizes that can be easily performed by D/SBEs, wherever possible. While package sizes vary depending on the scope and urgency of the work to be performed, we take the capability and capacity of our potential D/SBE partners into consideration at all times.

C.2.9 (c) Criteria for Evaluating Effectiveness of Small Business Program

Effectiveness will be determined by the number, type and attendance at workshops, the quality of work provided by our D/SBE partners, and the number of firms participating on the job. D/SBEs will also evaluate the quality of mentoring they receive.

C.2.9 (d) Description of Individual Job Training Plan

NorthGate is committed to building a workforce that is qualified and capable of generating supervisory personnel for this and future projects. NorthGate's plan will be modeled after the current Kiewit foreman/superintendent career development program and Zachry's job training program. The plan will provide training to move employees, especially women, black, Hispanic and other minorities, to a foreman or superintendent level, in the disciplines of grading, paving and structures.

Proposer's Mentoring and Job Training Plan Incorporated into CDA Documents: After TxDOT's review, comment and approval, our Mentoring and Job Training Plan will be incorporated into the CDA Documents as Exhibit 8, upon award of the CDA, and into the CMA Documents as Exhibit 5.

Proposed Plan to Integrate Subcontract Activities into Scheduling and Reporting System: Subcontracted work is included in the Project schedule to maintain accuracy and for reporting purposes, and is updated the same as self-performed activities. Our subcontractors and suppliers are introduced to the Project schedule during negotiations, to ensure clear understanding of our needs and expectations.

Project Management Plan

Quality Management Plan

C.3

NorthGate Constructors

C.3 QUALITY MANAGEMENT PLAN

The NorthGate Difference

NorthGate's quality management team's exemplary experience implementing contractor-controlled quality programs on urban design-build projects. Our Quality Management Program (QMP) provides proven processes to verify the Project meets or exceeds contractual requirements.

TxDOT Project Goals

(d) Securing quality design, construction and capital maintenance services ...
Implementation of the QMP by our quality organization results in "doing work right the first time."

(f) Expediting delivery of Project improvements ...
Quality workmanship through our industry-leading processes eliminates rework and helps maintain schedule.

(g) Facilitating participation by DBEs ...
Significant DBE participation is achieved through our Professional Services Quality Review Firm and Construction Quality Acceptance Firm.

Added Value Items Included in This Section

- **ISO certification verifies a single set of process requirements that are universally recognized and respected.**
- **Quality managers from design, construction and maintenance participate in design task forces to aid in planning, implementation, review and continual improvement.**
- **We have adapted our industry-leading contractor quality initiatives and programs to a Project-specific QMP.**
- **Unique to NorthGate is "MICK" (mobile information communication system), an electronic quality inspection, testing and reporting system designed to improve access and analysis of both qualitative and quantitative quality data.**

C.3 (a) Proposed Design, Construction and Maintenance Quality Program Organization

Rigorous implementation of the Quality Management Program (QMP) is key to achieving high-quality design, construction and maintenance. This will ensure we exceed TxDOT's technical requirements and allow hand-back at completion of the CMA. Through our team's collective experience in areas of quality management, NorthGate will provide initial and long-term Project value.

