Labor-Hours Modeling: Transparency and Accountability in Contract Negotiation

2022 PEPS Conference

Michael Haithcock, P.E. – Abilene District
Cliff Hallford, PMP – PEPS Division
Lauren D. Garduño, P.E. - Ports to Plains Alliance

Nov 30 & Dec 1, 2022

Safety: Mission ZERO

If we could save time in getting to contract Notice To Proceed,

... and ultimately to our finished project,

... we could take a big step,

... in Ending The Streak.

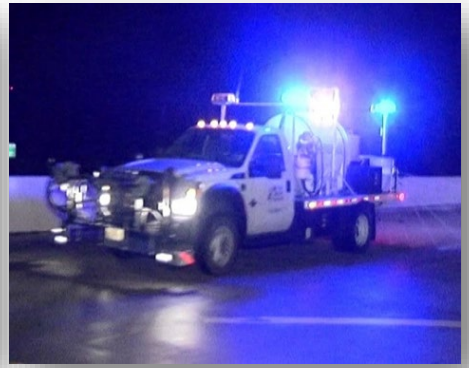
Mission Zero – Safety Is Intentional

Safety Never Stops!

Free Business Advice (Our Safety Culture)

<u>The Foundation 14</u>

1. PPE
2. Seat Belts
3. Idling
4. Parking Brake
5. Preventive Maintenance
6. Stretch and Flex
7. Traffic Control
8. Distracted Driving
9. Blue and Amber Lights
10. Lights On
11. Parking
12. Backing
13. Spotting
14. 360° Walkaround



REMEMBER THIS???

Negotiating Labor-Hours

2021 PEPS Conference

Michael Haithcock, P.E. – Abilene District
Cliff Hallford, PMP – PEPS Division
Lauren Garduño, P.E.

December 2, 2021

Fair and equitable contracts without regard to:

- ❑Hourly wages
- ❑Overhead rates
- ❑Direct Costs
- ❑Percent Profit

Consultants would receive a “market-rate” of labor hours based on historical data from the last three years.

This would be a support tool for inexperienced TxDOT project managers

How TxDOT Benefits

- Significantly less time to get a contract under NTP
- Labor hours normalized, and outliers eliminated
- Knowledge sharing tool for inexperienced TxDOT PMs
- PEPS has the ability to predict consultant budgets

How Consultants Benefit

- Significantly less time to get a contract under NTP
- Negotiations without regard to consultant salaries
- Consistency among TxDOT project managers
- Negotiations without regard to project construction cost

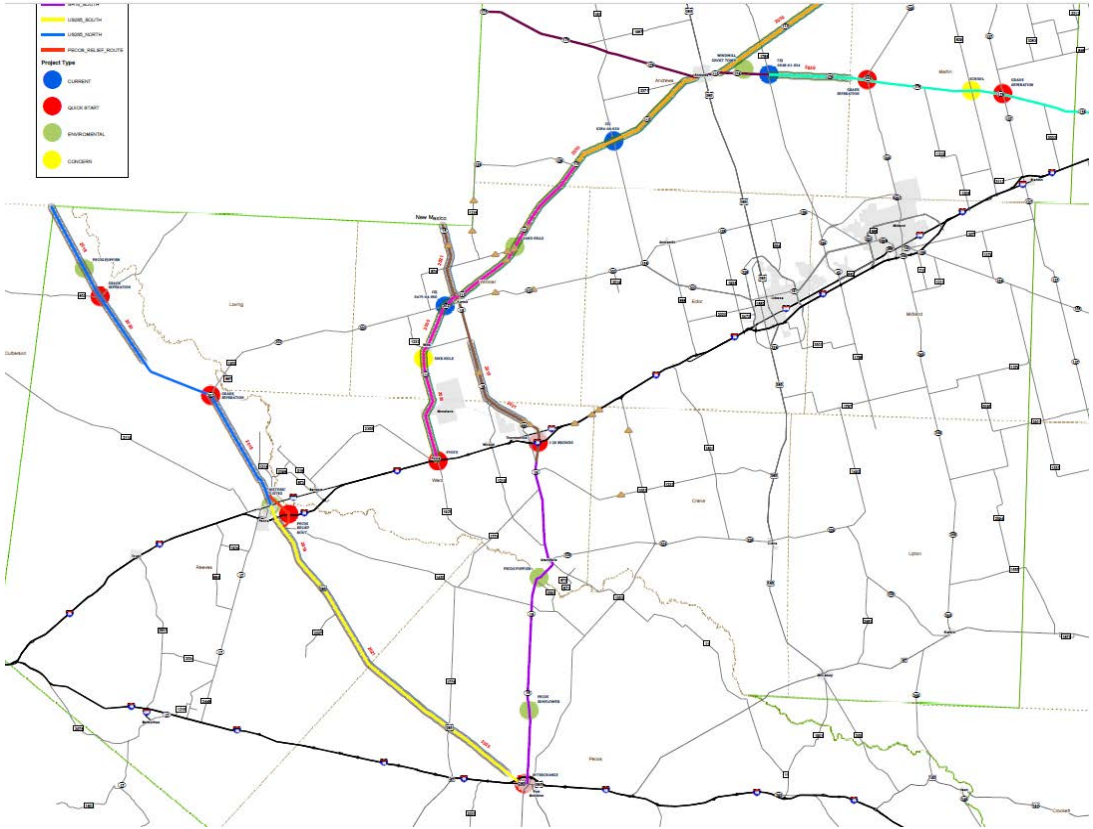
The Original Data Set – 9 Environmental and Schematic Contracts

Region	West Texas
Functional Class	Rural Arterial
Type of Work	Environmental and Schematic
Design Criteria	4R New Location & Reconstruction
Scale	Over 30 Miles
Districts	Odessa, Abilene, & Lubbock

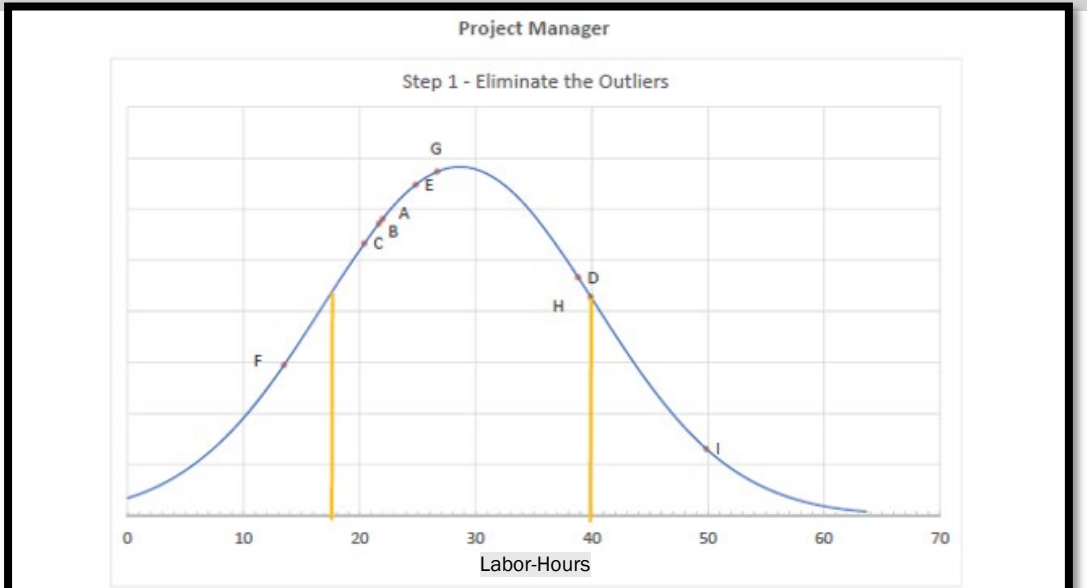
US 285 North	52 Miles
SH 176 East	53 Miles
SH 115 South	49 Miles
SH 18 North	38 Miles
SH 115 North	55 Miles
US 285 South	53 Miles
SH 18 South	47 Miles
SH 176 West	40 Miles
SH 349	50 Miles

Permian Basin 9 x 9 Contracts

US 285 North	*52 Miles*
SH 176 East	*53 Miles*
SH 115 South	*49 Miles*
SH 18 North	*38 Miles*
SH 115 North	*55 Miles*
US 285 South	*53 Miles*
SH 18 South	*47 Miles*
SH 176 West	*40 Miles*
SH 349	*50 Miles*



Project Manger



	Function Code	A	B	C	D	E	F	G	H	I	Average	Standard Deviation	mean minus 1 standard deviation	mean plus 1 standard deviation
Project Manager	102	7.23	13.11	5.13	19.16	7.40	9.43	15.21	23.88	10.15	12	6	6	18
	120	2.58	5.08	4.36	1.82	1.71	1.43	1.51	8.24	6.81	4	3	1	6
	130								1.22					
	145	11.96	3.48	10.91	14.29	15.71	2.64	9.96	6.58	32.13	12	9	3	21
	160	0.20			3.56					0.79				
Labor-hours/mile		21.97	21.67	20.40	38.84	24.82	13.50	26.68	39.92	49.87	29	12	17	40

Preliminary Data

Within one standard deviation

Outlier

Insufficient data

Labor Hours / Mile / Job Title

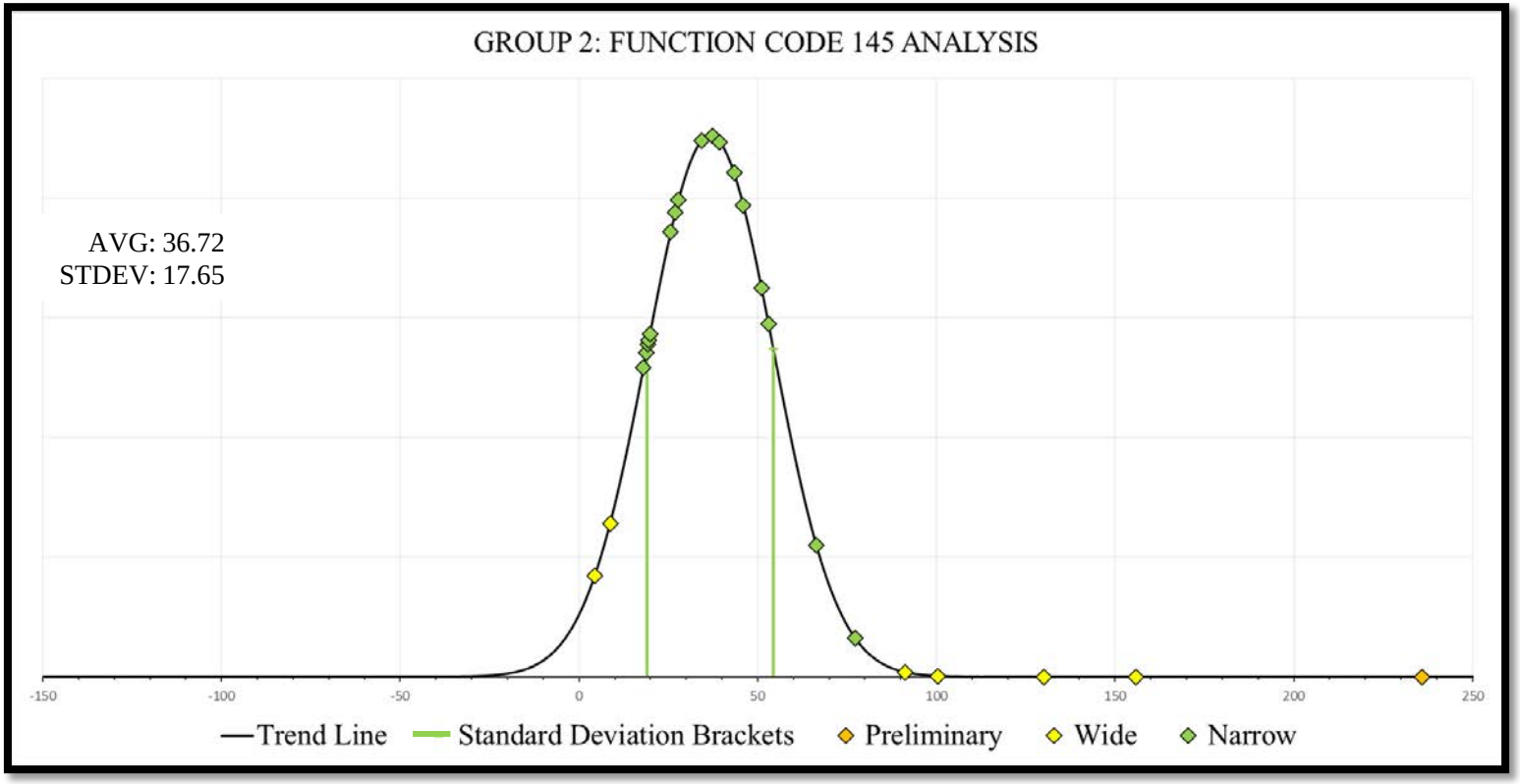
Roadway		
Project Manager	Average 28	Range 20 to 36
Deputy PM	Average 26	Range 21 to 32
Senior Engineer	Average 24	Range 18 to 31
Engineer	Average 72	Range 51 to 93
Engineer-in-Training	Average 94	Range 81 to 106
Design Tech	Average 43	Range 11 to 74
Environmental		
Senior Environmentalist	Average 22	Range 17 to 27
Environmental Scientist	Average 61	Range 40 to 81
Public Involvement	Average 20	Range 16 to 24
Survey and Database		
Survey Manager	Average 13	Range 8 to 18
Survey Technician	Average 26	Range 10 to 41
LIDAR Technician	Average 65	Range 48 to 83
Ortho Specialist	Average 12	Range 10 to 15

TxDOT CONNECT PS-CAMS

CONTRACT TYPE - PS&E
PROJECT TYPE - PREVENTATIVE MAINTENANCE
FUNCTIONAL CLASSIFICATION
DESIGN CRITERIA
CONSTRUCTION COST PER MILE

