Designers Reference Guide

San Antonio District, June 2025

Contents

Project Development

Schematic and Environmental

1. When planning a Direct Connect (DC) interchange, design all DC's for a 2-lane bridge, even if there is only 1 lane in the interim condition.

2. When designing a multi-level direct connect interchange, avoid installing straddle bents across the mainlanes of either roadway facility. If straddle bents are needed to be installed across any roadway, they shall be designed as pre-cast elements.

3. Consider future / ultimate condition of mainlanes including utilities and drainage when deciding the locations of bents to avoid future conflicts. Review the order of the stack for practicality and constructability. Consider the location of stub outs for future connections.

4. In a freeway configuration, slope frontage roads towards the mainlanes to collect drainage in median ditches between the mainlanes and frontage roads

5. When planning for operational improvements on a controlled access facility, an "X" ramp configuration is preferred. TxDOT Access Management manual is to be referenced and considered.

6. When designing for ramps for a facility on the interstate system, keep in mind FHWA's latest criteria on ramp spacing. They expect a minimum spacing of 2500' with an auxiliary lane and 3500' without an auxiliary lane where space permits. The spacing is measured from tip of painted gore to tip of painted gore.

7. The location of entrance and exit ramps are critical to the operations of a freeway system and any changes should be modeled with appropriate software for the operational characteristics of the project location (i.e. urban/rural, high/low volumes, proximity to major interchanges, etc.) and necessary public involvement should be conducted. During the PS&E phase or in construction, no changes to the locations of ramps should be made without consulting the Advanced Planning Director to ensure consistency with previous approvals and plans.

8. For an exit ramp, carry the 3rd frontage road lane (aux lane) to the adjacent intersection rather than ending it at an entrance ramp.

9. Design radii at intersections to accommodate WB-67 trucks. For driveways and side streets, design curve radii on a case-by-case scenario to accommodate the appropriate design vehicle

that will be utilizing the facility. Design to be checked with AutoTurn or applicable design software.

10. When providing a shared use path on one side of the roadway, consider utilizing z-crossings midblock if the intersection spacing is >1/2 mile and there is a demand for pedestrians / cyclists to access the path from across the street.

11. When converting from a rural typical section to an urban (curbed) typical section, when possible, adjust the profile slightly to allow all drainage within the ROW to be captured into the storm drain system.

12. When a BMP is required for storm water treatment, if possible, configure the drainage design to utilize nonstructural BMP's (e.g.: Grassy Swales, Vegetative Filter Strips, Detention Ponds).

13. When collecting traffic data, plan to avoid collection on holidays, non-school periods, college dead week, Mondays and Fridays, special events, bad weather days, etc.

14. Coordinate with TxDOT to obtain high resolution color aerial images for schematic layout background.

15. When reconstructing a bridge over Waters of the US, if possible, span the entire waterway to avoid any Environmental impacts. Avoid placing drilled shafts in the OHWM.

16. All overpasses on or crossing a freight corridor must be constructed to meet the requirements of the Texas Highway Freight Network (THFN). Consider superelevation, beam/cap depth, surface underneath and shortest vertical curve point. Reference TxDOT Roadway Design manual, Chapter 21.

17. When expanding a roadway, it is critical to evaluate driveway tie in points early in the schematic phase to determine ROW needs. Coordinate with Property Owners early if structures or operations will be affected.

18. When constructing a bridge over a railroad, if possible span entire ROW to avoid extensive railroad coordination. Span the entire Railroad ROW to not hinder future RR expansion within the ROW. Verify the appropriate vertical clearance with each railroad company.

19. Avoid proposed drainage easements. If channel grading is required, fee simple ROW acquisition is a better option since TXDOT will have control over the property. Avoid channel grading threshold to require a pre-construction engineering if possible.

20. Develop typical section exhibits showing proposed utility corridors depicting proposed utility locations per UAR and TAC requirements. Coordinate with each utility company to determine appropriate spacing between utilities. Reference Appendix A .

21. When constructing an overpass grade separation, configure the overpass bridge in a manner that spans the entire intersecting roadway and preserve an envelope for an 8-lane future section. This approach is essentially a desirable minimum and applies for situations where any future plans are non-existent or are of a width that is less than this 8-lane future section. Research should be conducted with regard to any plans (TxDOT or local) for future expansion that may require additional width greater than this 8-lane section. Reference Appendix B.

22. For a MAPO, develop an 11”x17” or 24”x36”exhibit showing the proposed improvements, existing ROW line, proposed ROW line, proposed acreage acquired, and any damages that occur as a result of ROW acquisition. Reference Appendix C.

23. Reference the example schematic color scheme and symbology in Appendix D.

24. Review typical sections for future envelope limits or other constraints. Ditch widths in ROW to be considered.

25. Provide enough vertical clearance on overhead structures for construction/temporary forms. If not enough room, designate a temporary detour route in plans.

26. When shifting mainlanes to frontage road pavement then back to the mainlanes (i.e. 281) we should slow them down with signs to the frontage road speed then bring it back up when you get back to the mainlane pavement again.

27. Coordinate all Innovative Intersections with DES – Roundabout and Alternative Intersection Design lead early in the planning process.

Plans, Specifications & Estimates (PS&E)

Scoping

1. Drive the project limits with Area Engineer and Maintenance Supervisor to identify all of the project's needs prior to starting PS&E.
    a. Develop an estimate for all items identified.

QC/QA

1. Utilize the TxDOT PS&E QC Milestone Checklist. https://www.txdot.gov/business/resources/design-tools-training/electronic-plan-set-guidance/pse-pre-submittal-preparation.html
2. Retain the QC/QA files in the Project Folder for documentation

Plan Sheets

1. Reference PS&E Preparation Manual, October 2024: Chapter 3 – Plan Set Development https://onlinemanuals.txdot.gov/TxDOTOnlineManuals/manuals/AlphaList.html
2. Utilize the DES - PS&E QC Milestone Checklist at each milestone: https://www.txdot.gov/business/resources/design-tools-training/electronic-plan-set-guidance/pse-pre-submittal-preparation.html

Title Sheet

1. Use the SAT District templates for Federal or State projects found on txdot.gov: https://www.txdot.gov/about/districts/san-antonio-district/standards-forms.html

Existing Typical Sections

1. Review as-built plans, cores for existing pavement information
2. Coordinate with area office to request information on maintenance projects that may have modified the pavement
3. Coordinate with the District Pavement Engineer to verify existing pavement information

Proposed Typical Sections

1. Increase each layer by 6" on each side of each pavement section for each layer and include in quantities

Estimate and Quantity Summary Sheets

1. Reference PS&E Preparation Manual, Chapter 5.3.1 Bid Item Quantity Tolerances https://onlinemanuals.txdot.gov/TxDOTOnlineManuals/manuals/AlphaList.html
2. Provide areas (SY) for pavement items, "For Contractors Information" (i.e, HMA, Underseal/Bonding Courses)