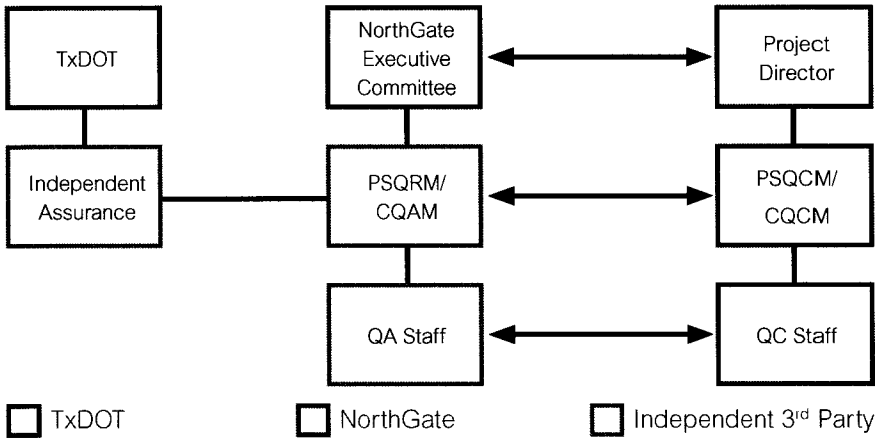
Our team members have pioneered industry-leading quality management programs on some of North America's largest design-build urban transportation projects, including the recently completed I-25 T-REX project in Denver; the I-15 Corridor Reconstruction in Salt Lake City; the Tacoma Narrows Bridge in Washington; the Sea-to-Sky Highway in British Columbia; and the Katy Freeway in Houston. Our team member experience establishes NorthGate's quality management organization as the leader in the industry. Since 2001, NorthGate's joint venture partners have implemented corporate-wide quality initiatives based on the understanding that owners demand quality-end products meeting their requirements and expectations.

Our quality organization is supported by NorthGate's corporate emphasis on quality, which focuses on knowing the requirements, doing work "right the first time," exceeding owners' expectations and promoting continuous improvement. Management training, full-time quality managers and quality measurement systems for tracking, reporting and analyzing rework to increase supervisor, subcontractor and workforce quality accountability. Workforce quality is conducted through pre-activity meetings, pre-operation meetings, daily toolbox meetings and weekly foremen meetings. Pre-activity meetings are attended by construction supervision, quality staff and owner staff to review the work plan, including applicable quality requirements, tolerances and check points. Our motto "what gets measured gets attention" is applied to our quality measures for quality plan performance, quality incidents by root-cause, and owner evaluations.

The DFW Connector presents unique design and construction challenges, which require a Project-specific QA/QC approach. Therefore, we have adapted our corporate quality program to be in alignment with TxDOT's Project requirements.

Our quality management organization is structured as an integrated team with responsibility for quality delegated to the people most capable of affecting the end product. Figure C.3-1 illustrates our integrated structure with TxDOT. This structure maximizes organizational efficiency while maintaining high standards for quality.

Figure C.3-1 Project Quality Management Organization

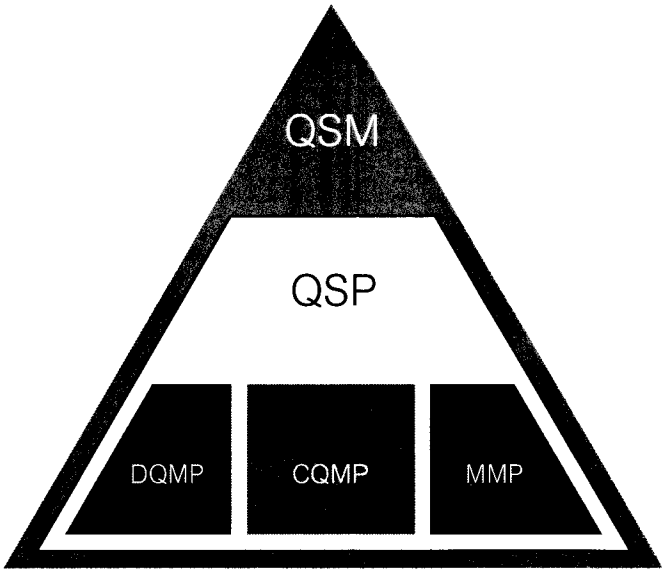


Arrows indicate lines of communication for coordination and collaboration; testing is independent.

NorthGate has developed a QMP that fully documents the quality management process and approach, and is ready to use at NTP1. The QMP underscores the commitment to quality and quality improvement for all elements of the work, and will be further refined and improved, then finalized well before NTP2. The plan includes quality management activities for design, construction and maintenance, which documents and verifies that the Project meets or exceeds contract requirements. The QMP meets the requirements of the International Organization of Standards (ISO) 9001:2000 for quality management systems. Although not required by the CDA, NorthGate will achi eve ISO 9001 certification within 12 months of NTP1.