GROUP 1	FM / RM	PM / 2R
GROUP 2	SH / US	PM / 2R
GROUP 3	INTERSTATE	PM
GROUP 4	FM / RM	3R
GROUP 5	SH / US	3R

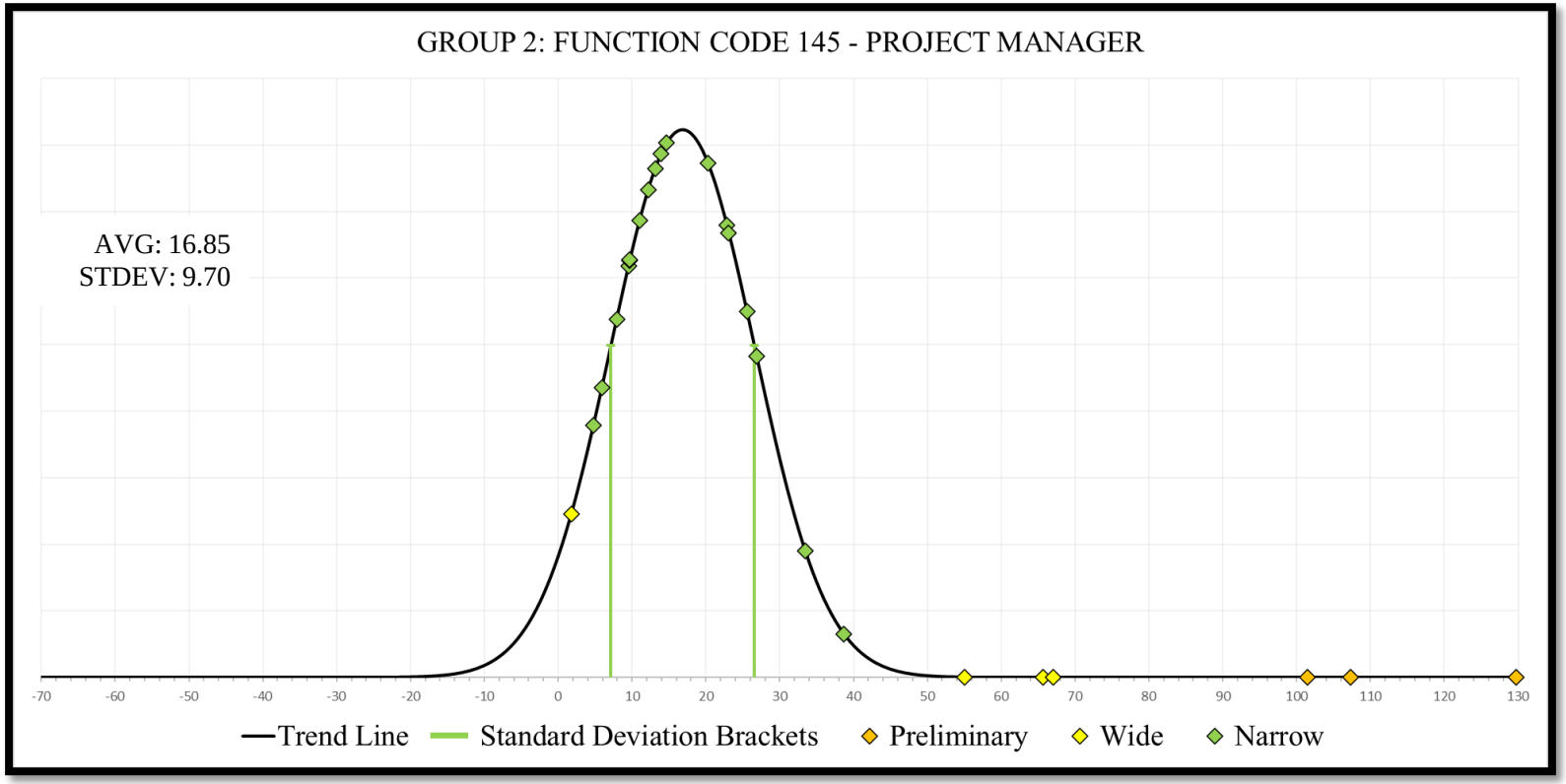
Group 2: Function Code 145 Analysis



Function Code 145 and 160 Summary (all 5 Groups - 115 Projects)

Group	Functional Class	Design Criteria	Number of Projects		Function Code 145 - Project Management	Function Code 160 - Roadway
1	FM	PM / 2R	25	Average	26.44	124.65
				Std Dev	6.65	47.72
					Narrow	Wide
2	SH	PM / 2R	26	Average	36.72	105.57
				Std Dev	17.65	46.61
					Narrow	Narrow
3	Interstate	PM	24	Average	23.83	85.69
				Std Dev	11.32	41.11
					Narrow	Narrow
4	FM	3R	23	Average	42.65	174.21
				Std Dev	28.35	69.38
					Narrow	Narrow
5	SH	3R	17	Average	49.24	183.84
				Std Dev	25.20	64.07
					Narrow	Narrow

Group 2: Function Code 145 – Labor Classification Analysis



Job Title Summary Function Code 145

Group	Functional Class	Design Criteria	Project Manager / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile
1	FM	PM / 2R	20.67	4.61	6.18
2	SH	PM / 2R	16.85	11.60	2.85
3	Interstate	PM	9.79	5.55	7.47
4	FM	3R	16.77	7.67	7.32
5	SH	3R	21.98	9.54	4.63

How would negotiations work?

TxDOT PM and Consultant would scope the project in the field together

Consultant would complete and submit a Scoping / Labor-Hour report

TxDOT PM compares the labor hours per mile and function code by mile to the TxDOT LABOR-HOURS SYSTEM REPORT for similar projects.

If the overall hours are not acceptable for a specific Function Code, then the TxDOT PM would look at each Labor Classification for discrepancy

Scoping Report Example

CCSJ / CSJ: 012504-033
County: Shackelford
Project Description:
Widen and overlay US 283 from Albany to the Throckmorton County line
Target letting date: 1/2019
Design: Project Justification Statement: US 283 is located in the Barnet Energy Sector. This project was selected as a Tier 1 energy sector project and funded with energy sector funds. This section of US 283 is the only section of US 283 in the Abilene District that has not been widened to at least a 40' roadway section.
Existing conditions: The existing pavement consist of flexbase, sealcoats and an overlay. The existing roadway has predominantly 12-foot lanes and 4-foot shoulders.
Project Scope: The following personnel meet on this project Michael Haithcock, Dan Richardson, Martin Sotelo and Cliff Hallford. The following was determined to be the scope of this project: widen pavement to 40' with flex base, overlay 2" SP D, culvert widening, safety end treatment, new signs, new metal beam guard fence and milled in rumble strips and stripping. Once the PSE is developed and a more detailed estimate is created the SP D may be increased to 3"

Projected Traffic:
ADT or AADT
24 HR T: 26.7%

Current Year (2014): 550
Future (2034): 817

Functional Classification: 5 Rural major collector

Design Standard: 3R

Major Structures: There are 6 bridge class structures on this project. Bridge reports and locations are attached.

UTILITY COORDINATION
Utility Involvements: Utilities should be located where structures are widened otherwise utilities should not be an issue

Scoping Report Example Continued

RIGHT OF WAY

Right-of-Way (ROW): Existing width: typically, 100 ft.

Required Right-of-Way anticipated: ☒ None ☐ Yes ☐ Undetermined

Easements anticipated ☒None ☐Temporary ☐Permanent ☐Utility ☐Other

ENVIRONMENTAL & PERMITS

Anticipated Environmental Document: Categorical Exclusion 22

MS4 Permit Compliance – Is the project located in a MS4? No

Environmental Permits/Variances/Commitments/Coordination anticipated: Na

Environmental Comments and Information: CE documentation

CONSTRUCTION

Preliminary Construction Schedule: 18 Months

Issues potentially affecting constructability/construction schedule: Unknown at this time

Early Completion Incentives recommended for consideration: None at this time as daytime lane closures are all that should be required.

Special Provisions: Unknown at this time.
Construction Inspection: Abilene Area Office

LIST OF ATTACHMENTS

1. **Project Location Map**
2. **Cost Estimates for Construction**
3. **Bridge Reports**
4. **Project Photos**

Labor Hour Example

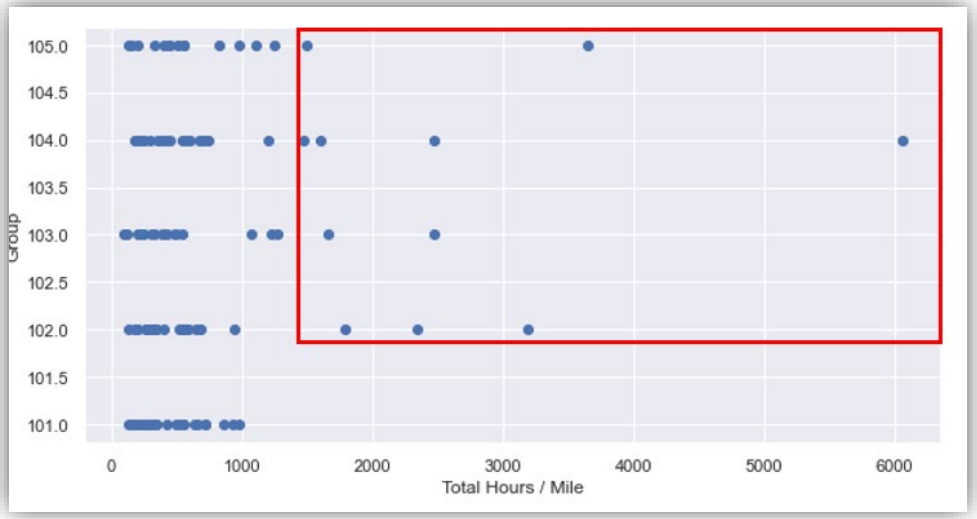
	Function Code	FC 102	FC 120	FC 145	FC 160	Summary hours per mile by labor title
Labor Title						
Project Manager	Hours per Mile	5.41	1.06	19.21	23.62	49.3
Support Manager	Hours per Mile	2.37	1.25	7.71	21.58	32.91
Engineer Senior	Hours per Mile	5.25	0.66	5.41	35.98	47.3
Engineer Design	Hours per Mile	5.34	1.1	3.45	57.76	67.65
Engineer Project	Hours per Mile	8.04	1.67	11.6	62.19	83.5
Engineer in Training	Hours per Mile	9.48	2.36	2.85	103.19	117.88
Engineering Tech	Hours per Mile	8.45	2.02	1.1	88.44	100.01
CADD Operator	Hours per Mile	6.26	0	1.56	56.07	63.89
Admin	Hours per Mile	1.02	0.51	4.98	8.29	14.8
Summary of hours per mile per function code		51.62	10.63	57.87	457.12	**577.24**

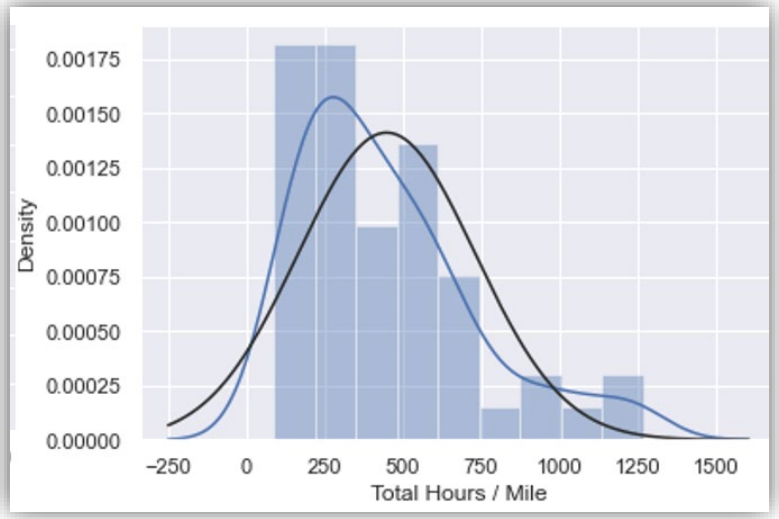
Labor-Hours Modeling

Labor-Hours Modeling

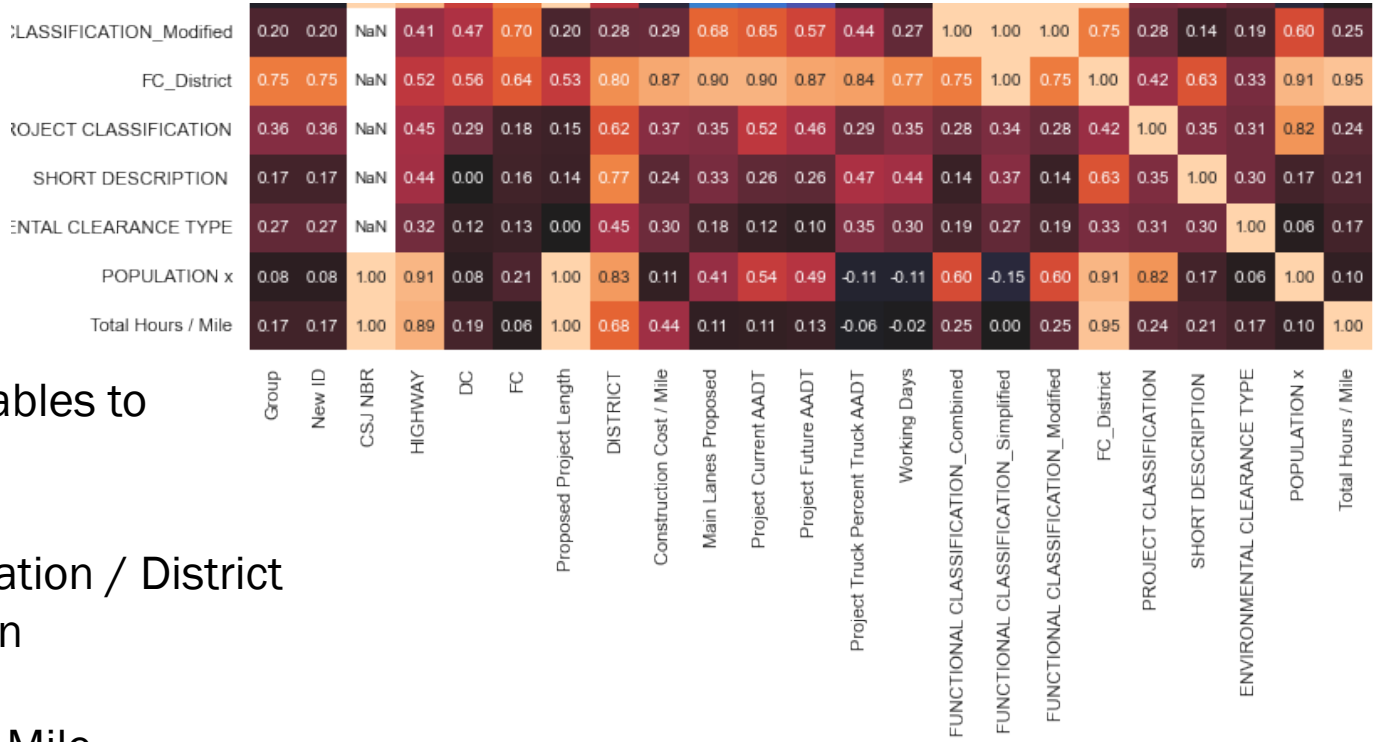
Model can predict ranges for consultant contract cost and predict consultant budget for projects in the STIP and UTP

Transportation Program Operations and Reporting





Transportation Program Operations and Reporting



Highest correlated variables to "Total Hours / Mile"

1) Functional Classification / District
2) Highway Designation
3) District
4) Construction Cost / Mile

LOE Labor Hour Example Negotiation

November 30, 2022

Project Information

- Winter Weather and heavy energy sector traffic has taken its toll on 4.4 miles of US 277 in Taylor County south of the City of Abilene.
- The Design Criteria is PM or 2R depending on the site visit with the Area Engineer.
- On this corridor there are 13 culverts that need safety treatments and Preventative Maintenance is needed on a two-span bridge.
- The Abilene District would also like to address all these issues in a single construction project and Let ASAP.
- Consultant assigned to the project has 1 Project Manager, 1 Senior Engineer, No Design Engineer, 1 Project Engineer, 4 EITs, 2 Engineer Tech, 1 CADD.