Traffic Control Narrative / Sequence of Work

1. Use the SAT District template provided on txdot.gov: https://www.txdot.gov/about/districts/san-antonio-district/standards-forms.html

Traffic Control Plan (TCP)

1. Work Zone speed reduction should be requested for all projects on high-speed facilities. Mobile and short duration work may not be applicable. Discuss with AE.
2. Provide enough vertical clearance on overhead structures for construction/temporary forms. If not enough room, designate a temporary detour route in plans.
3. Do not use off-system roadways for detours.
4. Verify sight distance for one lane two-way traffic control signal placement
5. Joint Bid utility work must be accounted for in the Traffic Control Plans and project schedule
6. Phasing – Verbiage needs to be clear in the plans if there is a need to follow the planned phasing.
7. Smart Work Zone Guide https://ftp.dot.state.tx.us/pub/txdot-info/trf/smart-work-zone-guidelines.pdf
    a. Use the Go / No-Go Decision Tool to determine applicable systems
8. Ensure all applicable signage is displayed in the TCP for each phase.

Roadway

1. Reference the SAT District Pavement Design Standard Operating Procedure (SOP)
2. Submit Requests for Design Waiver, Design Exceptions or THFN Variances by 30% PS&E.
3. Utilize TxDOT Safety Scoring Tool when developing typical sections.

Drainage

1. High Density Polyethylene (HDPE) and Polypropylene (PP) Guidelines:
    a. HPDE and PP will be allowed for these conditions with roadways under ADT 20,000
        i. Parallel drainage, in ditches outside the driving lanes
        ii. Driveways
        iii. Recommended for use behind retaining walls (Need District Bridge Engineer concurrence)
        iv. Under sidewalk (only for roadways that have <2,000 ADT)
    b. For any other situation
        i. Must be requested through District Construction Office (DCO). Must have appropriate Site Conditions (per Structural Design Considerations for Specifying Thermoplastic Pipe, June 2023)

Retaining Walls

1. Reference SAT District Aesthetic Guide. All aesthetic sheets incorporated in PS&E will be signed and sealed. https://www.txdot.gov/about/districts/san-antonio-district/urban-design-themes.html
    a. Aesthetic guidelines must be tailored to the individual project. Designer required to review the guidelines and ensure all affected elements identify the aesthetic treatment proposed and clearly show in plans.
2. Submit PBLR for Retaining Walls exceeding 25' height.

Bridges/Structures

1. Reference SAT District Aesthetic Guide. All aesthetic sheets incorporated in PS&E will be signed and sealed. https://www.txdot.gov/about/districts/san-antonio-district/urban-design-themes.html
    a. Aesthetic guidelines must be tailored to the individual project. Designer required to review the guidelines and ensure all affected elements identify the aesthetic treatment proposed and clearly show in plans.
2. If a new bridge is proposed of any existing GP lane alignment, contact Caesar Villegas. DMS procedures dictate that they must immediately prevent over height movers from traveling under the new obstruction if the clearance does not allow
    a. If any orange W-12 signs are posted, they must be sent to Caesar Villegas
3. PBLR must be submitted to SAT District Bridge section prior to submitting to Bridge Division at 30% to 60% PS&E level.

Utilities

1. Identify potential locations for Pole Bracing early.
2. If SUE Data is obtained, do not accept Level A Test Holes that cannot positively identify the utility location. For example, if they hit "rock or hard strata", the provider must find a solution to locate the line.
3. TxDOT ITS and TxDOT Signals need to be identified separately. Use the Transguide Locate Request Form.
4. Joint Bid Utility Plans require review by the PS&E designer to ensure the traffic control plan is properly sequenced to account for the JB utility work.
5. Include 2024 - SS5061, Subsurface Utility Locate, on projects that have joint bid and non-joint bid utility relocations.

SW3P

1. Consider Z-Curb Inlet Protection for temporary BMP
2. Consider Flexamat for Channel/Ditch Protection where grass cannot grow (i.e. rocky subgrade)

Railroad

1. Ensure SOW sheets are reviewed by TRF Railroad Corodinator at 95% and 100% to ensure all information is accurate prior to Letting
2. If the project requires Railroad insurance, phase that work first so that the RR insurance does not expire.

Force Accounts

1. Erosion Control – Estimate 2 to 3 cycles of replacement based on project timeline
2. Law Enforcement – Request current cost per hour for law enforcement from Area Office to determine total cost
3. Safety Contingency – 2% of total barricade costs. $1,000 minimum; round up to the nearest $100 thereafter
4. Railroad – Contact Rail Division

Miscellaneous

1. Work Zone speed reduction should be evaluated for all projects
2. During the PS&E phase or in construction, no changes to the locations of ramps should be made without consulting the Advanced Planning Director to ensure consistency with previous approvals and plans.
3. When a Specification states, "shown on plans", ensure it is properly shown in the plans.
4. Form 2229, Significant Projects with Contracting Strategies (i.e. Milestones / Incentives / Disincentives) requires CST review and approval prior to final PS&E.
    a. Designer must submit Form 2229 to District Plan Review *1 week prior to the formal 95% PS&E submittal* if a project requires any type of Accelerated Construction Procedures.
5. Do not call out anything as Subsidiary, unless the specification allows it.

Contract Time Determination

1. All Contract Time Determinations (CTD) schedules require Area Office and District Construction review. District Construction Engineer required to sign the schedule as "reviewed."
    a. DCO review to verify time charges account for weather and holidays
    b. Pavement and TCP must be ironed out prior to meeting with Area Office for beneficial feedback and discussion on CTD
2. Designer will provide 2 CTDs. One will show production rates for CTD review. One will not show production rates for DES submittal.
3. CTD must follow the Sequence of Work. If you want them to stick to the phasing you have designated, this needs to be clearly stated in the plans.
4. Break up quantities per phase
5. Do not use more than 20 days for an activity in the CTD

6. Consider and document crew number and sizes
7. Include cure time for appropriate work items (concrete, soil stabilization (lime, cement, etc.))
8. Include non-joint bid and joint bid utility activities in the CTD
9. Reference Appendix E for SAT Calendars White Page.
    a. Cure time needs to be included in CTDs for: Prime Coat, Lime Treatment, Cement Treatment, Concrete
10. All Contract Time Determination (CTD) schedules over 36 months requires a District Administrative Review and Approval. Provide the following for the review:
    a. CTD with production rates shown
    b. CTD with production rates not shown
    c. Traffic Control Sheets
    d. Sequence of Work
    e. General Notes
    f. Milestone assumptions/calculations
    g. All activities include weather
    h. Contract Time is based on Specification
11. Accelerated Construction Procedures – Significant Projects with Milestones / Incentive / Disincentive requires CST review and approval prior to final PS&E. Form 2229 is required to be submitted to with the 95% PS&E package.