The first component of the QMP is the Quality System Manual (QSM), a high-level document that describes NorthGate's quality management system, our approach to quality planning, quality acceptance, quality control and quality improvement (Figure C.3-2). The QSM describes the systems to meet NorthGate's requirements, CDA/CMA requirements and the ISO 9001:2000 standard for quality management. Example categories contained in the QSM are: Management Responsibility, Resource Management, Product Realization, Purchasing, Measurement and Improvement. The QSM is included in Appendix D.2.B Project Quality Management Plan (PQMP).

Figure C.3-2 Quality Management Plan Overview



The Quality System Procedures (QSPs) are the next level of the QMP and contain the procedures to meet performance requirements. The QSPs include the required six procedures to be compliant with ISO 9001:2000 standards: (i) document control, (ii) control of records, (iii) control of nonconformance, (iv) internal auditing, (v) corrective action and (vi) preventative action. These procedures are applicable to all phases of the work including design,

construction and maintenance, and describe how to fulfill the QSM requirements to achieve quality and who is responsible for the process.

The foundation of the Project Quality Management Plan consists of:

- Design Quality Management Plan (DQMP)
- Construction Quality Management Plan (CQMP)
- Maintenance Management Plan (MMP)

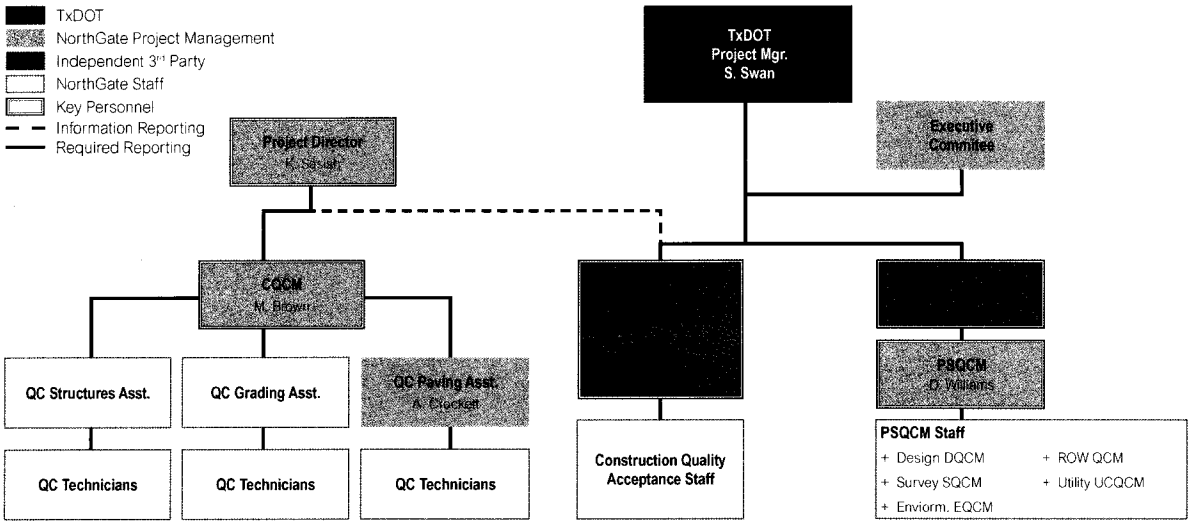
The CQMP, DQMP and MMP contain the specific procedures for quality and quality improvement.

C.3 (b) Quality Management Structure Organizational Chart

NorthGate's commitment to quality begins with the Joint Venture Executive Committee empowering the quality management team to develop and operate the quality program with the authority to effect change and provide leadership for successful implementation. The Joint Venture Executive Committee participates in reviewing the QMP for continuous improvement. NorthGate has created an integrated quality management staff including: a Professional Services Quality Control Manager (PSQCM), a Construction Quality Control Manager (CQCM), a Professional Services Quality Review Manager (PSQRM) and Independent Construction Quality Acceptance Managers (CQAM). These managers provide the overarching support for excellence in implementing the QMP.