*Project ID: A00140689	Project Name: US 277 VIEW TO TO 3.7 MI SW OF FM 1235		
Project Type: Construction	Project Subtype: Roadway	Project Stage: PS&E	Project Status: Active
*District / Division: Abilene - 08	County: Taylor	Highway: US 277	Control Section: 0407-06
Combined Project Letting Estimate: $3,500,000.00	*Estimated Let Date: 01/01/2026	Controlling Project ID: 0407-06-047	Control Section Job: 0407-06-047

Project Details

Limits From:

SOUTH END OF BNSF BRIDGE

Limits To:

3.7 MI SW OF FM 1235

Project Classification:

OV - Overlay

Responsible District:

Abilene

Budget Responsible District:

Abilene

Short Description:

Preventive Maintenance

Project Description:

MILL AND OVERLAY

Project Location

Location Data

Control Section Data

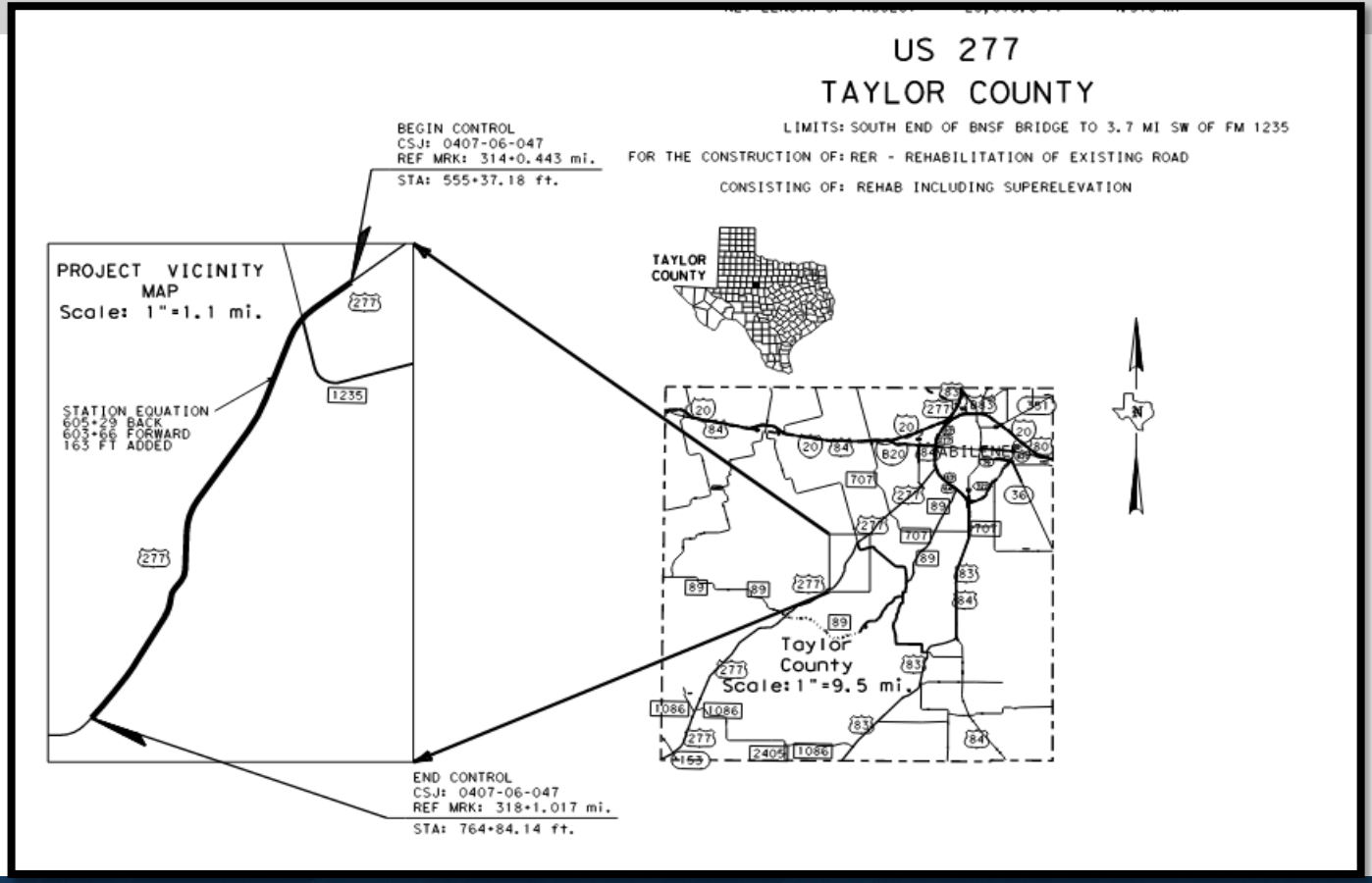
Pavement Plan

Roadway Assets

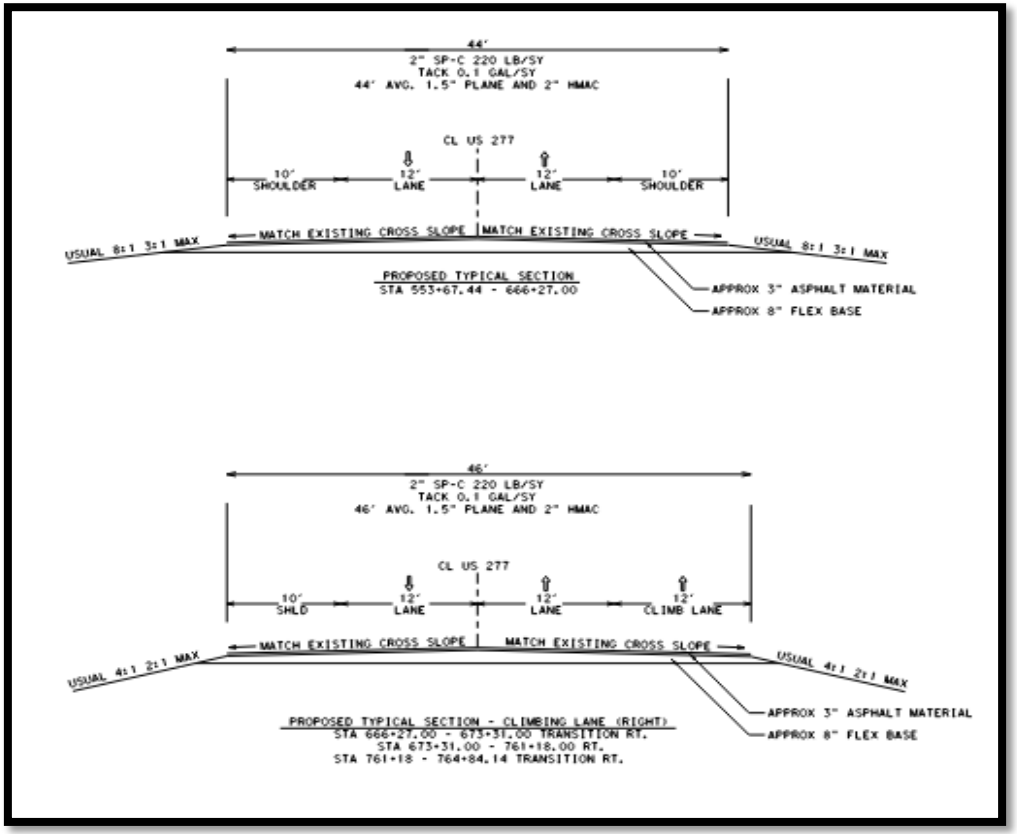
Functional Classification	Begin Mile Points	End Mile Points	Most Restrictive Proposed Class
Minor Arterial	9.302	13.672	

Main Lanes	Minimum	Maximum	Type	Length
Existing	2	2	Rural Undivided (Conventional)	4.370

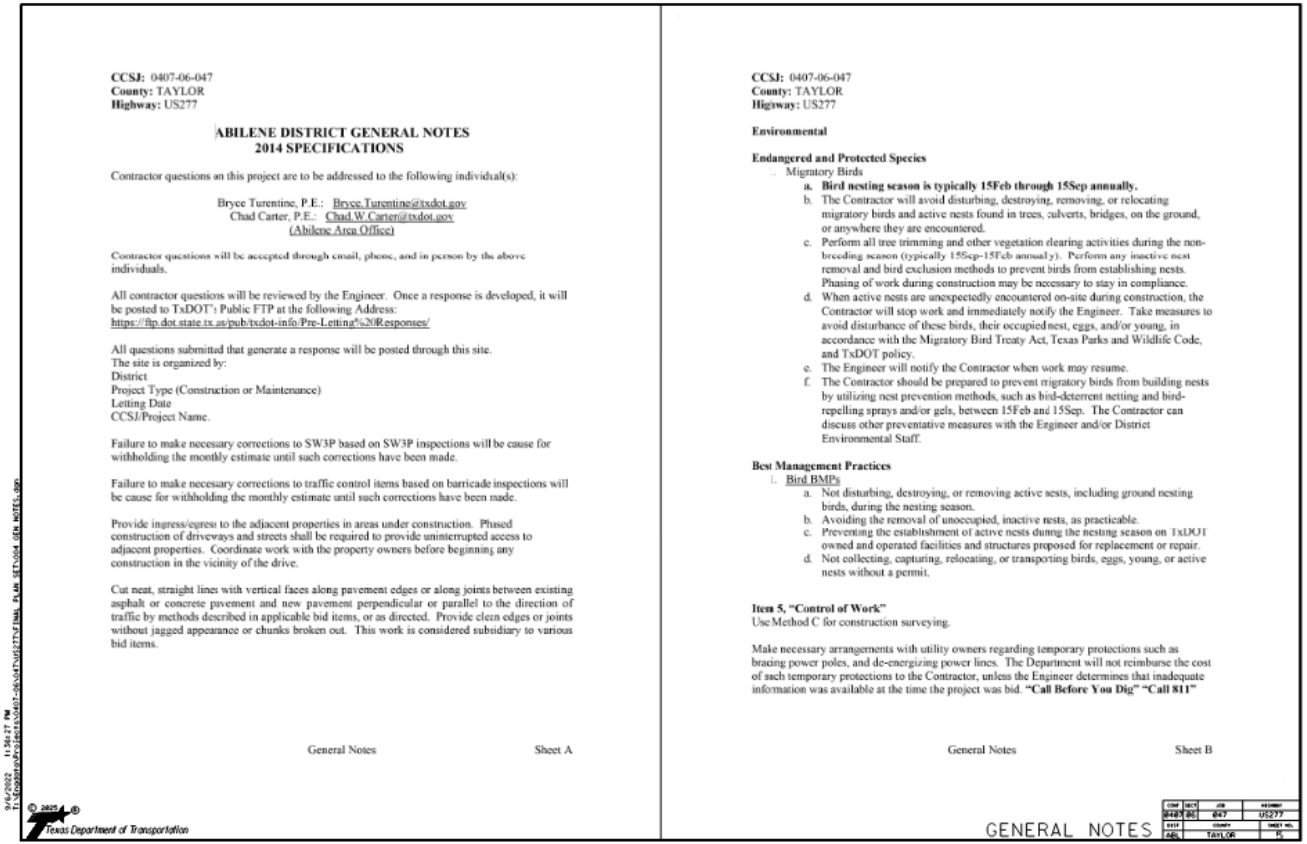
Title Sheet


US 277
TAYLOR COUNTY
LIMITS: SOUTH END OF BNSF BRIDGE TO 3.7 MI SW OF FM 1235
FOR THE CONSTRUCTION OF: RER - REHABILITATION OF EXISTING ROAD
CONSISTING OF: REHAB INCLUDING SUPERELEVATION
BEGIN CONTROL
CSJ: 0407-06-047
REF MRK: 314+0.443 mi.
STA: 555+37.18 ft.
PROJECT VICINITY MAP
Scale: 1"=1.1 mi.
STATION EQUATION
605+29 BACK
603+66 FORWARD
163 FT ADDED
TAYLOR COUNTY
ABILENE
Taylor County
Scale: 1"=9.5 mi.
END CONTROL
CSJ: 0407-06-047
REF MRK: 318+1.017 mi.
STA: 764+84.14 ft.

Typical Sections



General Notes



CCSJ: 0407-06-047
County: TAYLOR
Highway: US277

ABILENE DISTRICT GENERAL NOTES
2014 SPECIFICATIONS

Contractor questions on this project are to be addressed to the following individual(s):

Bryce Turentine, P.E.: Bryce.Turentine@txdot.gov
Chad Carter, P.E.: Chad.W.Carter@txdot.gov
(Abilene Area Office)

Contractor questions will be accepted through email, phone, and in person by the above individuals.

All contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT's Public FTP at the following Address:
https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting/%20Responses/

All questions submitted that generate a response will be posted through this site.
The site is organized by:
District
Project Type (Construction or Maintenance)
Letting Date
CCSJ/Project Name.

Failure to make necessary corrections to SW3P based on SW3P inspections will be cause for withholding the monthly estimate until such corrections have been made.

Failure to make necessary corrections to traffic control items based on barricade inspections will be cause for withholding the monthly estimate until such corrections have been made.

Provide ingress/egress to the adjacent properties in areas under construction. Phased construction of driveways and streets shall be required to provide uninterrupted access to adjacent properties. Coordinate work with the property owners before beginning any construction in the vicinity of the drive.

Cut neat, straight lines with vertical faces along pavement edges or along joints between existing asphalt or concrete pavement and new pavement perpendicular or parallel to the direction of traffic by methods described in applicable bid items, or as directed. Provide clean edges or joints without jagged appearance or chunks broken out. This work is considered subsidiary to various bid items.

General Notes Sheet A

Texas Department of Transportation

CCSJ: 0407-06-047
County: TAYLOR
Highway: US277

Environmental

Endangered and Protected Species

1. Migratory Birds
   a. **Bird nesting season is typically 15Feb through 15Sep annually.**
   b. The Contractor will avoid disturbing, destroying, removing, or relocating migratory birds and active nests found in trees, culverts, bridges, on the ground, or anywhere they are encountered.
   c. Perform all tree trimming and other vegetation clearing activities during the non-breeding season (typically 15Sep-15Feb annually). Perform any inactive nest removal and bird exclusion methods to prevent birds from establishing nests. Phasing of work during construction may be necessary to stay in compliance.
   d. When active nests are unexpectedly encountered on-site during construction, the Contractor will stop work and immediately notify the Engineer. Take measures to avoid disturbance of these birds, their occupied nest, eggs, and/or young, in accordance with the Migratory Bird Treaty Act, Texas Parks and Wildlife Code, and TxDOT policy.
   e. The Engineer will notify the Contractor when work may resume.
   f. The Contractor should be prepared to prevent migratory birds from building nests by utilizing nest prevention methods, such as bird-deterrent netting and bird-repelling sprays and/or gels, between 15Feb and 15Sep. The Contractor can discuss other preventative measures with the Engineer and/or District Environmental Staff.

Best Management Practices

1. Bird BMPs
   a. Not disturbing, destroying, or removing active nests, including ground nesting birds, during the nesting season.
   b. Avoiding the removal of unoccupied, inactive nests, as practicable.
   c. Preventing the establishment of active nests during the nesting season on TxDOT owned and operated facilities and structures proposed for replacement or repair.
   d. Not collecting, capturing, relocating, or transporting birds, eggs, young, or active nests without a permit.

Item 5, "Control of Work"
Use Method C for construction surveying.