Construction Estimates

1. Reference SAT Cost Estimate SOP (Appendix J)

Construction Management Plans (CMPs)

1. A Construction Management Plan is required for any project that will have any unclear certification(s) after letting.
2. Reference DES webpage for official SOP: https://crossroads/divisions/des/sections/final-pse-processing/construction-management-plans.html
3. The Draft CMP for a project **must be submitted** to District Plan Review **with the formal 95% submission**.

Standard Specifications Item by Item Guide

Items 1 through 10, General Requirements and Covenants

Item 7, Legal Relations and Responsibilities

1. If a project has an unusual constraint, include in the PS&S. A Special Provision request will be required for any modifications to Standard Specifications.
    a. Example: No demolishing or river closures from Memorial Day to Labor Day due to high pedestrian traffic

100 Items, Earthwork and Landscape

Item 100, Preparing Right of Way

1. The use of Item 100 should be reviewed for each project. If a resurfacing project does not require Item 100, do not include it. If only a small area requires Prep ROW, only quantify those areas.
2. Pay for Prep ROW by Station.
3. Designate specific trees for preservation if required to preserve
    a. Show preservation details/locations on plan sheets. Ensure tree survey is requested in the design survey.
    b. Check sight distance issues with overgrown branches
    c. Avoid listing trees to be removed since omission of a tree could constitute additional work
    d. Verify clear zone requirements for large diameter trees
4. For anything being removed on a project, include a bid item to pay for the removal.
    a. Do not include the removal as subsidiary to Prep ROW
    b. Avoid use of CY due to varying depths in the field/unknowns
    c. Default to (SY) and (EA) whenever possible
    d. Large drainage structures, such as headwalls should have a separate bid item
    e. Bridges or Bridge Class Culverts, use Item 496
    f. MBGF, Use Item 542
    g. Small, large, or overhead signs use Items 644, 647 or 650
    h. Electrical Service, Use Item 628
    i. Roadway Illumination, Use Item 610

Item 104, Removing Concrete

1. Review as-builts for non-standard riprap or mowstrip areas. Verify survey data.
2. Default to payment by (SY) where possible.

Item 105, Removing Treated and Untreated Base and Asphalt Pavement

1. Quantify and pay with appropriate bid item.
2. Do not include as part of excavation quantity.
3. Obtain cores/as-built data to verify existing depths

Item 106, Obliterating Abandoned Roadway

1. Quantify and pay with appropriate bid item
2. Do not include as part of excavation quantity
3. Requires additional topsoil and seed because typically salvage material is not enough.

Item 110, Excavation

1. Provide the quantity summary in tabular form by stations
2. Verify excavation quantities are not duplicated in pavement removal quantities.

Item 132, Embankment

1. Provide the quantity summary in tabular form by stations
2. Refer to the SAT District Pavement Design SOP
3. Ensure General Notes include appropriate material specifications per SAT Pavement Design SOP

Item 134, Backfill Pavement Edges

1. Use with overlay projects that create profile changes for edge conditions
2. Refer to Standard Specification for appropriate type

Item 160, Topsoil

1. Use in conjunction with Item 162 or Item 164 / 169
2. Limit the amount of disturbance
3. No need for ROW to ROW if not disturbed

Item 161, Compost

1. Use in conjunction with Item 162 or Item 164 / 169
2. Limit the amount of disturbance
3. No need for ROW to ROW if not disturbed

Item 162, Sodding for Erosion Control

1. Include permanent seed or sod for all disturbed areas
2. Typically used in urban areas, where space is limited
3. Requires identical quantity of Item 160

Item 164, Seeding for Erosion Control

1. Include both temporary cool and temporary warm seed for all disturbed areas
2. Include permanent seed for all disturbed areas
3. Quantities for both temporary and permanent seed should be broken out per project phase, not just one final quantity to be installed at the end
4. Requires identical quantity of Item 160/Item 161 and Item 169.

Item 168, Vegetative Watering

1. Required to establish vegetation (Refer to Items 160, 161, 162, 164, 169)

Item 169, Soil Retention Blankets

1. Use to cover ALL disturbed areas.
2. Topsoil/Compost or similar seed bed is required
3. Seeding is required (temporary and permanent)
4. Watering is required

200 Items, Subgrade Treatments and Base

Item 247 -360

1. Refer to SAT Pavement Design SOP

300 Items, Surface Courses and Pavements

1. Refer to SAT Pavement Design SOP
2. Item 346, SMA is not appropriate for frontage roads
3. Do not use Type B as Level Up

Item 360, Concrete Pavement

1. Transition CRCP to HMA
    a. Include TRANS-20
    b. Include Bid Item 360

400 Items, Structures

Item 400, Excavation and Backfill for Structures

1. Cut and restore for hot mix or concrete pavement requires a miscellaneous detail including material type and pavement section

    a. If cut and restore requires reopening to traffic, provide either Cement Stabilized Backfill or Flowable Backfill as a pay item in the detail
    b. If cut and restore is under natural ground, typical embankment may be used
2. For cut and restore that requires reopening to traffic, provide a detail to backfill trench with Cement-Stabilized Backfill or Flowable Backfill. A bid item must be provided to pay for this material.

Item 403, Temporary Special Shoring

1. Review the need for Temporary Shoring at inlets, culverts, drainage structures, OSB columns, bridge columns
2. Ensure soil nails will not penetrate private property.
3. Verify there is enough room to slope or bench
    a. OSHA 29 CFR Part 1926, Subpart P – Excavations

Item 416, Drilled Shaft Foundations

1. Are karst features (caves) a possibility? If so, see Appendix F.
2. For Traffic Signals – Ensure that vertical clearance under any signal assembly is meets 18.5'.
3. Any exposed drill shafts over 3 lf in height need to be coordinated through the District Bridge Engineer
4. Consider using both friction and bearing for drill shaft design.
5. Core holes are not a bid item

Item 420, Concrete Substructures

1. Conduit is a pay item.

Item 423, Retaining Walls

1. Verify type and location of walls early.
    a. Evaluate all types of retaining walls
    b. Carefully consider in situ vs old fill areas
2. Consider constructability and equipment in tight ROW areas.
3. Check horizontal and vertical location of proposed retaining walls with approved schematic to ensure future transportation envelope is preserved.
4. Check middle ordinate on turn around approaches at retaining walls along the bridge header bank. If wall needs to be constructed on a radius, ensure nominal size of panels can be used along radius to avoid fabrication of non-typical nominal sized wall panels.
5. Design vertical profile for top and bottom of retaining walls. Minimize PI's in profiles.
6. Avoid "perch wall" situation in all design. Consult with Bridge section for further guidance on any "perch wall" situation
7. Verify that aesthetic treatments (i.e. Use SAT Aesthetic Guidelines) are included in the bid price or under a separate item. The details are to be signed and sealed.