The PSQCM, David Williams, P.E., has 24 years of experience and is a Senior Engineering Manager for NorthGate's lead designer, Parsons Brinckerhoff. David provides leadership, technical planning and design skills for complex, large-scale transportation projects throughout the United States. The PSQRM, Rachel Hayden, P.E., has 18 years of experience focused on design and management of large, multi-discipline projects for TxDOT, regional municipalities, and DART. Mark Brown, P.E., the CQCM, has 36 years of experience in Texas specializing in quality acceptance and quality control for heavy/highway projects. He is responsible for implementing and managing project quality acceptance and quality control processes and programs. Independent Construction Quality Acceptance will be performed by Robert Arizola, P.E., and Robert Schenck, P.E. Robert Arizola has served as a project manager on transportation projects throughout Houston and Austin on design-build and bid-build work. He is trained in TxDOT material testing and has in-depth experience with TxDOT quality acceptance testing and inspection procedures. Robert Schenck, P.E, is a Senior Project Manager in the DFW Metroplex, providing construction materials engineering and testing, geotechnical services and environmental services. The design and construction quality organization is shown in Figure C.3-3. Resumes for these quality managers are provided in Appendix D.1 Key Personnel Resumes and References. NorthGate has established an organization with clear lines of responsibility that is essential for effective quality management. Interrelationships between Project management, design, construction, maintenance and quality programs are clearly defined. Project management ensures that responsibilities and authorities are defined and communicated.

Figure C.3-3 Design-Build Quality Management Organization



The PSQRM and CQAM will report to TxDOT as required and the Joint Venture Executive Committee at least quarterly at the Project quality management review meetings and will call upon its authority when necessary to assure conformity to quality standards and procedures. The PSQRM and CQAM are required by NorthGate's QMP to be functionally independent from production or installation personnel. The PSQRM and CQAM will report all quality records and audits to TxDOT and project management as required by the CDA/CMA.

The CQCM and CQAM are responsible for implementation of the design-build quality program under the CQMP and MMP for NorthGate as described in this section. The PSQCM and PSQRM are responsible for implementation of the DQMP.

As a part of its QC structure, NorthGate has assigned discipline QC assistants for the areas of paving, grading and structures. These assistants are responsible for QC procedure implementation, training, sub-consultant quality program oversight, and oversight of the corrective action program. These construction QC personnel report to the CQCM and have the obligation to stop work, issue nonconformance reports, and perform preventative and corrective actions when required by the Quality Systems Procedures.