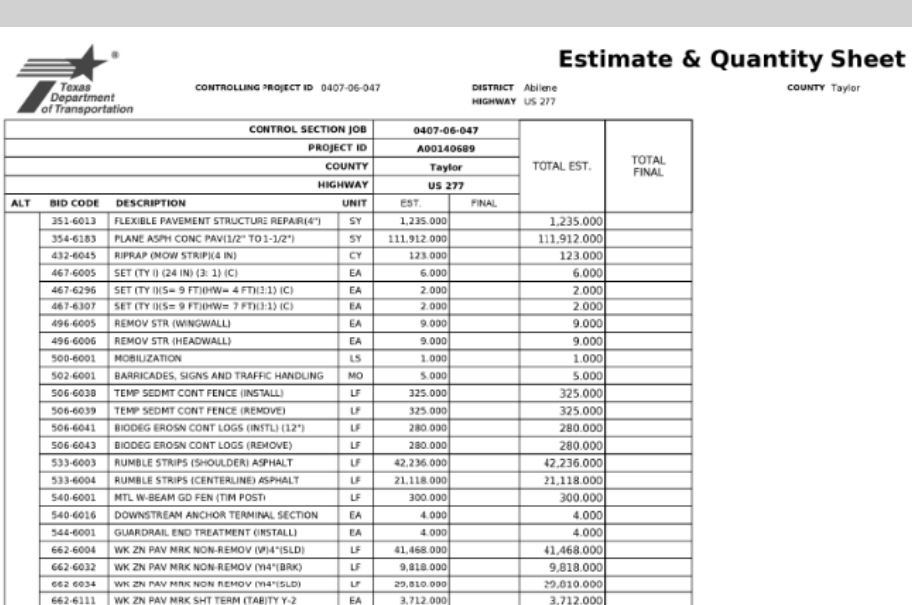
Make necessary arrangements with utility owners regarding temporary protections such as bracing power poles, and de-energizing power lines. The Department will not reimburse the cost of such temporary protections to the Contractor, unless the Engineer determines that inadequate information was available at the time the project was bid. **"Call Before You Dig" "Call 811"**

General Notes Sheet B

GENERAL NOTES

CONT	SECT	JOB	HIGHWAY
0407	06	047	US277
DIST	COUNTY		SHEET NO.
ABL	TAYLOR		

Estimate & Quantity Sheet



Texas Department of Transportation

Estimate & Quantity Sheet

CONTROLLING PROJECT ID 0407-06-047 DISTRICT Abilene COUNTY Taylor
HIGHWAY US 277

				CONTROL SECTION JOB		TOTAL EST.	TOTAL FINAL
				PROJECT ID			
				COUNTY			
				HIGHWAY			
ALT	BID CODE	DESCRIPTION	UNIT	EST.	FINAL		
	351-6013	FLEXIBLE PAVEMENT STRUCTURE REPAIR(4")	SY	1,235.000		1,235.000	
	354-6183	PLANE ASPH CONC PAV(1/2" TO 1-1/2")	SY	111,912.000		111,912.000	
	432-6045	RIPRAP (MOW STRIP)(4 IN)	CY	123.000		123.000	
	467-6005	SET (TY I) (24 IN) (3: 1) (C)	EA	6.000		6.000	
	467-6296	SET (TY II)(5= 9 FT)(HW= 4 FT)(3:1) (C)	EA	2.000		2.000	
	467-6307	SET (TY II)(5= 9 FT)(HW= 7 FT)(3:1) (C)	EA	2.000		2.000	
	496-6005	REMOV STR (WINGWALL)	EA	9.000		9.000	
	496-6006	REMOV STR (HEADWALL)	EA	9.000		9.000	
	500-6001	MOBILIZATION	LS	1.000		1.000	
	502-6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	5.000		5.000	
	506-6038	TEMP SEDMT CONT FENCE (INSTALL)	LF	325.000		325.000	
	506-6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	325.000		325.000	
	506-6041	BIODEG EROSN CONT LOGS (INSTL) (12")	LF	280.000		280.000	
	506-6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	280.000		280.000	
	533-6003	RUMBLE STRIPS (SHOULDER) ASPHALT	LF	42,236.000		42,236.000	
	533-6004	RUMBLE STRIPS (CENTERLINE) ASPHALT	LF	21,118.000		21,118.000	
	540-6001	MTL W-BEAM GD FEN (TIM POST)	LF	300.000		300.000	
	540-6016	DOWNSTREAM ANCHOR TERMINAL SECTION	EA	4.000		4.000	
	544-6001	GUARDRAIL END TREATMENT (INSTALL)	EA	4.000		4.000	
	662-6004	WK ZN PAV MRK NON-REMOV (W)4"(SLD)	LF	41,468.000		41,468.000	
	662-6032	WK ZN PAV MRK NON-REMOV (Y)4"(BRK)	LF	9,818.000		9,818.000	
	662-6034	WK ZN PAV MRK NON-REMOV (Y)4"(SLD)	LF	29,810.000		29,810.000	
	662-6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	3,712.000		3,712.000	
	666-6300	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL)	LF	8,773.000		8,773.000	
	666-6303	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL)	LF	41,468.000		41,468.000	
	666-6312	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL)	LF	9,818.000		9,818.000	
	666-6315	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL)	LF	29,810.000		29,810.000	
	668-6016	PREFAB PAV MRK TY B (W)(12")(SLD)	LF	247.000		247.000	
	668-6018	PREFAB PAV MRK TY B (W)(24")(SLD)	LF	94.000		94.000	
	672-6007	REFL PAV MRKR TY I-C	EA	115.000		115.000	
	672-6009	REFL PAV MRKR TY II-A-A	EA	517.000		517.000	
	3077-6023	SP MIXESSP-CSAC-B PG70-22	TON	12,313.000		12,313.000	
	3077-6075	TACK COAT	GAL	11,196.000		11,196.000	
	6185-6002	TMA (STATIONARY)	DAY	6.000		6.000	
	6185-6005	TMA (MOBILE OPERATION)	DAY	6.000		6.000	
	18	SAFETY CONTINGENCY: CONTRACTOR FORCE ACCOUNT WORK (PARTICIPATING)	LS	1.000		1.000	

Traffic Control

DEFINE ?

SEQUENCE OF WORK

GENERAL

1. ALL ROADWORK TO BE COMPLETED DURING DAYTIME HOURS WITH FOLLOWING CRITERIA: USE FLAGGERS FOR ROAD INTERSECTIONS. BUSINESS AND RESIDENTIAL DRIVES TO REMAI
2. PLACE ADVANCE WARNING SIGNS AND BARRICADES IN ACCORDANCE WITH TMUTCD AND APPL
3. FOLLOW THE REQUIREMENTS OF THE EDGE CONDITION WORKSHEET AS WORK PROGRESSES.
4. THE STEPS OF THE CONSTRUCTION SEQUENCE MAY BE MODIFIED AS APPROVED, IN WRITIN ENGINEER. ANY CHANGES IMPLEMENTED, SHALL HAVE DETAILS THAT ARE SIGNED AND SE LICENSED PROFESSIONAL ENGINEER.

PHASE 1: MBGF AND CULVERT END TREATMENTS

1. PLACE ALL EROSION PREVENTION BMPS ALONG PROJECT AS SHOWN IN SW3P SITE PLAN
2. INSTALL NEW MBGF ALONG BOTH SIDES OF ROADWAY AT CULVERTS 2 AND 4.
3. INSTALL SAFETY END TREATMENTS TO EACH END OF CULVERTS 1, 3, AND 8.
4. INSTALL SAFETY END TREATMENTS AT WEST END OF CULVERTS 5, 6, 7, AND 9.

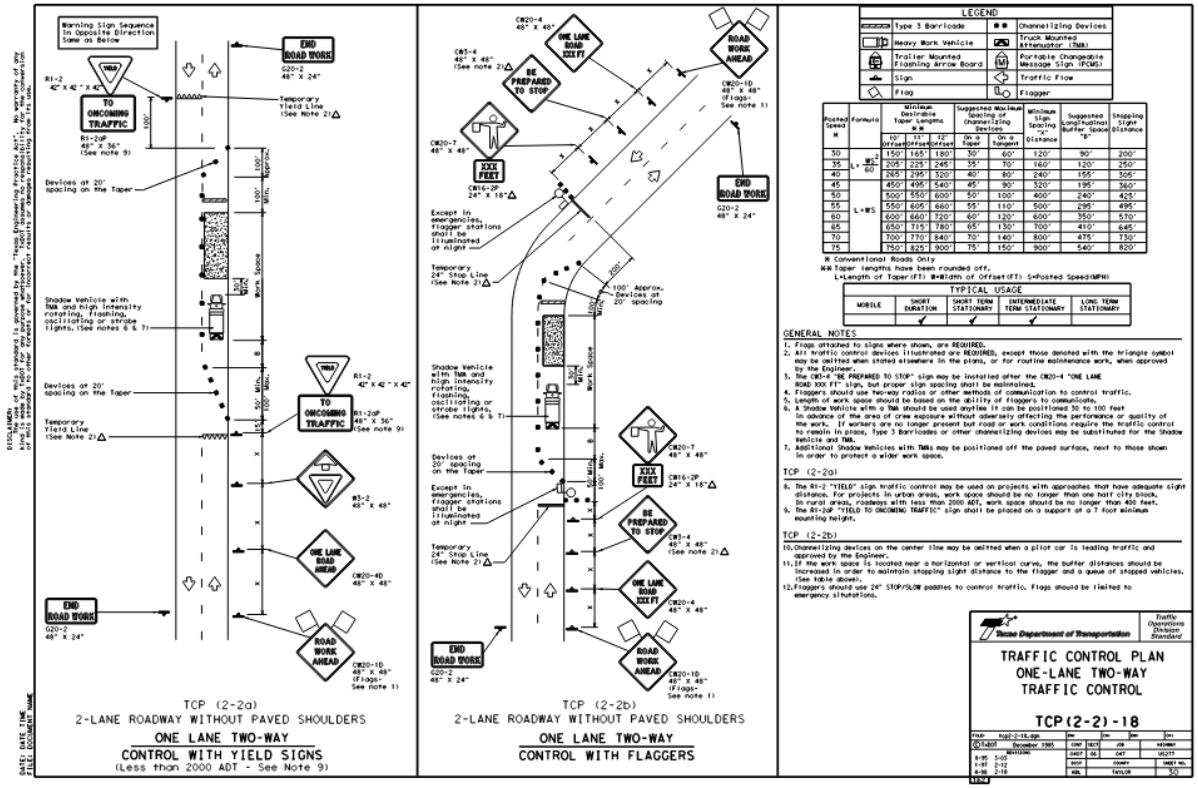
NOTE: --NO CHANGE ON EAST END OF CULVERTS 5, 6, 7 (EXISTING MBGF TO REMAIN) ,9 (OUTSIDE OF CLEAR ZONE)--

PHASE 2: MILLING

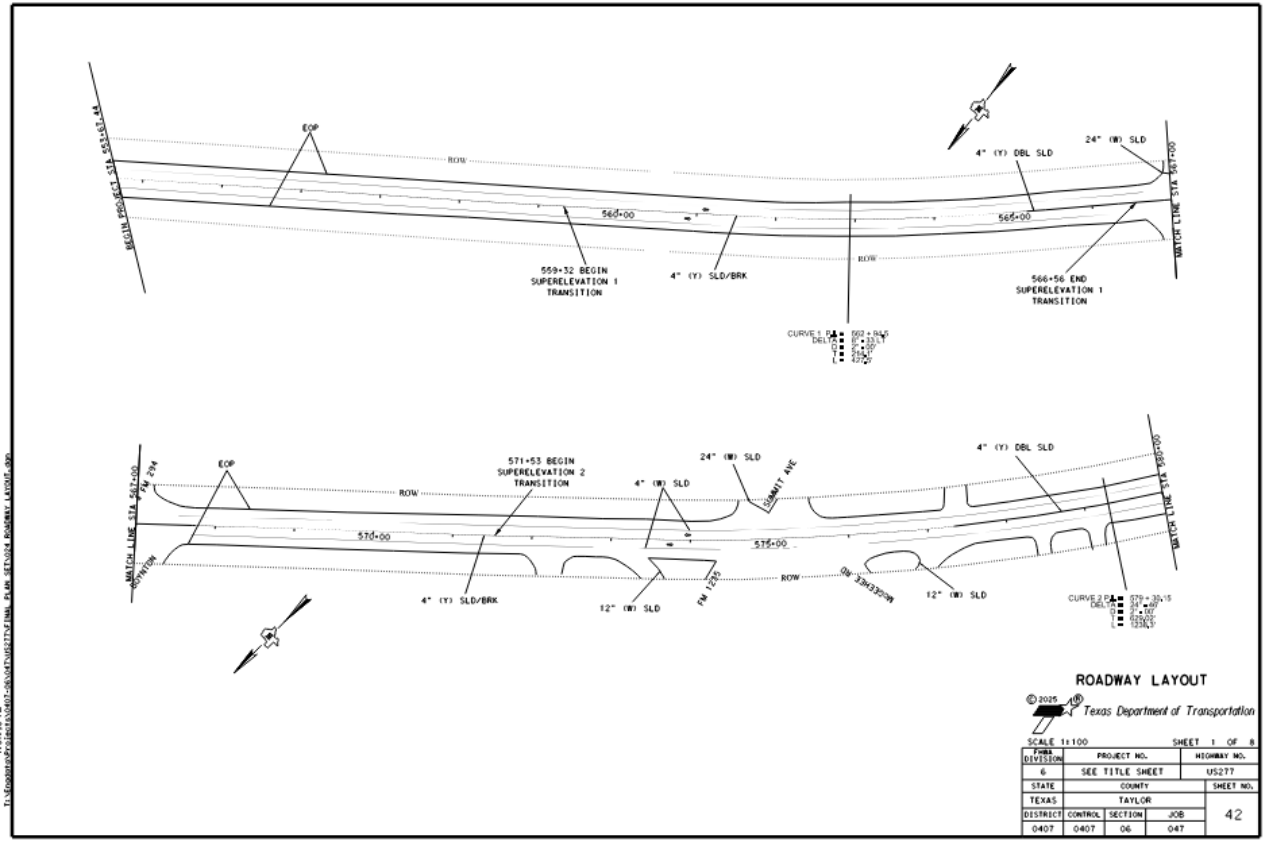
1. LOCATE AREAS FOR PAVEMENT REPAIR PRIOR TO MILLING OPERATIONS.
2. MILLING OPERATIONS SHALL PROGRESS IN SEGMENT LENGTHS THAT WILL ALLOW THE FULL THE PAVEMENT TO BE MILLED IN ONE DAY.
3. KEEP EXISTING SUPER ELEVATIONS IN PLACE WHEN MILLING.
4. TAPER MILLING DEPTH AT THE END OF EACH SEGMENT TO PROVIDE A SMOOTH TRANSITION FROM THE MILLED TO EXISTING SURFACE.
5. REMOVE ALL LOOSE DEBRIS AND PLACE TEMPORARY PAVEMENT MARKING TABS PRIOR TO OP LANE TO TRAFFIC OR AS DIRECTED.