8. Show location and outfall of underdrains. Ensure positive drainage.
9. Include riprap flume to avoid runoff draining on face of wall and along the top of wall.
10. Continue flume at end/beginning of retaining walls for drainage down embankment
11. The use of shallow curb or median inlets with a pipe riser is preferred in areas within a MSE retaining wall to allow adequate length of panel strap embedment.
12. Ensure strap lengths do not conflict with TCP Phasing
13. Any slope steeper than 4:1 and greater than 5-foot tall should be analyzed for slope stability
    a. Present a slope stability analysis for riprap slope without giving any credit for strength of riprap material
14. Temporary Earth Walls require P&P and DD Sheets
15. Quantify Temporary Special Shoring from the bottom of the retaining wall
16. Ensure the geotechnical borings are adequate to correctly characterize the soil/rock type where soil nails are proposed
17. Ensure that soil nails do not penetrate private property.
18. Ensure drilled shafts are deep enough at vertical abutments or drilled shaft retaining walls. When cutting out for the bottom of RW facia panels, the minimum embedment length is diminished. It is also diminished when there are large drainage appurtenances or when excavating for adjacent box culverts.

Item 432, Riprap

1. If using stone riprap, include details/ and SAT standard FRR(SP) showing typical section thickness and filter fabric.
2. Ensure riprap details are included if there is not a standard.

Item 450, Railing

1. Placement of Traffic Rail, Pedestrian Rail or Combination Rail should be evaluated for each project site.
2. In urban areas in the San Antonio District, consider the use of SSTR in lieu of MBGF for maintenance considerations
3. Pedestrian handrail – Ask the AO for preference
4. Do not use pedestrian handrail at radii of intersecting streets if possible. This causes nonstop maintenance issue with rail hits.
5. Verify sight distance with rail at intersections
6. 4-foot clearance outside bridge needed for angle brackets outside of slab, Bidwell overhand needed
7. Check clear zone requirements for railing at structures at sidewalks (blunt ends).
8. Include payment for rail foundation and ensure appropriate detail or standard is included, where applicable.

Item 454, Bridge Expansion Joints

1. Request pavement cores on bridges close to bridge joints to verify existing HMA depths
2. Use SAT District standard for Header Type Expansion Joint and Sealant

Item 459, Gabions and Gabion Mattresses

1. Provide a detail in PS&E because there is not a standard. SAT Preference is to use standard sizes from the manufacturers

Item 460, Corrugated Metal Pipe

1. Use SAT culvert assessment summary.
2. Default use CMP for driveways.
    a. Use RCP in sandy soils due to CMP rust issues.

Item 462, Concrete Box Culverts and Drains

1. Use SAT culvert assessment summary.
2. Perform a bridge condition survey for widening.
3. Include Trench Excavation Protection or Temporary Special Shoring where appropriate
4. Include a General Note for culvert clean out. This can be paid under the Erosion Control Force Account, but needs to be set up appropriately in PS&E.
5. Flowable Fill – Consider payment for at least 1 foot more than calculated.

Item 464, Reinforced Concrete Pipe

1. Use SAT culvert assessment summary.
2. Designate trunkline (link) alphabetically by system and number. Laterals for same system use alpha and number-number. Example: Trunk line is named Line B1 and Laterals are named Line B1-1, Line B1-2, etc. Labels for line in plan view are in a rectangle.
3. No pipes smaller than 24”for storm drains.
4. No trunk line under roadway without approval from Hydraulic Design Engineer (HDE).
5. No parallel trunk lines without justification and concurrence with HDE
6. Backfill (if under roadway) trench with Flowable Backfill and pay using Item 401
7. Limit pipe bend use and require junction boxes at points of inflection
8. See above for appropriate use of HDPE and PP

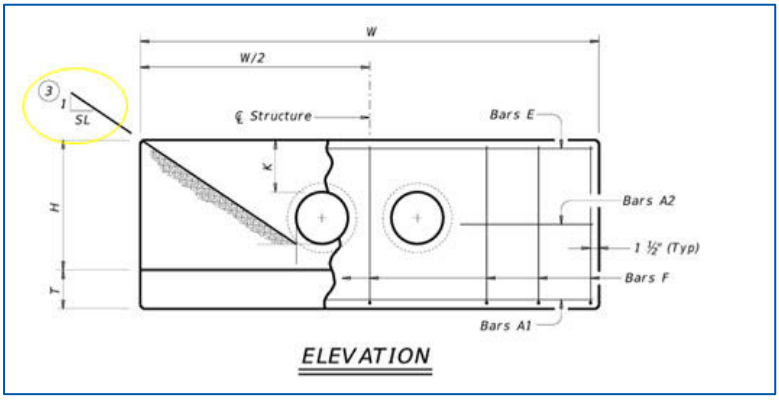
Item 465, Junction Boxes, Manholes, and Inlets

1. Designate by type, alpha for system, sequential numbering within the system, CI-A13 means Curb Inlet System A Number; DI-A14 Drop Inlet System A Number 14, MH-A14, JB-A15. Labels for Junction boxes, Manholes, and Inlets in plan view are in an oval.
    a. For capping an existing inlet or a manhole use San Antonio District Standard
    b. http://www.txdot.gov/inside-txdot/district/san-antonio/specinfo.html

2. Consider all dimensions, thicknesses and skews when designing storm sewer connections into and out of junction boxes, manholes, and Inlets
3. Do not use traffic grates in front of CTB.
4. Do not use traffic grates in shoulders

Item 466, Headwalls and Wingwalls

5. Evaluate utilities when setting location of headwall
6. Consider use of Trench Excavation Protection or Temporary Special Shoring for new wingwalls when removing existing wingwalls
7. HEADWALL (CH-PW-0) – The height of the headwall is determined by the size of the RC pipe. The length (W) is tied to a slope that is required to be included in the plans. The length of the wall can significantly vary (for a 30" RCP, 2:1 = 16.6' and 6:1 = 44'-6")



Item 467, Safety End Treatment

1. Evaluate utilities when setting location of SET

Item 474, Linear Drains

1. Avoid trench/linear drains due to long term maintenance. Trench/Linear drains will be allowed for use on driveways or side streets to intercept water before flowing to TxDOT roadway

Item 476, Jacking, Boring, or Tunneling Pipe or Box

1. 1.5 feet from surface required, but consider pavement depth
    a. Verify pavement structure
2. Provide traffic control and protection for the bore pit.
3. Verify bore pit is located within TxDOT ROW

Item 496, Removing Structures

1. Bridges or bridge-class culverts will be paid using Item 496
2. Retaining walls will be paid using Item 496

500 Items, Miscellaneous Construction

Item 502, Barricades, Signs and Traffic Handling

1. See Appendix E for guide to calculation of quantity.

Item 503, Portable Changeable Message Sign

1. On project with multiple PCMS, provide a table showing when/where PCMS are to be used.

Item 508, Constructing Detours

1. Provide a horizontal alignment and vertical profile if not widening
2. Provide a pavement detail for the detour
3. Ensure that the minimum clearance height under temporary signals is met.