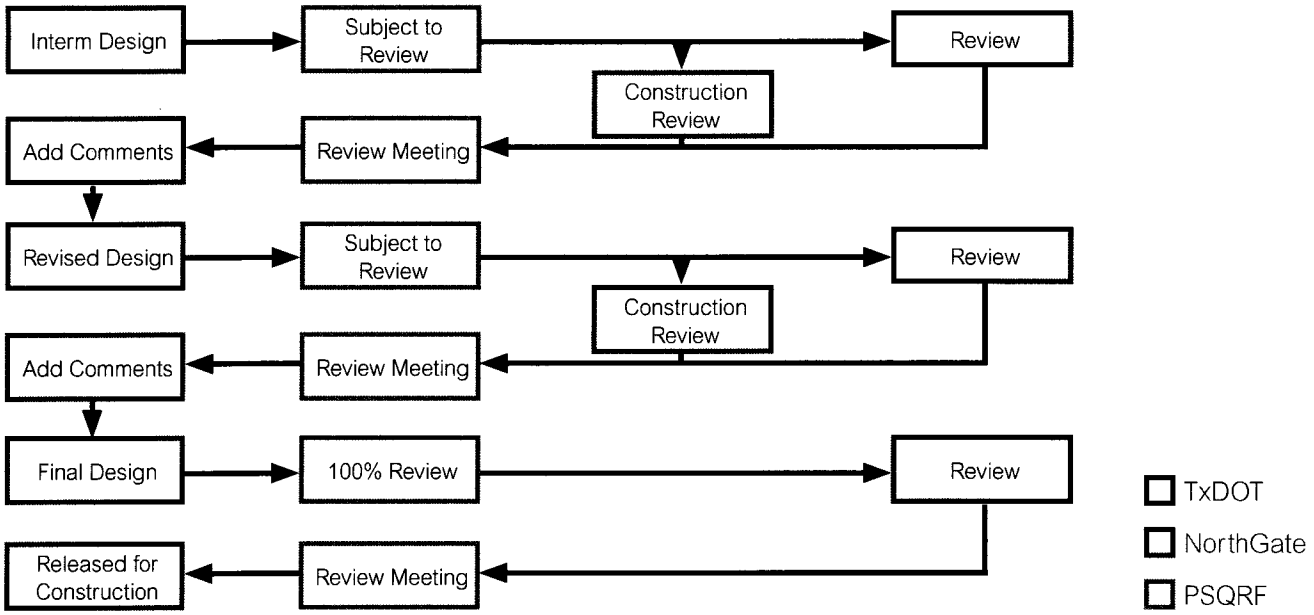
The Professional Services Quality Review Firm (PSQRF) and Construction Quality Acceptance Firm (CQAF) will remain independent from design and construction process and production quality control. The CQAF is responsible for all acceptance testing and inspection. The PSQRF and CQAF will provide all quality reporting to TxDOT, as required.

At the design and construction management level, the responsibility for achieving quality objectives resides with the Project Director; Deputy Project Director – Design and Administration; and Deputy Project Director – Construction. These directors' will enforce all policies, objectives and responsibilities for design-build quality.

C.3 (c) Description of Quality Management Plan

Functional Independence: Under the QMP, the Professional Services QC Manager, Professional Services Quality Review Manager, Construction QC Manager, Construction QA Manager and Maintenance QC Manager are functionally independent from the production organization but have direct interface with design, construction or maintenance activities. The PSQRM and CQAM have the authority to effect changes in production procedures in the event of any failure to comply with the requirements of the Technical Provisions or any of the processes described in the QMP. The PSQRM and CQAM report directly to TxDOT and NorthGate's Executive Committee. The PSQCM, CQCM and Maintenance QC Manager have the ability to effect changes in design, construction and maintenance procedures, have the obligation to issue nonconformance reports, and have the authority to stop work in the event of nonconformance or significant risk if required by the QMP procedures.

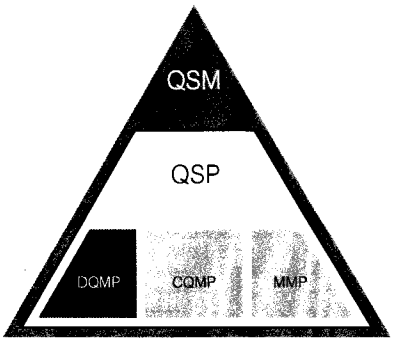
Figure C.3-4 Formal Process for Design Submittals



Design Reviews: Formal design submittals are submittals that require action by the receiving party. Examples of formal submittals are design reviews, construction packages, utility submittals, conformance submittals and as-built submittals. Informal submittals are for informational or clarification purposes only; however, these informal processes will be documented the same as formal processes. The process for design submittals is shown in Figure C.3-4 and further described in Appendix D.2.B.

Changes to the design and design deficiency corrections will be reviewed in the same manner as formal design submittals. NorthGate will maintain a database to track revisions by package, date, sheet, type, description and number. This database will be used by the PSQRF to aid in the certification process.

QA/QC for Design: NorthGate will develop an efficient and effective Design Quality Management Plan (DQMP) (Appendix D.2.B). The DQMP is a set of formal procedures that support the QSM for quality and quality improvement in design including structures, environmental, right-of-way, utilities and survey. These procedures are specifically designed to address the critical activities for design, environmental, ROW, utilities and survey and include internal reviews, external reviews, certificate of compliance and release for construction.