PHASE 3: PAVEMENT REPAIR

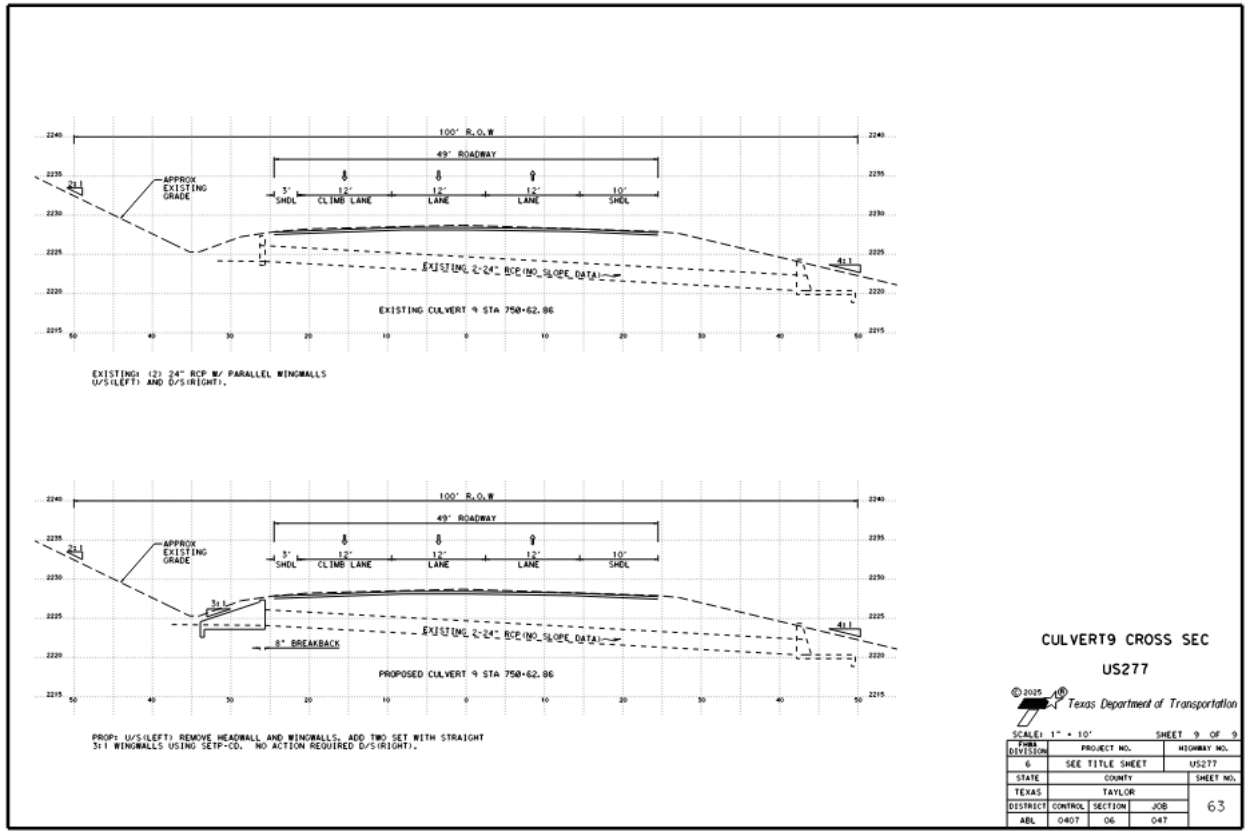
1. COMPLETE PAVEMENT REPAIRS AT LOCATIONS DIRECTED BY THE ENGINEER.
2. REMOVE ALL LOOSE DEBRIS FROM CLOSED LANES BEFORE OPENING TO TRAFFIC.
3. MAINTAIN TEMPORARY PAVEMENT MARKINGS AS NEEDED.



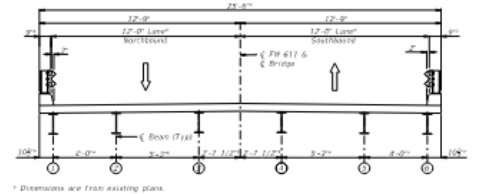
Roadway Layouts with Horizontal Alignments



Extra Labor Hours



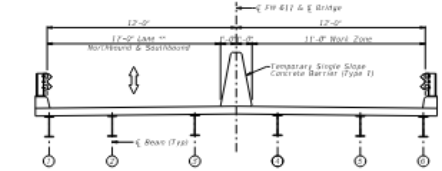
Extra Labor Hours



* Dimensions are from existing plans.

EXISTING BRIDGE, PHASE 3 REPAIRS & FINAL BRIDGE SECTION

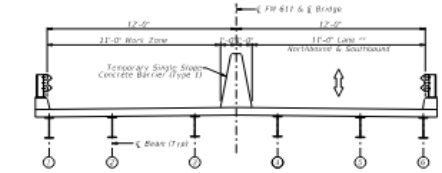
Scale: 3/16" = 1'-0"
(Looking Ahead Station)
(Showing Existing & Final Traffic Lanes)



** Using temporary traffic signal to alternate NB & SB traffic.

CONSTRUCTION PHASE 1 BRIDGE SECTION

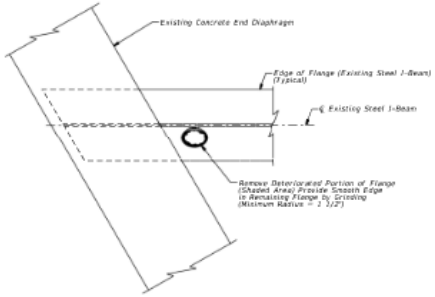
Scale: 3/16" = 1'-0"



** Using temporary traffic signal to alternate NB & SB traffic.

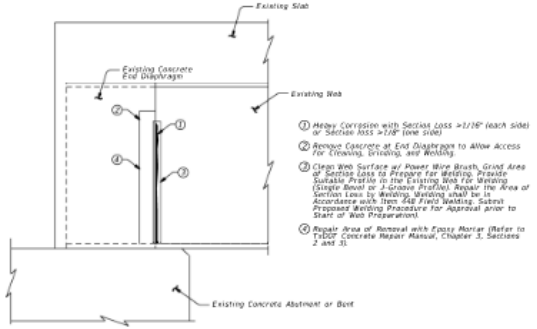
CONSTRUCTION PHASE 2 BRIDGE SECTION

Scale: 3/16" = 1'-0"



TYPE 1 STEEL BEAM REPAIR DETAIL

(Plan View Showing Bottom Flange Repair)
Scale: 1 1/2" = 1'-0"



TYPE 3 STEEL BEAM REPAIR DETAIL

(Elevation View Showing Web Repair)
Scale: 1 1/2" = 1'-0"

Function Code 102 - Feasibility Studies

Fn Code 102	Design Criteria	Group	Functional Class	Design Criteria
	PM / 2R	2	SH	PM / 2R
		Miles	4.4	

		1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Sum 1-9	Total	Range
	Model	23.32	20.24	7.00	28.47	28.03	13.64	9.20	0.35	1.80	132.05	152.85	112.02 - 189.29
1st Submittal	Lauren	54.00	36.00	0.00	36.00	36.00	16.00	16.00	4.00	2.00	200.00	210.00	
1st Submittal	Cliff	28.00	28.00	0.00	28.00	28.00	12.00	12.00	2.00	2.00	140.00	160.00	
2nd Submittal	Lauren	48.00	36.00	0.00	36.00	32.00	16.00	16.00	4.00	2.00	190.00	194.00	
2nd Submittal	Cliff	32.00	34.00	0.00	36.00	32.00	12.00	16.00	8.00	2.00	172.00	172.00	
3rd Submittal	Lauren	48.00	34.00	0.00	32.00	32.00	12.00	8.00	4.00	2.00	172.00	180.00	
3rd Submittal	Cliff	48.00	34.00	0.00	32.00	32.00	12.00	8.00	4.00	2.00	172.00	180.00	

AGREE

Function Code 102 - Feasibility Studies

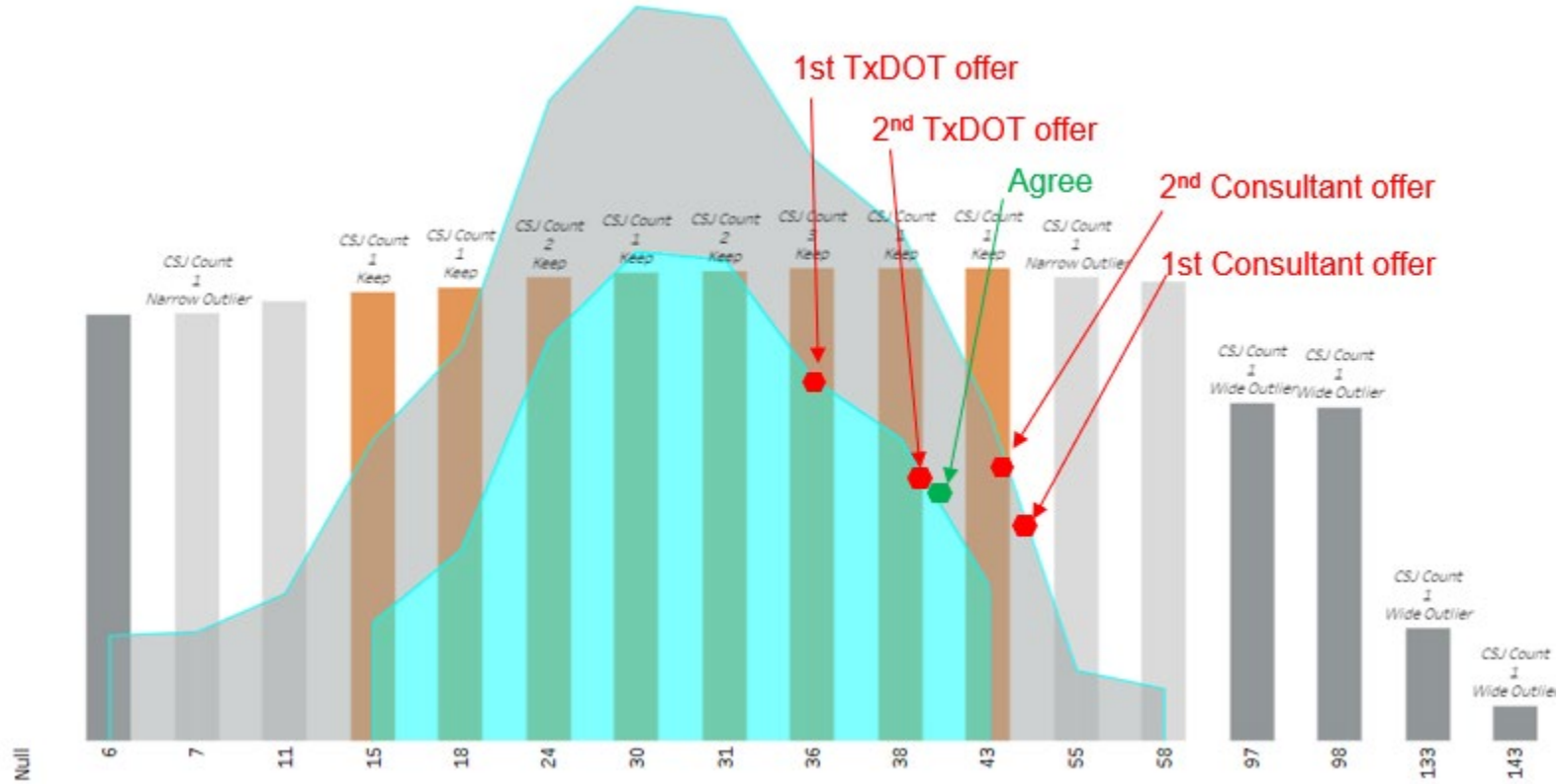


Tableau Function Code 102 - Feasibility Studies

Labor-Hours Summary
Transparency and Accountability in Contract Negotiation

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 102 - Route
1	FM	PM/2R	25	Average	20.08
				Std. Dev.	7.75
2	SH	PM/2R	23	Average	30.74
				Std. Dev.	8.28
3	Interstate	PM	22	Average	17.93
				Std. Dev.	6.54
4	FM	3R	19	Average	29.01
				Std. Dev.	19.49
5	SH	3R	15	Average	19.93
				Std. Dev.	7.12

Legend
Narrow
Wide

Group
(All)

Function Code
102 - Route

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile	Engineering Tech / Mile	CADD / Mile	Admin / Mile	Support MGR / Mile	Average Hours / Mile	Average Job Title
102 - Route	1	FM	PM/2R	16	3.40	2.06	1.62	5.21	5.23	0.73	0.97	0.22	0.64	20.08	20.08
	2	SH	PM/2R	12	5.30	4.60	1.59	6.47	6.37	3.10	2.09	0.08	0.41	30.74	30.01
	3	Interstate	PM	11	3.53	2.47	5.02	1.96	3.17	1.30	0.32	0.15	0.01	17.93	17.93
	4	FM	3R	12	3.66	3.22	3.08	5.00	6.85	3.14	0.21	0.39	0.22	29.01	25.77
	5	SH	3R	8	3.53	3.76	1.95	4.31	4.38	0.37	0.55	1.05	0.03	19.93	19.93

Function Code 120 - Social/Econ/Environ Studies

Fn Code 120	Design Criteria	Group	Functional Class	Design Criteria
	PM / 2R	2	SH	PM / 2R
		Miles	4.4	

		1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Sum 1-9	Total	Range
	Model	1.98	3.08	0.66	3.30	2.02	1.63	0.62	0.00	0.35	13.63	14.40	11.0 - 17.8
1st Submittal	Lauren	2.00	2.00	0.00	2.00	2.00	0.00	0.00	0.00	0.00	8.00	8.00	
1st Submittal	Cliff	4.00	4.00	0.00	4.00	2.00	2.00	1.00	1.00	0.00	18.00	18.00	
2nd Submittal	Lauren	4.00	4.00	0.00	4.00	2.00	2.00	1.00	1.00	0.00	18.00	18.00	
2nd Submittal	Cliff	4.00	4.00	0.00	4.00	2.00	2.00	1.00	1.00	0.00	18.00	18.00	

AGREE

Function Code 120 - Social/Econ/Environ Studies

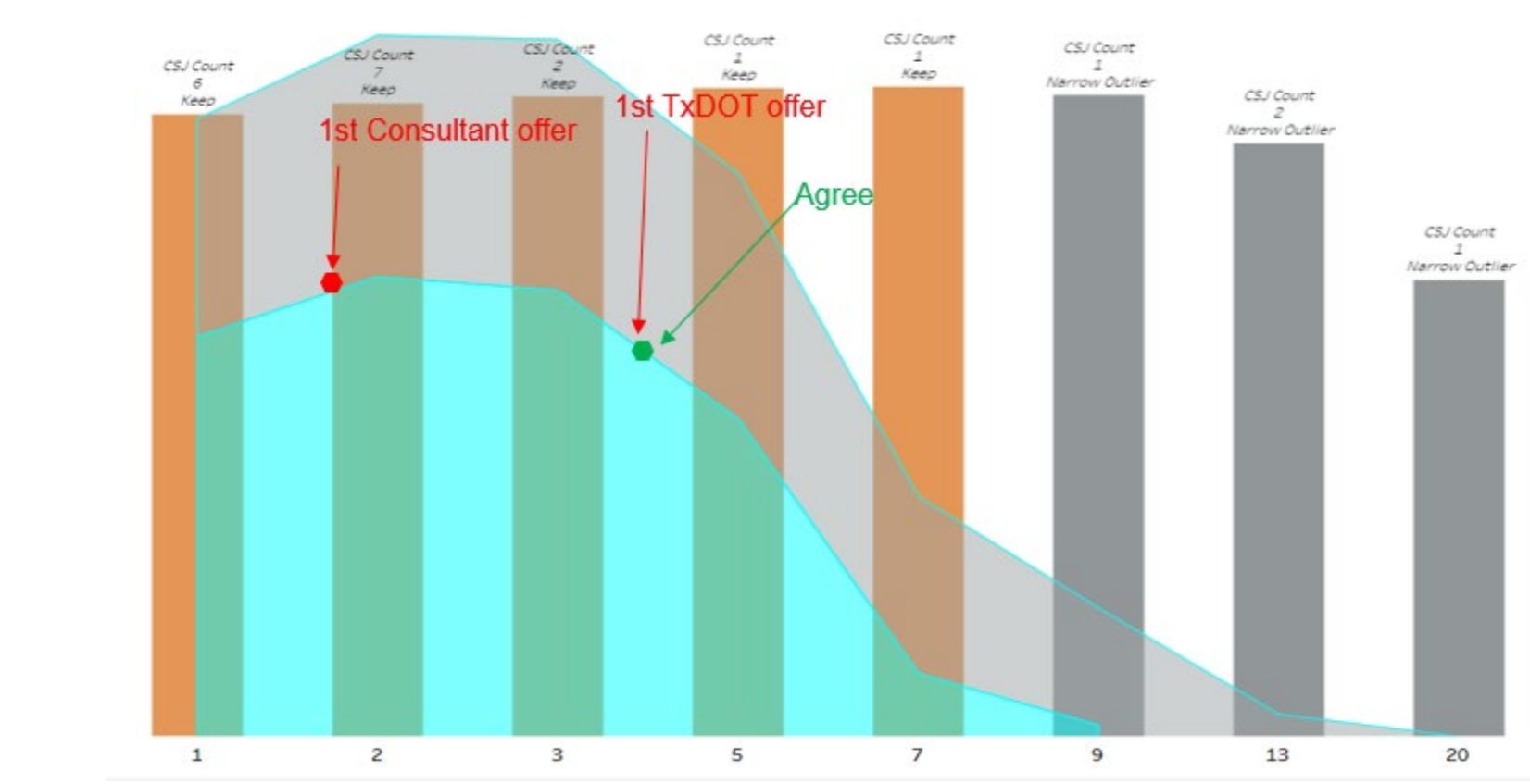


Tableau Function Code 120 - Social/Econ/Environ Studies

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 120 - ENV
1	FM	PM/2R	25	Average	2.14
				Std. Dev.	0.87
2	SH	PM/2R	23	Average	3.10
				Std. Dev.	2.31
3	Interstate	PM	22	Average	1.26
				Std. Dev.	0.70
4	FM	3R	19	Average	2.35
				Std. Dev.	1.34
5	SH	3R	15	Average	4.84
				Std. Dev.	2.67