Item 506, Temporary Erosion, Sedimentation and Environmental Controls

1. Use Item 0506-6002 Rock Filter Dams TY 2 at culvert outfall when widening a culvert

Item 512, Portable Traffic Barrier

1. Avoid mixing portable steel with portable concrete due to connection issues.
2. Provide a construction zone that is 26ft from Edge of Barrier to Barrier where feasible
3. Provide a construction zone that is 36ft from Edge of Barrier to Barrier needed for OSB, DS work where feasible
4. Include barrier gaps for contractor entrances/exits

Item 514, Permanent Concrete Traffic Barrier

1. If permanent barrier is being used for temporary traffic control, ensure the final barrier height is met or else designate CTB key in, drilled shafts or taller barrier. If drilled shafts will be required, add a note to the plans to clarify the intent.

Item 529, Concrete Curb, Gutter, and Combined Curb and Gutter

1. Do not use Gutter
2. When separating opposite movements of traffic, default to *non*-mountable curb
    a. Used for raised median projects along arterial roadways
    b. Place raised pavement markers on top of medians to provide visibility at night (not on pavement next to curb)
3. When separating same direction of traffic, utilize mountable curb. This is more forgiving but serves the purpose of deterring vehicles from making the movement that is discouraged.
    a. Avoid widths less than 4 ft wide due to challenges with visibility and adequate width for signing.

Item 530, Intersections, Driveways, and Turnouts

1. Include a typical section or detail for all potential type of driveways (Seal Coat, ACP, Concrete)
2. Design proposed driveways with the same material as existing driveways.
3. If sidewalk is present, ensure driveway accommodates pedestrian access route requirements.

Item 531, Sidewalks

1. Use PROWAG Design Standard, but follow the RDM standards where possible.

Item 533, Rumble Strips

1. Profile pavement markings or rumble strips shall be considered for all roadways.
2. Obtain road cores to verify if milled rumble strips are an option

Item 536, Concrete Medians and Directional Islands

1. Design for WB-67 turning radii
2. DO NOT block approach shoulders
3. Back-to-back curb for raised median delineation is not recommended, utilize 4' medians (face of curb to face of curb) where pavement width allows.
4. Stamped and stained concrete as per the District Aesthetics Guidelines (region specific) should be used at islands to help delineate pedestrian elements, not for riprap

Item 540, Metal Beam Guard Fence

1. Embankment is subsidiary. Extensive embankment should be surveyed, engineered and quantified.
2. Contact District Design Director for short radii details.
3. Verify posts do not conflict with underground drainage or utilities.
4. Verify that TxDOT Illumination is not in conflict.
5. SAT Preference is to utilize GF-2 post mounted delineator panels. Do not use GF-1
6. Design with Maintenance in mind – minimize use of MBGF and consider concrete barrier in lieu of MBGF where appropriate. (i.e. Major interchanges)
7. Use steel posts over drainage culverts where appropriate
8. MBGF begin and end stations must be called out

Item 542, Removing Metal Beam Guard Fence

1. Determine if existing rail is suitable for reuse. Contact the Maintenance Section and Area Office to determine whether it will become the property of Contractor or TxDOT.

Item 545, Crash Cushion Attenuators

1. Include Crash Cushion Summary Sheet in PS&E
2. Refer to SAT District Master General Notes for appropriate types in Bexar County

Item 560, Mailbox Assemblies

1. If there is an existing mailbox, it must be put back.
2. Consider where to install the mailbox assembly. Postman cannot reverse vehicles.
3. Consolidate mailboxes wherever possible. Consider the use of Neighborhood Delivery Collection Box Units (NDCBU's) when there are at least 3 multi-racks co-located or anticipated to accommodate various mailboxes. Coordinate with USPS.
4. Type 4 support / foundation only. White coated steel single post and multiple post.
5. Although TxDOT cannot spend state highway funds to install mailboxes for patrons not living on state highways, any previously department installed mailboxes for off-system patrons may remain.

Item 585, Ride Quality for Pavement Surfaces

1. Refer to SAT District Pavement Standard Operating Procedures

600 Items, Lighting, Signing, Markings and Signals

Item 610, Roadway Illumination Assemblies

1. Use LED lights.
    a. No. 8 is the minimum size for underground conductors
2. Work with District staff to determine if high mast illumination is applicable.
    a. High Mast Illumination is preferred, when applicable
3. Determine wiring system. Upgrade to 3 wire system when applicable.
4. Underpass lighting – include lighting under and on both sides of the underpass, when pedestrian activity is expected and / or when the geometry of the roadway changes beneath the underpass
5. If the project has continuous illumination in the locations listed below (c) , then the designer must request an Attachment Number from the District Design Director.
    a. The plans must be sent to the applicable City for their review and concurrence
    b. The Title Sheet with appropriate Attachment Number must be sent to the relative City for their signature
    c. Agreements for city-maintained illumination:
        - *City of Balcones Heights* (1963), IH 10 from Dewhurst Rd to Gill Rd
        - *City of Castle Hills* (1966), IH 410 from Blanco Rd to Jackson-Keller Rd
        - *City of Converse* (2025), FM 1516 from FM 78 to Gibbs Sprawl (decorative lighting)
        - *City of Elmendorf* (2014), letter only/no agreement, SL 1604 at Old Corpus Christi Rd
        - *City of Hondo* (1989), US 90 from 0.3 mi W of 173 to 462, SH 173 from 0.7 mi N of 90 to 0.5 mi S of 90

- *City of Leon Valley* (1979), IH 410 from 0.181 mi W of SH 16 to 0.122 mi E of SH 16
- *City of Live Oak* (1972), letter only/no agreement copy but they pay CPS bill for IH 35
- *City of New Braunfels* (1998), IH 35 within city limits
- *City of San Antonio* (2014), various locations along IH 10, IH 35 (including within Schertz limits), IH 37, IH 410, US 281, US 90, SH 151, SL 1604 and PA 1502
- *City of Schertz* (2001), IH 35 within city limits covered partly by CPS and partly by NBU due to service limits
- *City of Seguin* (2020), IH 10 within city limits
- *City of Selma* (1989) for TxDOT to maintain IH 35 from SL 1604 (SW city limit) to NE city limit
- *City of Universal City* for SL 1604 lighting

6. Existing Illumination maintenance must be addressed prior to Letting
    a. Design PM must schedule a meeting with District Master Electrician (Roy McCue) when final plans are submitted (approximately 4 months prior to letting) to schedule a night drive. Area Engineer must also be included.
    b. During the night drive, it is required to document/survey all existing illumination maintenance issues that CPSE can repair before the contractor begins the project.
7. If using permanent illumination for temporary traffic control, ensure SS for Illumination Maintenance is included
8. SS for Lockbox/Tamper Proof box – get with Jorge for SS number for Urban Areas Only
9. No exceptions to copper wire.