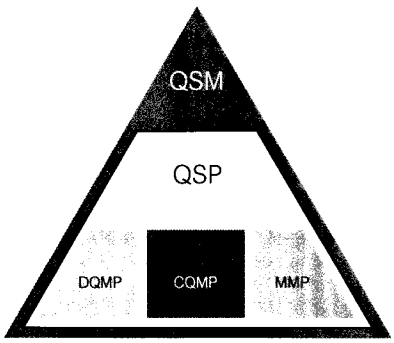
A two-tier review process for design is prescribed by the DQMP. The first tier reviews are internal to the design team and are handled as peer reviews with other design team members. This review, done by engineers with an intimate understanding of the design elements, provides the opportunity for continual improvement. The second tier reviews will be conducted by the PSQRF managed by the PSQRM. These external reviews will be conducted by a team of knowledgeable engineers not involved in the design or construction of the Project. These PSQRF reviews will be conducted much like the internal reviews using engineers seeking out items that do not conform to the Project's design criteria and acceptable standards of care, and provide for and protect those requirements as outlined in the CDA/CMA. These reviews include plans, spreadsheets and other software methods or outputs used in the development of the contract documents. Review comment forms will be used to track and dispose of all formal comments. All comments are compiled by sheet and discipline, returned to the PSQRM for distribution and addressed as outlined in the DQMP.

Changes to the design during construction will be reviewed using the same two-tier process as the original design. Specific design-build processes such as field design changes, approved for construction drawings and nonconformance evaluations will be implemented. NorthGate will maintain a database to track revisions by package, date, sheet, type, description and number. This database will be used by the PSQRF in the certification process. Design QA/QC roles and responsibilities are summarized in Figure C.3-5.

Figure C.3-5 Design QC/QA: Roles and Responsibilities

Title	Role and Responsibility	Work to be Accomplished
PSQCM	Control design processes to meet Project requirements.	Provide QC training, oversee QC for design operations, perform peer reviews and internal reviews.
PSQRM	Perform independent design reviews.	Perform second-tier external reviews independent from design to assure conformance to specifications for design, right-of-way, utilities, survey and environmental compliance.

QA/QC for Construction: NorthGate will develop an efficient and effective Construction Quality Management Plan (CQMP) . The CQMP is a set of procedures that support the QSM for quality and quality improvement in construction. The procedures are specifically designed to address the critical activities from planning to construction. Examples of the procedures included in the CQMP are: pre-activity meetings, production work plans, quality control testing, development of hold points, acceptance testing, preparation of inspection reports and material receiving.



Additionally, the CQMP procedures clearly define the roles and responsibilities between the quality acceptance and quality control organizations to ensure

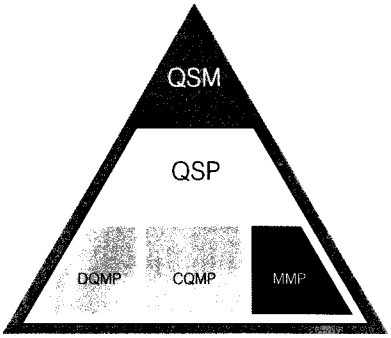
construction is monitored, measured and verified for conformance to the CDA/CMA. Construction QA/QC roles and responsibilities are summarized in Figure C.3-6 and further expanded as CQP-01 in the CQMP.

Figure C.3-6 Construction QC/QA: Roles and Responsibilities

Title	Role and Responsibility	Work to be Accomplished
Construction QC Manager	Control construction processes to meet Project requirements and document compliance.	Provide QC training and oversee QC for construction operations, planning, and continuous improvement. Implement and document control testing and inspection. Issue non-conformances, stop work notices, preventative actions and corrective actions.
QC Technicians	Perform material testing and inspection.	Follow quality control testing procedures and provide documented test results to reasonably ensure the product meets the specifications.
Construction QA Manager	Review and verify of the construction QC processes.	Monitor and audit the CQMP to determine if it is functioning correctly. Monitor all quality control activities and QC managers for verification purposes.
QA Technicians	Perform material testing and inspection.	Follow quality acceptance testing procedures and provide documented test results at 100% the required frequency according to the Inspection Test Plan.