Legend
Narrow
Wide

Group
(All)

Function Code
120 - ENV

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile	Engineering Tech / Mile	CADD / Mile	Admin / Mile	Support MGR / Mile	Average Hours / Mile	Average Job Title
120 - ENV	1	FM	PM/2R	13	0.37	0.36	0.16	0.14	0.34	0.29	0.26	0.00	0.02	2.14	1.94
	2	SH	PM/2R	18	0.45	0.70	0.15	0.75	0.46	0.37	0.14	0.00	0.08	3.10	3.10
	3	Interstate	PM	9	0.28	0.03	0.30	0.29	0.20	0.00	0.15	0.00	0.01	1.26	1.26
	4	FM	3R	12	0.23	0.50	0.29	0.41	0.18	0.36	0.29	0.00	0.02	2.35	2.28
	5	SH	3R	6	1.16	0.15	0.00	0.90	1.15	0.57	0.74	0.14	0.03	4.84	4.84

Function Code 145 – Project Management

Fn Code 145	Design Criteria	Group	Functional Class	Design Criteria
	PM / 2R	2	SH	PM / 2R
		Miles	4.4	

		1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Sum 1-9	Total	Range
	Model	72.38	17.82	2.60	22.53	2.82	0.35	0.00	17.56	10.43	96.80	150.00	102.00 - 198.0
1st Submittal	Lauren	90.00	40.00	0.00	30.00	0.00	0.00	0.00	12.00	0.00	172.00	180.00	
1st Submittal	Cliff	90.00	20.00	0.00	24.00	8.00	4.00	0.00	8.00	8.00	162.00	172.00	
2nd Submittal	Lauren	90.00	40.00	0.00	30.00	0.00	0.00	0.00	12.00	0.00	172.00	180.00	
2nd Submittal	Cliff	90.00	40.00	0.00	30.00	0.00	0.00	0.00	12.00	0.00	172.00	180.00	

AGREE

Function Code 145 – Project Management

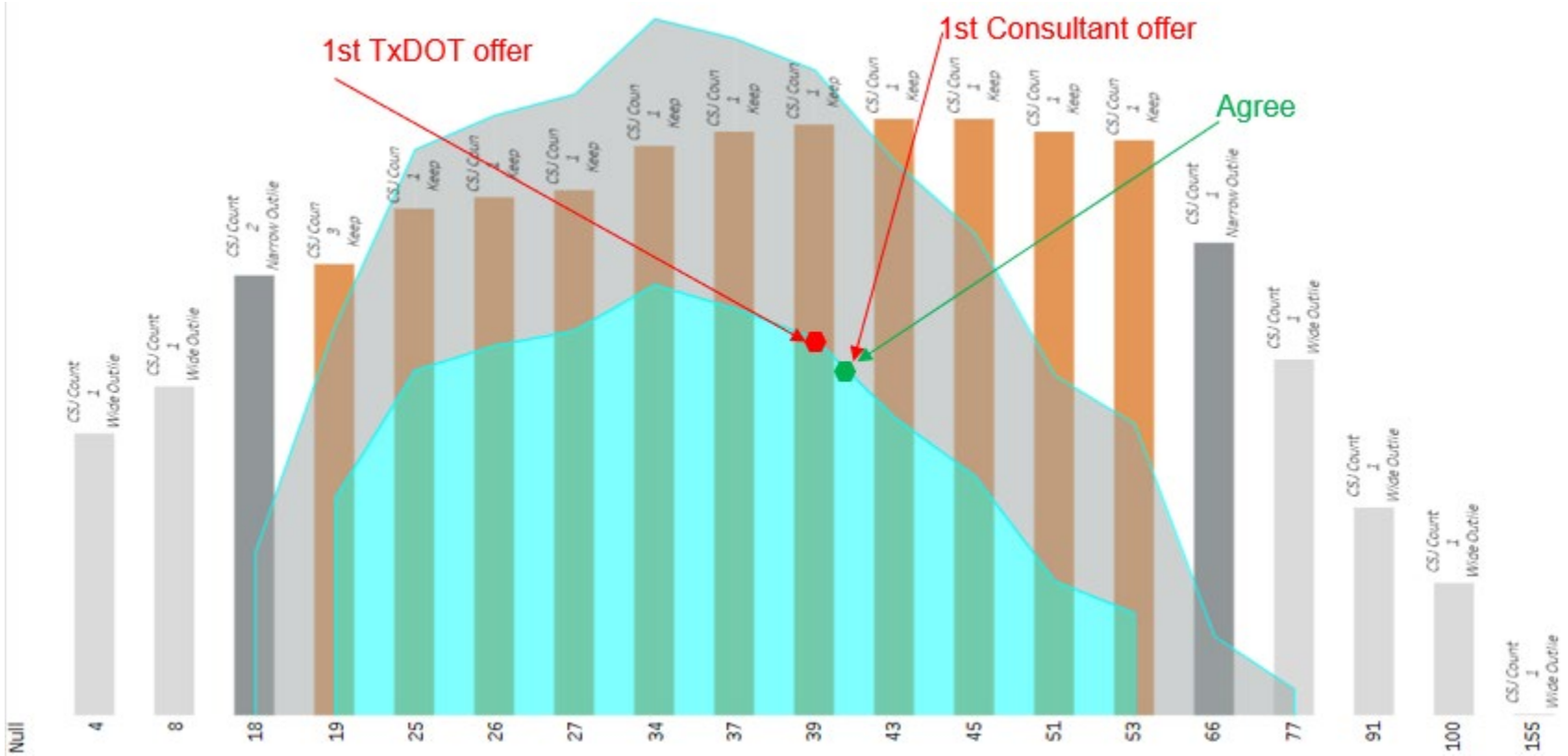


Tableau Function Code 145 – Project Management

Labor-Hours Summary
Transparency and Accountability in Contract Negotiation

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 145 - Project Management
1	FM	PM/2R	25	Average	26.44
				Std. Dev.	6.65
2	SH	PM/2R	23	Average	34.13
				Std. Dev.	11.92
3	Interstate	PM	22	Average	23.83
				Std. Dev.	11.32
4	FM	3R	19	Average	34.17
				Std. Dev.	20.22
5	SH	3R	15	Average	43.40
				Std. Dev.	19.22

Legend
Narrow
Wide

Group
(All)

Function Code
145 - Project Management

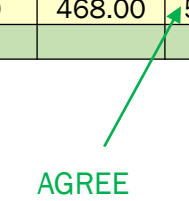
Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile	Engineering Tech / Mile	CADD / Mile	Admin / Mile	Support MGR / Mile	Average Hours / Mile	Average Job Title
145 - Project Management	1	FM	PM/2R	14	10.92	5.46	0.68	2.14	0.67	0.17	0.14	3.66	1.36	26.44	25.20
	2	SH	PM/2R	13	16.45	4.05	0.59	5.12	0.64	0.08	0.00	3.99	2.37	34.13	33.29
	3	Interstate	PM	13	9.04	1.46	1.60	3.42	2.87	0.09	0.52	2.78	1.61	23.83	23.39
	4	FM	3R	13	16.07	3.56	0.71	4.58	1.47	0.00	0.00	4.69	2.52	34.17	33.60
	5	SH	3R	8	18.18	2.81	0.80	7.15	2.89	0.20	0.55	9.30	1.52	43.40	43.40

Function Code 160 - Roadway Design

Fn Code 160	Design Criteria	Group	Functional Class	Design Criteria
	PM / 2R	2	SH	PM / 2R
		Miles	4.4	

		1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Sum 1-9	Total	Range
	Model	28.47	19.14	23.89	73.08	137.72	99.79	51.83	2.11	7.61	443.65	460.00	352 - 528
1st Submittal	Lauren	40.00	28.00	0.00	120.00	120.00	120.00	60.00	12.00	0.00	500.00	550.00	
1st Submittal	Cliff	32.00	20.00	0.00	90.00	150.00	100.00	40.00	4.00	8.00	444.00	490.00	
2nd Submittal	Lauren	36.00	24.00	0.00	110.00	120.00	110.00	60.00	8.00	0.00	468.00	500.00	
2nd Submittal	Cliff	36.00	24.00	0.00	110.00	120.00	110.00	60.00	8.00	0.00	468.00	500.00	



Function Code 160 - Roadway Design

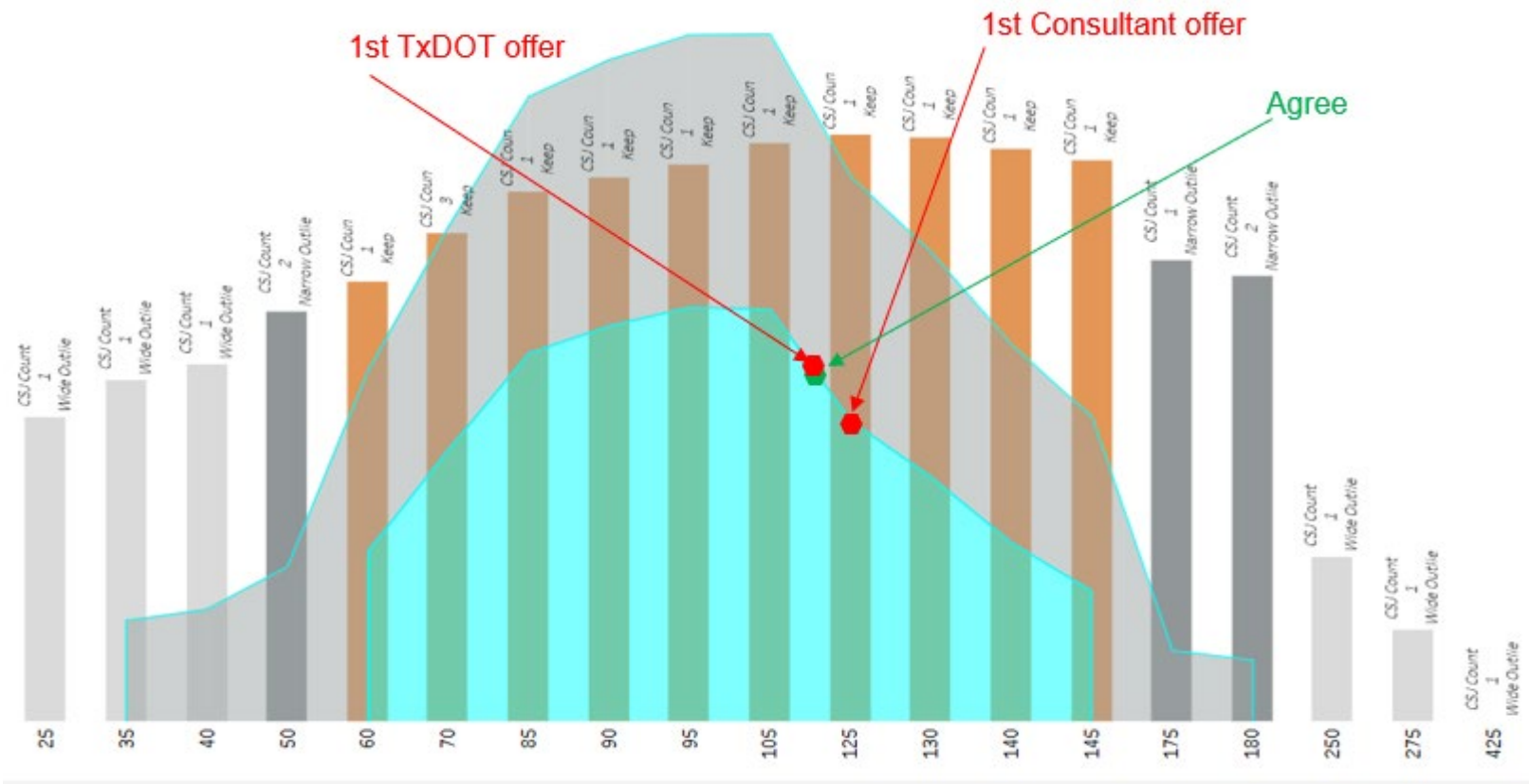


Tableau Function Code 160 - Roadway Design

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 160 - Roadway
1	FM	PM/2R	25	Average	124.65
				Std. Dev.	47.72
2	SH	PM/2R	23	Average	100.83
				Std. Dev.	29.97
3	Interstate	PM	22	Average	95.19
				Std. Dev.	42.97
4	FM	3R	19	Average	156.22
				Std. Dev.	41.97
5	SH	3R	15	Average	154.04
				Std. Dev.	64.27

Legend
- Narrow
- Wide

Group: (All)

Function Code: 160 - Roadway

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile	Engineering Tech / Mile	CADD / Mile	Admin / Mile	Support MGR / Mile	Average Hours / Mile	Average Job Title
160 - Roadway	1	FM	PM/2R	16	4.53	6.56	13.23	15.96	31.09	29.32	18.75	0.13	1.29	124.65	120.86
	2	SH	PM/2R	12	6.47	4.35	5.43	16.61	31.30	22.68	11.78	0.48	1.73	100.83	100.83
	3	Interstate	PM	17	5.42	3.47	4.41	15.12	32.29	5.60	20.29	0.00	0.31	95.19	86.91
	4	FM	3R	11	5.91	11.34	18.67	9.66	33.90	39.81	36.20	0.00	0.73	156.22	156.22
	5	SH	3R	8	6.90	15.23	21.39	13.19	41.63	20.42	28.50	1.75	5.03	154.04	154.04

Function Code 161 – BASE DRAINAGE wo CULVERTS

Fn Code 161	Design Criteria	Group	Functional Class	Design Criteria
	PM / 2R	2	SH	PM / 2R
		Miles	4.4	

		1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Sum 1-9	Total	Range
	Model	17.69	11.04	0.57	51.52	96.27	27.59	27.41	0.00	0.53	232.63	250.00	210.8 - 289.2
1st Submittal	Lauren	40.00	40.00	0.00	30.00	120.00	40.00	60.00	12.00	0.00	342.00	360.00	
1st Submittal	Cliff	24.00	18.00	0.00	60.00	100.00	32.00	32.00	2.00	2.00	270.00	270.00	
2nd Submittal	Lauren	24.00	18.00	0.00	60.00	100.00	32.00	32.00	2.00	2.00	270.00	270.00	
2nd Submittal	Cliff	24.00	18.00	0.00	60.00	100.00	32.00	32.00	2.00	2.00	270.00	270.00	