Item 613, High Mast Illumination Poles

1. If installing proposed high mast for temporary illumination, consider long lead times for the tower. Also, need to account for final grading if the illumination is installed early

Item 617, Temporary Roadway Illumination

1. Include temporary Illumination on projects that have existing illumination.
    a. Ensure temporary illumination poles are located outside of the clear zone
    b. Provide temporary illumination design in plans
2. Consider timber poles and span wire for temporary illumination to avoid issues with installing proposed.
3. Consider installing permanent for temporary use, if possible.
    a. Ensure the proposed grading is accounted for if permanent is placed early
    b. Verify underground items do not conflict with proposed conduit if permanent is placed early
4. Include the SS for Illumination Maintenance for maintenance of existing illumination.

Item 618, Conduit

1. Use SCH 80 under the roadway.
2. Do not reuse old conduit. Install new instead.

Item 620, Electrical Conductors

1. Install a minimum size #8 equipment grounding conductor (EGC) in all conduits including traffic signal and ITS cables. Payment and the size of the EGC will be in accordance with standard ED (3)-14.

Item 628, Electrical Services

1. All proposed electrical services should be 120/240

Item 644, Small Roadside Sign Assemblies

1. Bridge rail mounted signs should be avoided if possible due to limited access for maintenance
2. Bridge mounted vertical clearance signs see Appendix L
3. Triangular Slip Base System: SPF Triangular Slip base Housing only
4. 10 BWG is standard. Use SCH 80 only when required.
5. For turning lanes, review the existing sign locations to verify that the signs are not too close to the travel lane.
6. Avoid installing signs in pavement areas. Install outside of the pavement or on a raised median.
7. Do not automatically replace existing signs on projects. Verify the need. Utilize the TMUTCD and Sign Crew Field Book layouts for proposed signs.

Item 647, Large Guide Sign Support and Assemblies

1. Verify shafts do not conflict with underground drainage or utilities.
2. Verify structure does not conflict with overhead utilities.
3. Ensure that the shortest leg maintains 7 LF of vertical clearance above the ground.

Item 650, Overhead Sign Supports

1. Verify shafts do not conflict with underground drainage or utilities.
2. Visually verify the structure does not conflict with overhead utilities.
3. The removal of all "L" brackets previously utilized for Lane Control Signs (no longer in operation) shall be considered subsidiary to Item 636.
4. Vandalism panels shall be added to all OSBs (in which there are signs being replaced or added) and will be considered subsidiary to Item 647.
5. When replacing large signs on existing OSBs or COSSs, design for 18.5 LF vertical clearance and adjust sign dimensions accordingly (if possible). Verify THFN

6. Bottom align overhead signs on the OSB structure unless the difference in height is 2 LF or greater; if the sign height difference is 2 LF or greater, then center align the signs.
7. Avoid the use of trusses. If trusses are approved for use, ensure they are adequately protected.

Item 658, Delineator and Object Marker Assemblies

1. Include bid item for assemblies on rail and MBGF.
2. Quantify and pay for delineators and object markers with appropriate per bid items. Do not make them subsidiary items.
3. Ground support foundation: Wedge anchor system only

Item 662, Work Zone Pavement Markings

1. Include quantities and bid items for tabs for all projects that have new surface over the existing stripe.
2. Install Pavement Sealer (see general notes) for 14 days prior to Type I thermoplastic markings.
3. Include restriping of existing markings/markers for long-term duration (longer than 12 months) construction.
4. Utilize raised pavement markers including for different TCP changes
5. Consider using buttons for TCP in lieu of striping

Item 666, Retroreflectorized Pavement Markings

1. Profile pavement markings or rumble strips shall be considered for all roadways.
    a. Reference TRF Standards for appropriate criteria
2. For projects that are to be restriped in existing configuration, review latest Standards to ensure appropriate Pavement Markings are proposed.
3. On CRCP, use Shadow Lane Line Design pavement markings. Do NOT use Contrast Lane Lines.

Item 672, Raised Pavement Markers

1. Consider RPMs for Traffic Control

Item 677, Eliminating Existing Pavement Markings and Markers

1. SAT preference to remove existing pavement markings is Water Blasting. Ensure this method included in the project's General Notes. Mill & Fill is the second preferred option. Discuss with Area Engineer.
2. Removal of temporary pavement markings is subsidiary to installation

Item 680, Highway Traffic Signals

1. Include a signal timing plan.
2. Contact CoSA traffic Department if maintained and operated by CoSA.
3. Reference San Antonio District traffic signal general notes. Include communications package in every traffic signal design. Contact TransGuide for latest equipment requirements.
4. Do not put proposed CoSA ILSN signs on TxDOT Signal Arms. If they are existing signs, they are ok to put back.

Item 681, Temporary Traffic Signals

1. Include a phasing diagram for every TCP phase.
2. Ensure minimum clearance height of signal and temporary pavement is met.

Item 682, Vehicle and Pedestrian Signal Heads

1. All signal and pedestrian heads shall be polycarbonate.
2. All signal heads shall include reflective, vented aluminum back plates
3. Pedestrian signal heads shall be countdown

Item 688, Pedestrian and Vehicle Detectors

1. Pedestrian detectors shall be APS

700 Items, Maintenance

Item 730, Roadside Mowing

1. Reference SAT District Master General Notes for additional information
2. Requires use of State funds only, no Federal participation. TxDOTConnect must be reflected correctly.

Item 734, Litter Removal

1. Reference SAT District Master General Notes for additional information
2. All projects should include Litter Removal. Discuss frequency with Area Office.
3. Requires use of State funds only, no Federal participation. TxDOTConnect must be reflected correctly.

Item 735, Debris Removal

1. Reference SAT District Master General Notes for additional information.
2. All projects should include Debris Removal. Discuss frequency with Area Office.
3. Requires use of State funds only, no Federal participation. TxDOTConnect must be reflected correctly.

Item 738, Cleaning and Sweeping Highways

1. Reference SAT District Master General Notes for additional information
2. Requires use of State funds only, no Federal participation. TxDOTConnect must be reflected correctly.
3. Must include bid items for all roadbeds (ML, frontage, ramps, etc. on all major corridors in Bexar County. For Rural or other areas, by request only.

Item 740, Graffiti Removal and Anti-Graffiti Coating

1. Coordinate with District Landscape Architect

Item 785, Bridge Joint Repair or Replacement

1. Add a saw cut and seal option on spans less than 50'. Use in lieu of header material.

Special Specifications Item by Item Guide

Special Specifications – *In progress*

TBD for future

1. Under development

Project Specific Guide

Preventative Maintenance Projects (i.e. Overlays, Mill & Inlay, etc.)