The Inspection and Test Plan (ITP) (Appendix D.2.B) prescribes the required testing and inspection frequencies as required by the QMP based on the CDA/CMA, TxDOT Guide Schedule of Sampling and Testing and industry standards.

QA/QC for Maintenance: NorthGate will develop an efficient and effective Maintenance Management Plan (MMP). The MMP is a set of procedures that support the QSM for quality of maintenance. The procedures are designed to provide a safe roadway, preserve the capital investment and maintain a ride quality satisfactory to the traveling public. Examples of the procedures included in the MMP are: performance and measurement, routine maintenance, emergency response and scheduled inspections.

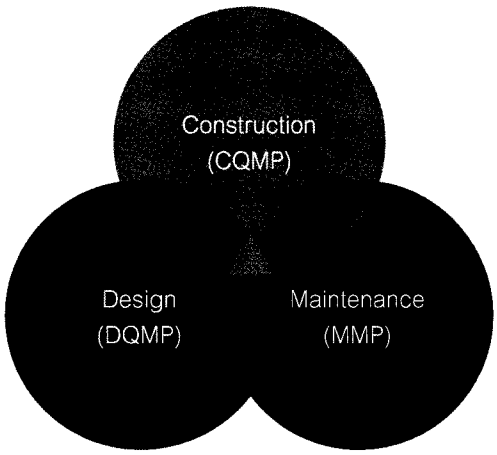


The quality acceptance and quality control of all materials and workmanship for maintenance activities during construction will be the same as those described in QA/QC in this section.

Upon implementation of the CMA by TxDOT, NorthGate will revise and prepare a Maintenance Management Plan that is consistent with the CMA requirements including the development of the Maintenance Services Quality Control Plan (MQCP) and assignment of a Maintenance QC Manager. The MQCP will place the responsibility for the quality of all design, construction, maintenance and repair associated with maintenance services after construction and during the CMA period on NorthGate. The MQCP will be submitted to TxDOT for review and approval.

It will be the responsibility of the Maintenance QC Manager to oversee the implementation of the MQCP during the CMA period; to identify the need for preventative and corrective action; and to issue nonconformance and stop work orders in the event of safety hazards or of significant risk. The Maintenance QC Manager will demonstrate independence from maintenance work forces and will submit an annual report to TxDOT that includes an assessment of maintenance service achievements, shortcomings, compliance with traffic control requirements, and any corrective action taken.

Figure C.3-7 Integration of Quality Managers



Quality Interfaces: NorthGate's construction and maintenance teams will be integrated with the design process. Quality managers from all three groups will participate in design task forces relating to their disciplines to gain efficiency in quality planning, implementation, review and continual improvement (Figure C.3-7). This group will work together and verify consistency in designs, details and standards in conformance

with the DQMP. The DQMP provides procedures for design change to correct deficiencies and notice of design changes to communicate with construction and maintenance.

NorthGate's design team will be integrated during construction and maintenance operations. Key design team members will be co-located with the construction and maintenance teams in our field offices to review construction and maintenance operations plans for quality and observe actual field conditions as they progress. Designers will assist construction and maintenance engineers to provide plan interpretation/clarification, and to discuss work sequencing, construction load issues, safety, traffic handling, incident management, constructability, maintainability and identification of changes beneficial to the quality and execution of the work.

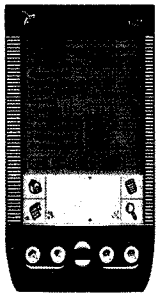
When issues, conflicts or deficiencies are discovered, interface among construction, maintenance and design quality is essential. Post Design Services (PDS) provide many processes for resolving quality issues including field design changes, nonconformance evaluations, as-built development, verification of field conditions and verification of design implementation. Procedures for PDS processes are prescribed by the QMP.