AGREE

ADD 8 HOURS PER CULVERT TO FUNCTION CODE 161

Function Code 161 – BASE DRAINAGE wo CULVERTS

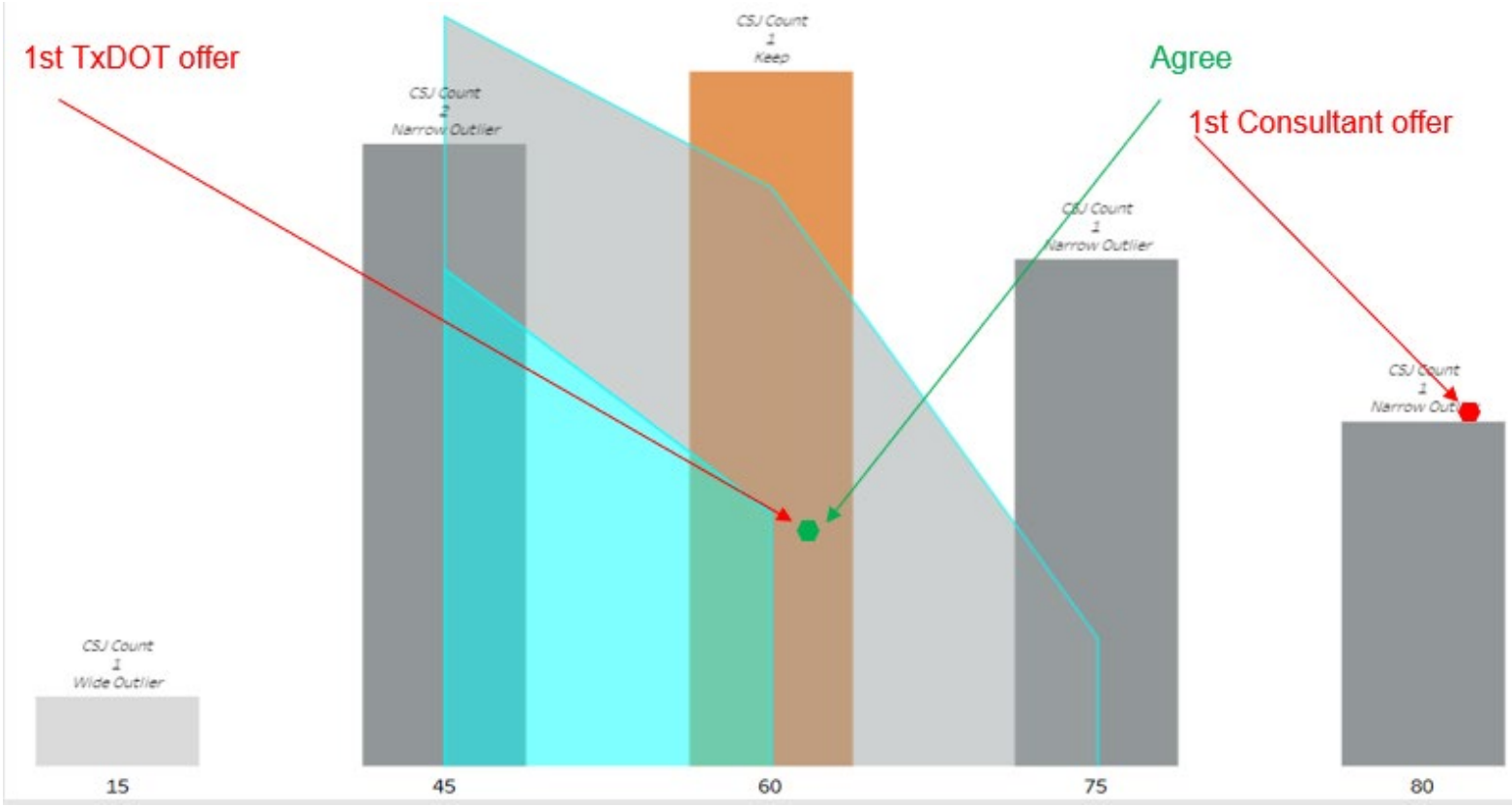


Tableau Function Code 161 – BASE DRAINAGE wo CULVERTS

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 161 - Drainage
1	FM	PM/2R	25	Average	82.32
				Std. Dev.	45.25
2	SH	PM/2R	23	Average	52.87
				Std. Dev.	8.82
3	Interstate	PM	22	Average	27.31
				Std. Dev.	15.08
4	FM	3R	19	Average	103.46
				Std. Dev.	38.56
5	SH	3R	15	Average	33.34
				Std. Dev.	16.28

Legend
- Narrow
- Wide

Group: (All)

Function Code: 161 - Drainage

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile	Engineering Tech / Mile	CADD / Mile	Admin / Mile	Support MGR / Mile	Average Hours / Mile	Average Job Title
161 - Drainage	1	FM	PM/2R	13	2.49	6.96	11.32	8.68	26.23	22.40	1.39	0.28	1.08	82.32	80.83
	2	SH	PM/2R	3	4.02	2.51	0.13	11.71	21.88	6.27	6.23	0.00	0.12	52.87	52.87
	3	Interstate	PM	10	1.51	4.14	1.73	5.41	7.72	2.04	4.47	0.00	0.29	27.31	27.31
	4	FM	3R	9	3.92	5.47	14.24	11.06	30.15	23.96	7.82	0.26	2.55	103.46	99.43
	5	SH	3R	9	2.23	4.34	7.62	5.10	9.39	2.48	1.40	0.10	0.68	33.34	33.34

Function Code 162 - Signing, Pavement Markings, Signalization

Fn Code 162	Design Criteria	Group	Functional Class	Design Criteria
	PM / 2R	2	SH	PM / 2R
		Miles	4.4	

		1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Sum 1-9	Total	Range
	Model	8.45	14.92	33.53	31.02	76.30	43.30	28.86	0.50	4.93	241.69	260.00	135 - 350
1st Submittal	Lauren	16.00	28.00	0.00	40.00	100.00	40.00	60.00	12.00	4.00	300.00	300.00	
1st Submittal	Cliff	8.00	32.00	0.00	36.00	76.00	48.00	32.00	4.00	4.00	240.00	270.00	
2nd Submittal	Lauren	16.00	28.00	0.00	40.00	100.00	40.00	60.00	12.00	4.00	300.00	300.00	
2nd Submittal	Cliff	16.00	28.00	0.00	40.00	100.00	40.00	60.00	12.00	4.00	300.00	300.00	

AGREE

Function Code 162 - Signing, Pavement Markings, Signalization

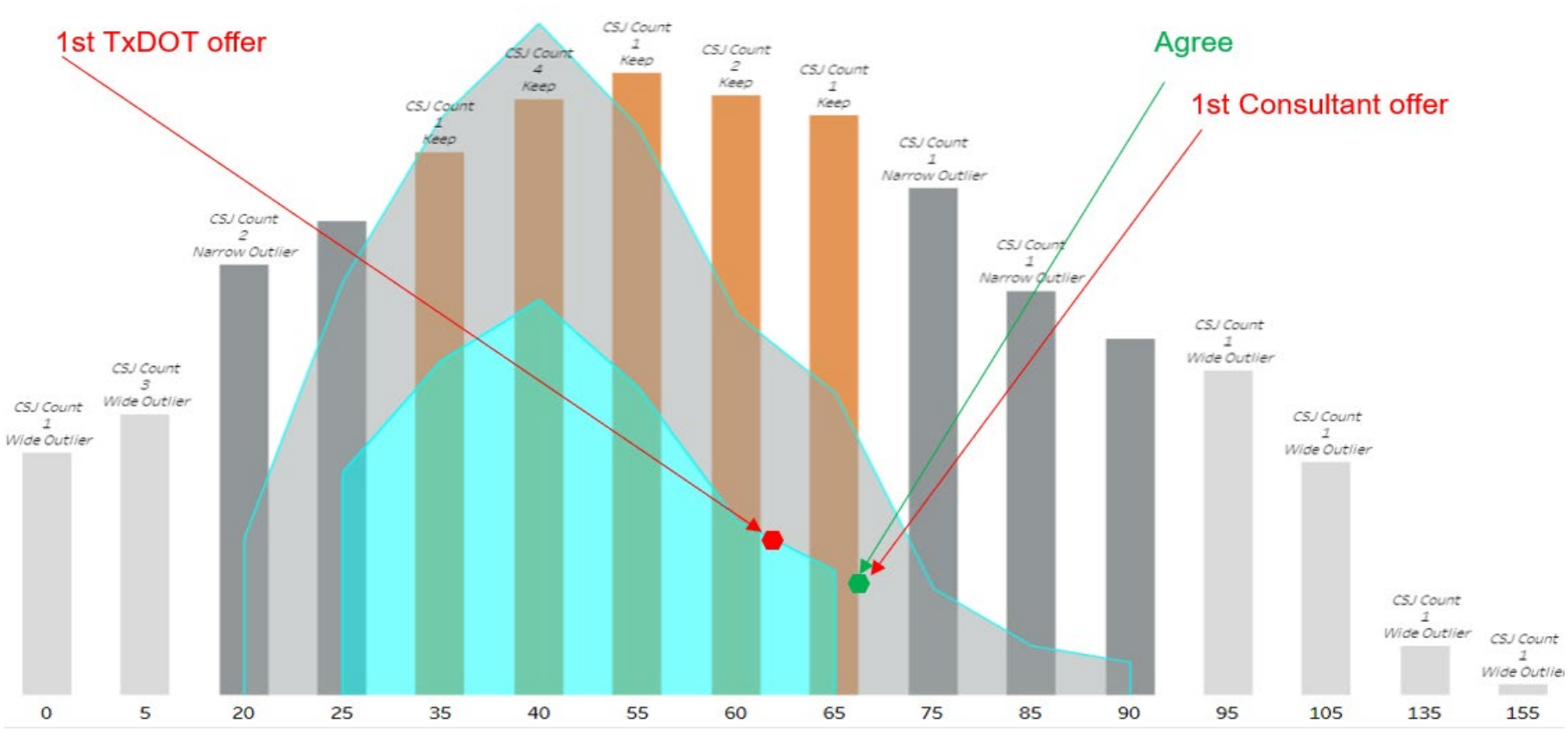


Tableau Function Code 162 - Signing, Pavement Markings, Signalization

Labor-Hours Summary
Transparency and Accountability in Contract Negotiation

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code: 162 - Signing and Marking
1	FM	PM/2R	25	Average	44.91
				Std. Dev.	14.90
2	SH	PM/2R	23	Average	54.93
				Std. Dev.	24.31
3	Interstate	PM	22	Average	33.48
				Std. Dev.	13.51
4	FM	3R	19	Average	32.38
				Std. Dev.	10.13
5	SH	3R	15	Average	37.42
				Std. Dev.	16.37

Legend
Narrow
Wide

Group
(All)

Function Code
162 - Signing and Marking

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile	Engineering Tech / Mile	CADD / Mile	Admin / Mile	Support MGR / Mile	Average Hours / Mile	Average Job Title
162 - Signing and Marking	1	FM	PM/2R	12	1.23	1.99	3.08	5.60	18.45	6.21	8.07	0.00	0.28	44.91	44.91
	2	SH	PM/2R	18	1.92	3.39	7.62	7.05	17.34	9.84	6.56	0.09	1.12	54.93	54.93
	3	Interstate	PM	14	1.77	0.77	5.11	6.66	12.71	3.52	2.28	0.34	0.32	33.48	33.48
	4	FM	3R	9	1.31	1.62	5.80	2.88	10.37	7.46	1.77	0.00	1.17	32.38	32.38
	5	SH	3R	9	1.49	1.97	6.20	4.69	12.38	1.78	7.38	0.08	1.45	37.42	37.42

Function Code 163 - Miscellaneous (Roadway)

Fn Code 163	Design Criteria	Group	Functional Class	Design Criteria
	PM / 2R	2	SH	PM / 2R
		Miles	4.4	

		1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Sum 1-9	Total	Range
	Model	39.60	41.45	26.27	72.91	111.85	57.20	31.64	0.22	28.90	410.00	425.00	280 - 525
1st Submittal	Lauren	80.00	80.00	80.00	80.00	80.00	80.00	80.00	40.00	40.00	640.00	700.00	
1st Submittal	Cliff	40.00	40.00	32.00	80.00	120.00	60.00	32.00	8.00	8.00	420.00	450.00	
2nd Submittal	Lauren	40.00	40.00	32.00	80.00	120.00	60.00	32.00	8.00	8.00	420.00	450.00	
2nd Submittal	Cliff	40.00	40.00	32.00	80.00	120.00	60.00	32.00	8.00	8.00	420.00	450.00	

AGREE

Function Code 163 - Miscellaneous (Roadway)

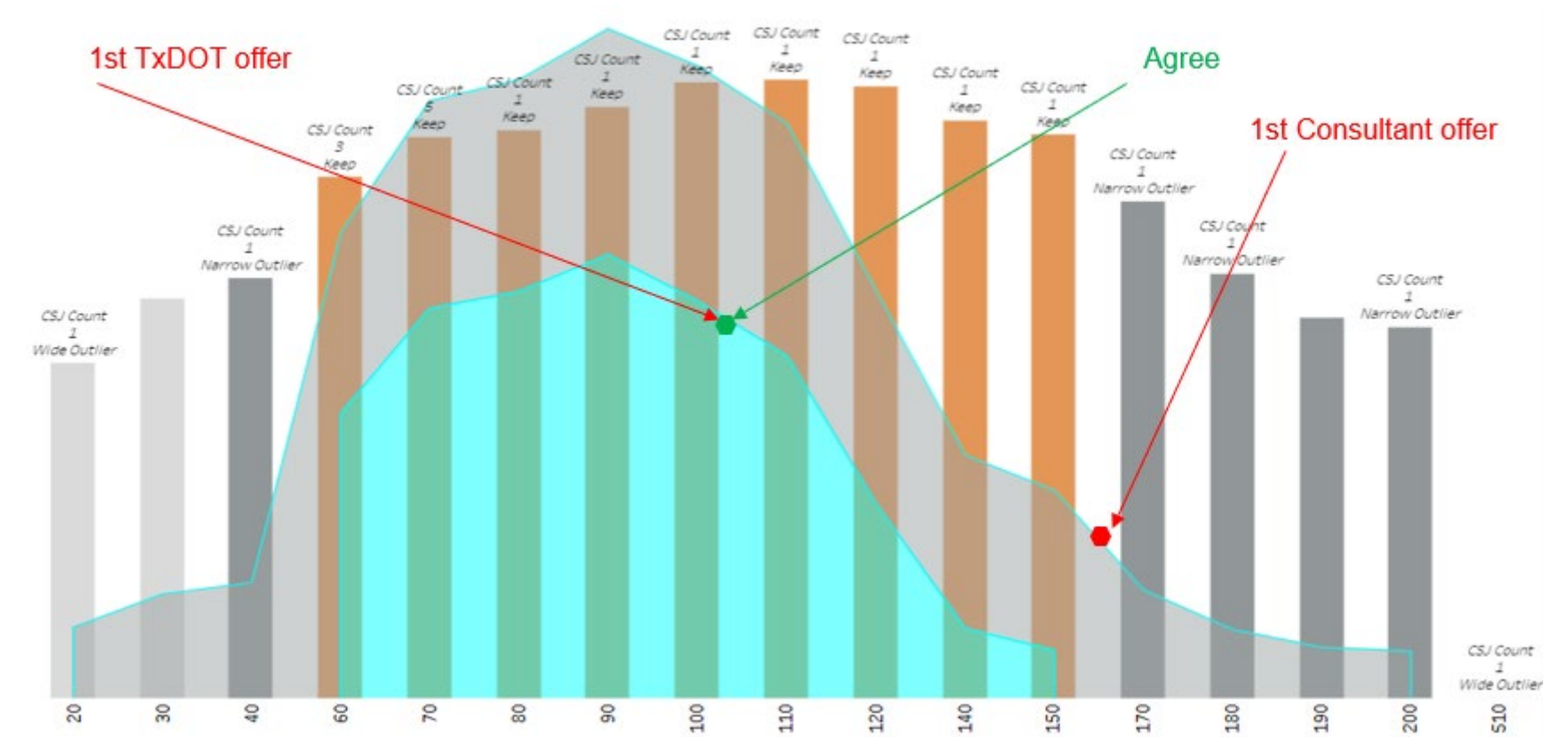


Tableau Function Code 163 - Miscellaneous (Roadway)