Scoping

1. Drive and visit the project limits with the Director of Maintenance, Area Engineer, Maintenance Supervisor and Pavement Engineer prior to starting design to scope the project accurately.
    a. During the field visit, take notes on all the needs of the project as indicated by the Area Engineer and Maintenance Supervisor. Not all elements may be included in the project, but all needs should be formally documented.
2. Obtain crash data for the project limits (1/4 mile outside the begin and end limits) from the SAT Traffic Office and perform an existing crash analysis.
3. Request cores, FWD and GPR from District lab. If bridges are within the limits, obtain cores on the bridges near the joints also.
4. Reference the SAT District Project Scoping Guide (Appendix J)

Roadway

1. Paving limits at intersections should extend to the ROW line
2. Include overlay *on ramps* for freeway main lane overlays and/or frontage road overlay projects
3. Paving limits on frontage roads projects should include the *ramps* up to the mainlanes.
4. Pay for Base Repairs using Item 351. Must include a detail in the PS&E showing what the base repair section looks like. Do not pay with individual pavement items.
5. Update Metal Beam Guard Fence (MBGF) to the latest standards
    a. Consider potential to use rail adjustment bid items
    b. Increase MBGF height if placing overlay adjacent to existing MBGF
    c. Include Mowstrip. Per standard, embankment is subsidiary to mowstrip. If mowstrip installation creates excessive embankment quantities, discuss whether a bid item should be considered with the Area Office and District Design Engineer.
    d. Only utilize SAT District preference for MBGF Reflector: "GF2 (POST MOUNTED DELINEATOR)"
6. Upgrade substandard Safety End Treatments (SETs) to the latest standards
7. Remove pedestrian barriers.
8. Review TCAP Data to determine areas required to be updated
9. Include plan details for tapers into curb inlets and/or drain boxes, if applicable
10. Work with District Pavement Engineer to determine strategies to address Ride Quality
11. Mill under existing bridges/structures to maintain vertical clearance.
12. Consider refreshing striping on intersecting streets.
13. If existing striping is to be modified for different lane configurations, coordinate with Area Engineer and District Design Director

14. Consider including rest areas in overlay. Coordinate with Area Office and Director of Maintenance.
15. Minimum 7 ft needed for Hot Mix Equipment. Minimize triangle pavements.

Bridge

1. Reference Bridge Railing Manual, Chapter 4, Treatment of Existing Railing to determine if bridge rail requires upgrading. https://onlinemanuals.txdot.gov/TxDOTOnlineManuals/manuals/AlphaList.html
2. For Bridges, provide a milling taper detail at beginning and end of each bridge. This should be standard length per inch of mill.
3. Check the condition of the existing bridge. SAT District preference is to leave at least 0.5" of existing HMA on bridge deck. Do not mill to the bridge deck surface.
4. Obtain pavement cores on bridges to verify existing HMA depth
    a. Cores near bridge joints
5. Replace existing header joints on all bridges
    a. Use the cores to determine depth of header material
    b. Use SAT District Standard
6. Do not overlay or seal an existing direct traffic concrete bridge deck
7. Upgrade Thrie Beam connections to bridge rail. Verify with Bridge Engineer to determine if special detail is required.

Traffic

1. Ensure there are no existing loop detectors that may be damaged with milling.
2. Determine if Permanent Count Stations are within the project limits. Coordinate with TPP.

Miscellaneous

1. If Lane Assessment Fees are required, include a Lane Assessment Fee Table Plan Sheet, appropriate General Note and Special Provision. Consider adding on all high-volume roads, not only interstates. Discuss with Area Engineer.

Culvert Widening, Installation and Replacement

1. Culvert / Pipe Protection
    a. Extend structure outside of clear zone
    b. Reference to RDM Chapter 17, Roadside Safety Design and Roadside Safety Hardware
2. Temporary Shoring
    a. Include temporary shoring for areas parallel to traffic to include parallel wing walls
    b. Show temporary shoring construction phasing in culvert layouts
    c. Provide plan and profiles for temporary shoring

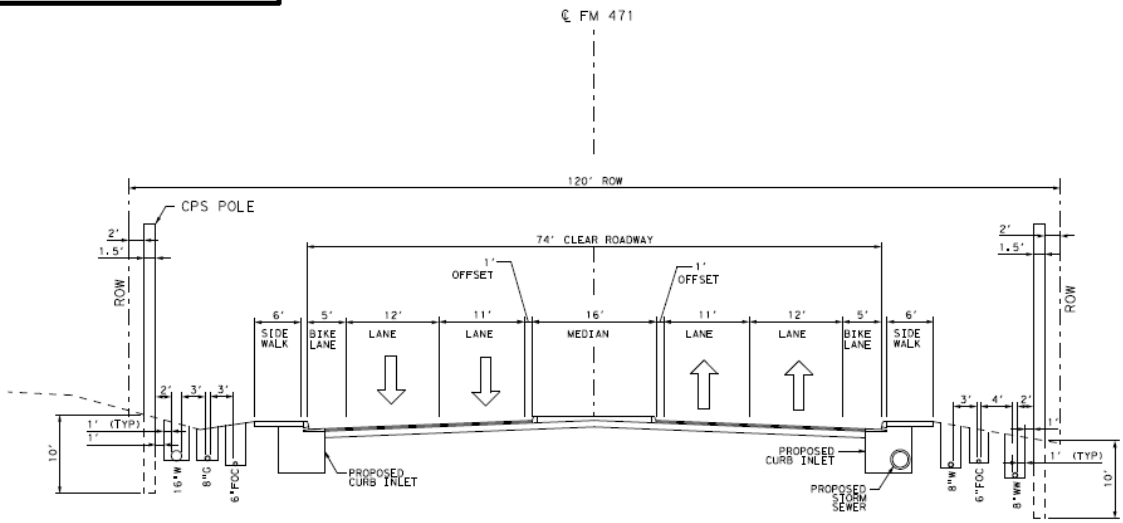
d. Excavation for widenings may create a vertical face that requires shoring to allow for culvert extensions and headwall construction.