Quality Documentation: To remain compliant with the ISO 9001:2000 standard and the CDA/CMA, all quality activities are documented and filed for future reference and audit. Document Control and Control of Records are ISO-required quality system procedures under our QMP. NorthGate will use CentricProject, a Web-based project information center (discussed in more detail in Section C.2.1 (a) Communication and Documentation Methods Within Proposer's Team) that allows for electronic tracking of Project activities in real time, for our document control system.

Unique to NorthGate is the use of the "MICK" system (Figure C.3-8), an electronic quality inspection, testing and reporting system designed to improve access and analysis of both qualitative and quantitative quality data. The database can be used to produce statistical analysis, control charting, test records and inspection records instantaneously for transfer to the document control system. This database information is available through a Web-based interface and can be uploaded to TxDOT's I2MS system as required.

TxDOT Oversight: The Professional Services QC Manager, Construction QC Manager, Professional Services Quality Review Manager, Construction QA Manager and Maintenance QC Manager are all primary points of contact with TxDOT regarding quality. These quality managers will interact with TxDOT to coordinate documentation, resolve issues and implement TxDOT oversight procedures. All quality documentation and data will be available and transmitted to TxDOT through our Web-based collaborative document control system. TxDOT will have full access to areas where the work is performed and will be afforded the opportunity to oversee QA and QC activities during all phases of design, construction and maintenance. Implementation of TxDOT oversight is found throughout the procedures in the QMP. Partnering will be implemented according to the CDA/CMA and QMP. Quality related matters are resolved weekly at quality meetings.

Figure C.3-8 MICK Quality System



MICK provides real time data entry with the use of hand-held PDAs that download inspection and testing data daily.

Federal Oversight: Consideration is made in the QMP to achieve cooperation and coordination with federal oversight in development of procedures to verify integration of federal requirements. The QMP provides for the following federal oversight requirements as a minimum:

- NorthGate responsible for all quality control, process controls and material testing to provide reasonable assurance the contract requirements are met
- NorthGate's CQAF responsible for all acceptance testing and auditing of the quality control functions
- TxDOT oversight activities that are an independent evaluation of the sampling and testing procedures and testing equipment
- Qualified staff and laboratories for verification or certification
- Referee testing procedures
- Federal review of the entire assurance program

Federal oversight will be afforded the opportunity to verify/oversee all phases of design, construction and maintenance.

Quality Interface with Stakeholders and Third Parties: NorthGate will interact with Stakeholders and other third parties prior to and during all major construction phases to plan and coordinate activities. Proper notice will be given to the Stakeholders and other third parties for all major construction activities and meetings requested. Stakeholders and third parties will be afforded the opportunity to participate in weekly nonconformance review meetings and have the opportunity to oversee quality acceptance and quality control activities during all phases of design, construction and maintenance as described in the QMP.

Audit Regime: The QMP includes an elaborate audit scheme that ensures the quality system is functioning properly. At the base level, the PSQRF and CQAF continuously monitor and audit the design, construction and maintenance quality control processes. Internal auditing of the QMP is an ISO-required quality system procedure that comprises the second level of audit (QSP-13) (Appendix D.2.B). The third and top level in the audit regime is oversight of all aspects of the quality system afforded to TxDOT and federal partners.

Curing Noncompliance: Control of Nonconforming Product is a key element for NorthGate to receive ISO 9001:2000 certification. Control of Nonconforming Product (QSP-02) is an ISO-required quality system procedure described in the PQMP. This procedure will ensure that conditions adverse to quality such as failures, malfunctions, deficiencies, defective material and equipment, deviations and other nonconforming work are promptly identified and corrected.

When nonconformances are or reoccurring according to the ISO standard, a Corrective Action will be issued to identify the root cause of the problem, develop a plan of action to correct the problem, implement the corrective action and follow up with review to ensure the actions have been effective. The Corrective Action procedure is key to fix root causes and ensure repeat mistakes are avoided. Corrective Action (QSP-03) is an ISO-required quality system procedure that can be found in the PQMP.