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 163 - Misc
1	FM	PM/2R	25	Average	62.42
				Std. Dev.	16.81
2	SH	PM/2R	23	Average	93.20
				Std. Dev.	29.79
3	Interstate	PM	22	Average	53.53
				Std. Dev.	28.91
4	FM	3R	19	Average	102.75
				Std. Dev.	21.54
5	SH	3R	15	Average	102.82
				Std. Dev.	43.87

Legend
- Narrow
- Wide

Group: (All)

Function Code: 163 - Misc

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile	Engineering Tech / Mile	CADD / Mile	Admin / Mile	Support MGR / Mile	Average Hours / Mile	Average Job Title
163 - Misc	1	FM	PM/2R	13	3.24	2.55	6.60	9.63	17.17	9.52	5.45	0.19	1.02	62.42	55.37
	2	SH	PM/2R	15	9.00	9.42	5.97	16.57	25.42	13.00	7.19	0.05	6.58	93.20	93.20
	3	Interstate	PM	14	5.95	3.51	4.88	12.08	17.98	0.26	7.94	0.55	0.38	53.53	53.53
	4	FM	3R	10	5.63	9.32	13.88	12.70	18.88	15.39	21.48	0.51	2.14	102.75	99.93
	5	SH	3R	10	9.88	9.37	11.50	14.84	17.96	19.52	11.02	0.79	5.18	102.82	100.06

Summary

Function Code	1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Other Job Titles	TOTAL
102	48.00	34.00	0.00	32.00	32.00	12.00	8.00	4.00	2.00	8.00	180.00
120	4.00	4.00	0.00	4.00	2.00	2.00	1.00	1.00	0.00	0.00	18.00
145	90.00	40.00	0.00	30.00	0.00	0.00	0.00	12.00	0.00	8.00	180.00
160	36.00	24.00	0.00	110.00	120.00	110.00	60.00	8.00	0.00	32.00	500.00
161	24.00	18.00	0.00	60.00	100.00	32.00	32.00	2.00	2.00	0.00	270.00
162	16.00	28.00	0.00	40.00	100.00	40.00	60.00	12.00	4.00	0.00	300.00
163	40.00	40.00	0.00	80.00	120.00	60.00	32.00	8.00	8.00	37.00	425.00
Total	258.00	188.00	0.00	356.00	474.00	256.00	193.00	47.00	16.00	85.00	1873.00

Contract Cost

Function Code	1 Project Manager / Mile	2 Engineer (Senior) / Mile	3 Engineer (Design) / Mile	4 Engineer (Project) / Mile	5 Engineer-In-Training / Mile	6 Engineering Tech / Mile	7 CADD / Mile	8 Admin / Mile	9 Support MGR / Mile	Other Job Titles	TOTAL
102	48.00	34.00	0.00	32.00	32.00	12.00	8.00	4.00	2.00	8.00	180.00
120	4.00	4.00	0.00	4.00	2.00	2.00	1.00	1.00	0.00	0.00	18.00
145	90.00	40.00	0.00	30.00	0.00	0.00	0.00	12.00	0.00	8.00	180.00
160	36.00	24.00	0.00	110.00	120.00	110.00	60.00	8.00	0.00	32.00	500.00
161	24.00	18.00	0.00	60.00	100.00	32.00	32.00	2.00	2.00	0.00	270.00
162	16.00	28.00	0.00	40.00	100.00	40.00	60.00	12.00	4.00	0.00	300.00
163	40.00	40.00	0.00	80.00	120.00	60.00	32.00	8.00	8.00	37.00	425.00
Total Hours	258.00	188.00	0.00	356.00	474.00	256.00	193.00	47.00	16.00	85.00	1873.00
Contract Cost	$66,409.20	$41,939.04	$ -	$61,089.60	$48,803.04	$25,625.60	$18,767.32	$4,032.60	$3,477.76	$12,155.00	**$282,299.16**

Proposed Negotiation Process for Base Contract

1. First Negotiate the Labor Hours for the Function Code

2. Start at the Average Hours per Mile then use Engineering Judgement

3. After Agreement on Function Code, then examine Job Titles

4. Distribution of Labor Hours per Job Titles is unique to each firm

5. Be Flexible, but make sure Labor Hours are in correct Function Code

6. Distribution amongst Job Titles must make sense to that project

How transparent will TxDOT be with the Labor Hours Model

1. Transparency is very important and key to successful negotiations
2. How the data would be used and ultimately shared has not been determined
3. It is early in development of the LOE model, and we are working on the process
4. We have a joint committee with ACEC to ensure consultant input and fairness
5. We will keep you posted next year and will do an in-person presentation once complete

Function Code 102 Route Studies

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 102 - Route
1	FM	PM/2R	25	Average	20.08
				Std. Dev.	7.75
2	SH	PM/2R	23	Average	30.74
				Std. Dev.	8.28
3	Interstate	PM	22	Average	17.93
				Std. Dev.	6.54
4	FM	3R	19	Average	29.01
				Std. Dev.	19.49
5	SH	3R	15	Average	19.93
				Std. Dev.	7.12

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile
102 - Route	1	FM	PM/2R	16	3.40	2.06	1.62	5.21	5.23
	2	SH	PM/2R	12	5.30	4.60	1.59	6.47	6.37
	3	Interstate	PM	11	3.53	2.47	5.02	1.96	3.17
	4	FM	3R	12	3.66	3.22	3.08	5.00	6.85
	5	SH	3R	8	3.53	3.76	1.95	4.31	4.38

Function Code 120 Environmental Studies

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 120 - ENV
1	FM	PM/2R	25	Average	2.14
				Std. Dev.	0.87
2	SH	PM/2R	23	Average	3.10
				Std. Dev.	2.31
3	Interstate	PM	22	Average	1.26
				Std. Dev.	0.70
4	FM	3R	19	Average	2.35
				Std. Dev.	1.34
5	SH	3R	15	Average	4.84
				Std. Dev.	2.67

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile
120 - ENV	1	FM	PM/2R	13	0.37	0.36	0.16	0.14	0.34
	2	SH	PM/2R	18	0.45	0.70	0.15	0.75	0.46
	3	Interstate	PM	9	0.28	0.03	0.30	0.29	0.20
	4	FM	3R	12	0.23	0.50	0.29	0.41	0.18
	5	SH	3R	6	1.16	0.15	0.00	0.90	1.15

Function Code 145 Project Management

Group 1 - 5 Summary

Group	Functional Class	Design Criteria	Number of Projects		Function Code 145 - Project Manageme
1	FM	PM/2R	25	Average	26.44
				Std. Dev.	6.65
2	SH	PM/2R	23	Average	34.13
				Std. Dev.	11.92
3	Interstate	PM	22	Average	23.83
				Std. Dev.	11.32
4	FM	3R	19	Average	34.17
				Std. Dev.	20.22
5	SH	3R	15	Average	43.40
				Std. Dev.	19.22

Labor-Hours by Job Title

Function Code	Group	Functional Class	Design Criteria	Function Code Number of Projects	Project Manager / Mile	Engineer (Senior) / Mile	Engineer (Design) / Mile	Engineer (Project) / Mile	Engineer-In-Training / Mile
145 - Project Management	1	FM	PM/2R	14	10.92	5.46	0.68	2.14	0.67
	2	SH	PM/2R	13	16.45	4.05	0.59	5.12	0.64
	3	Interstate	PM	13	9.04	1.46	1.60	3.42	2.87
	4	FM	3R	13	16.07	3.56	0.71	4.58	1.47
	5	SH	3R	8	18.18	2.81	0.80	7.15	2.89

TxDOT addresses Industry Concerns with Labor Hour LOE Tool

"The LOE Tool will be used for all types of TxDOT Projects"

- We are loading data for low-risk Preventative Maintenance projects, the model will not be complete for six months, then needs reviewing, testing, tweaking, and testing some more – we are very, very early in the process.

"The LOE Tool has already been developed without consultant input and is being sold to us."

• Phase 1 (May 2021 – August 2021)	Abilene	9 E&S
• Phase 2 (Sept 2021 - August 2022)	Abilene, PEPS	104 PSE
• Phase 3 (Sept 2022 – present)	Abilene, PEPS, MPPM, ACEC	

TxDOT Labor-Hours Concerns

The Labor-Hour data must be correct / accurate for the proposed project.

- In the case of the 9 x $9M West Texas Environmental and Schematic corridors, we had a near perfect sample to examine.
- Imperative that TxDOT only use historical data from successful contracts on highly similar projects.

The Labor-Hour data must be applied accurately to each project.

- Each project has unique unknowns and risk involved for each job title.
- A contract will often be higher than the average number of labor-hours per mile due to the various complexity of a project.

TxDOT Labor-Hours Concerns

No two projects are the same

- The purpose of this tool is to get TxDOT and consultants closer to a contract that is fair and equitable for both sides.
- The tool does not replace engineering judgement or common sense in negotiations.

What if we use subconsultants for some services in the contract?

- Labor-hours can be reviewed by the Function Code instead of by the entire Job Title.
- The Prime can add the sub-consultant's hours to the Prime's Job Title for those services or that Function Code can be reviewed separately.

TxDOT Labor-Hours Concerns

What if we have multiple Senior Engineers or EITs on our contract?

- The Labor-Hours for each Job Title are added regardless of the number of employees at that position.

This system favors some consultant firms.

- Labor-Hours are reviewed regardless of wages, overhead rates, direct cost or profit.
- The number of Labor-Hours should be the same regardless of a firm's specifics.

Begin With The End In Mind - 2025

The model has been tweaked and the data is highly accurate

All Contracts beginning in 2024 or 2025 are entered

IT has perfected the format of the data and tableaus

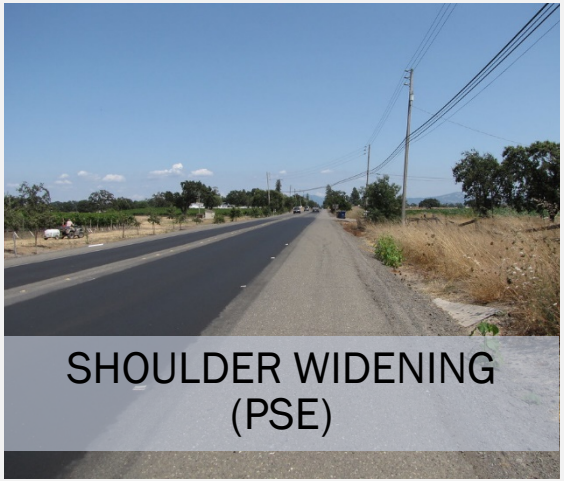
TxDOT PMs have been trained on how to use the tool

Consultants are receiving the market rate of Labor Hours

Negotiations are much faster and more efficient

Contract information is much more transparent

Some Other Contract Types That We Would Like to Examine in the Future:



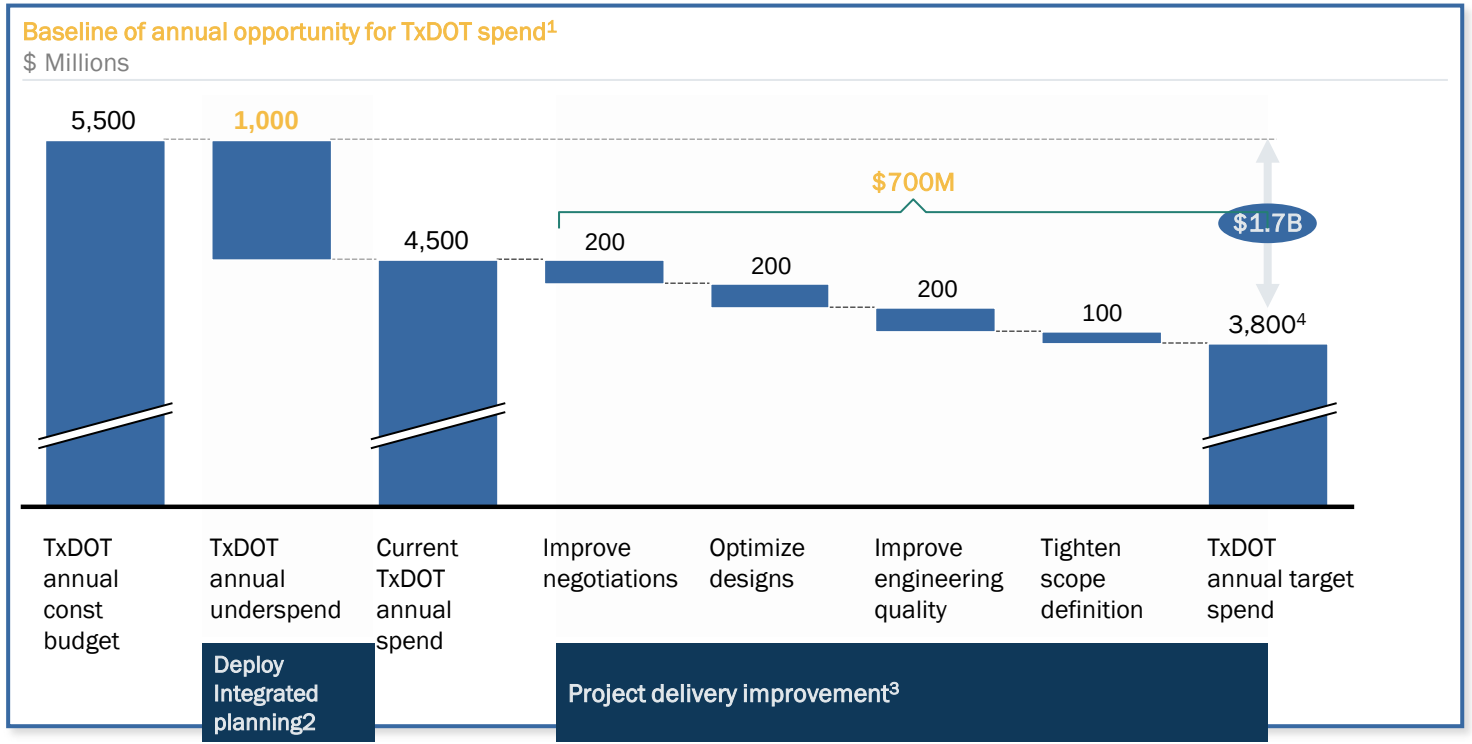
We are working with ACEC on the LOE Labor Hour Tool

- ★ John Lamb, Lamb-Star
- ★ Dawn Green, KCI
- ★ Doug Dillon, BGE
- ★ Don Green, RS&H
- ★ Todd Thurber, LJA
- ★ Lee Ann Dixon, Walter P. Moore
- ★ Kelly Kaatz, HDR
- ★ Dave Lubitz, Aguirre & Fields
- ★ John Hamilton, Parkhill
- ★ Travis Isaacson, The Rios Group

Why is this important?

Lauren Garduño, P.E.

3 Capturing planning and project delivery opportunities will allow TxDOT to deliver $1.7B in additional project value per year (2014)



1 Assumes steady state operation of enhanced project delivery organization
2 Assumes TxDOT can spend its total annual budget through enhanced budget planning and capital deployment
3 Assumes the capture of $300 million of the $450 million in annual over runs due to unpreventable scope changes, estimation errors, etc.
4 Opportunity excludes optimizing labor and labor management as currently that is outside TxDOT scope and is self-performed by contractors

Questions and Discussion

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