3. Trench protection
    a. Used for area parallel to culvert extension

Appendices

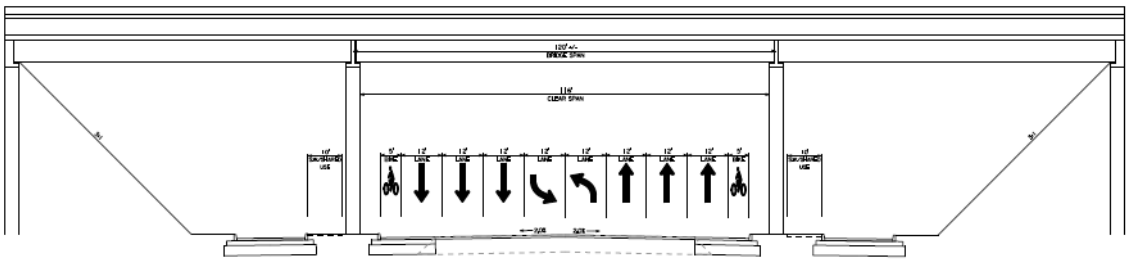
Appendix A, Preliminary Example Utility Corridor

PRELIMINARY ONLY
NOT A BIDDING DOCUMENT

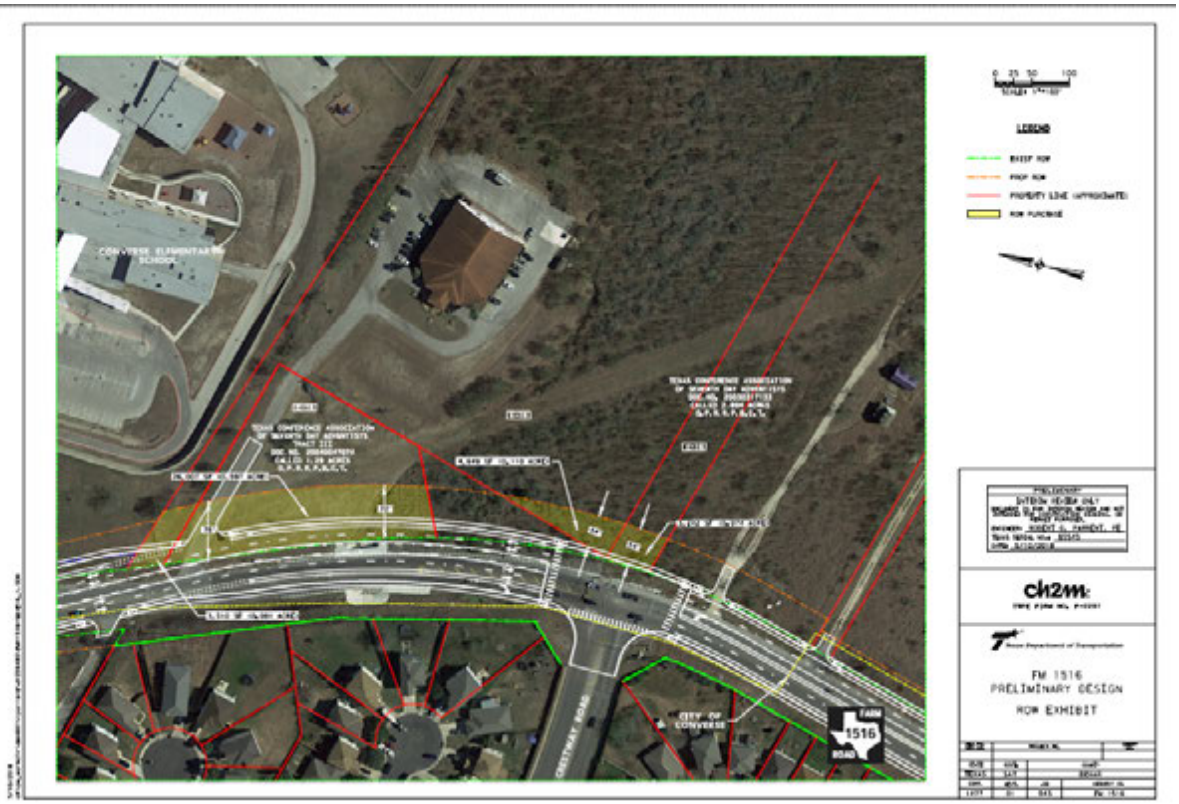


PROPOSED TYPICAL SECTION
POTENTIAL UTILITY CONFIGURATION

Appendix B, Example of Future Overpass Typical Section



Appendix C, Example of Map Exhibit



Appendix D, Schematic Example Color Scheme

Appendix E, SAT Calendars White Paper

SAT District September 30, 2020

SAT Calendars 2020-2040

Calendar Composition

Each contract and workday calendar were developed based on the *Item 8 Specification* definitions, SAT District *CTD Scheduling Guidelines*, TPD-PPM *Contract Time Determination Guidance*, and the Texas State Comptroller's *State of Texas Holiday Schedule* list.

All calendars were developed using an 8hr/day basis and includes non-workdays as defined by the corresponding *Item 8 Specification* or the SAT District *CTD Scheduling Guidelines*.

The following table provides the composition of each calendar based on the established definitions and assumptions detailed in this document. Refer to the SAT District *CTD Scheduling Guidelines* for guidance on when to use each calendar.

TABLE 3: CALENDAR COMPOSITION

Calendar Name	Holidays		Weekends		Weather Days	Wet Day
	National	State	Saturdays	Sundays		
8.3.1.1 Five-Day Workweek	No Work	Work	No Work	No Work	Work	Work
8.3.1.2 Six-Day Workweek	No Work	Work	Work	No Work	Work	Work
8.3.1.3 Seven-Day Workweek	No Work	Work	Work	Work	Work	Work
8.3.1.4 Standard Workweek	No Work	No Work	No Work	No Work	No Work	Work
8.3.1.5 Calendar Day	Work	Work	Work	Work	Work	Work
SAT Standard	No Work	No Work	No Work	No Work	No Work	Work
SAT Curing	Work	Work	Work	Work	Work	Work
SAT Dirt	No Work	No Work	No Work	No Work	No Work	No Work

Definitions

Contract calendars

- **8.3.1.1 Five-Day Workweek.** "Working days will be charged Monday through Friday, excluding national holidays, regardless of weather conditions or material availability." *Item 8 Specification*
- **8.3.1.2 Six-Day Workweek.** "Working days will be charged Monday through Saturday, excluding national holidays, regardless of weather conditions or material availability." *Item 8 Specification*
- **8.3.1.3 Seven-Day Workweek.** "Working days will be charged Monday through Sunday, excluding national holidays, regardless of weather conditions or material availability." *Item 8 Specification*
- **8.3.1.4 Standard Workweek.** "Working days will be charged Monday through Friday, excluding national or state holidays, if weather or other conditions permit" *Item 8 Specification*
- **8.3.1.5 Calendar Day.** "Working days will be charged Sunday through Saturday, including all holidays, regardless of weather conditions, material availability, or other conditions not under the control of the Contractor." *Item 8 Specification*

Page 1 of 6

Workday Calendars

- **SAT Standard.** General activity calendar used for any activity that does not require a more specific calendar (i.e. dirt work or curing). Excludes weekends, national and state holidays, and weather days. See "assumptions" for defined non-workdays.
- **SAT Curing.** Used for any curing activity. This is an open calendar that allows cure time to be represented 24/7.
- **SAT Dirt.** Used for earthwork operations. Excludes one more weather day (wet day) per month than the SAT Standard calendar.

Assumptions

Assumptions are based the *Item 8 Specification,* SAT District *CTD Scheduling Guidelines*, TPD-PPM *Contract Time Determination Guidance*, and the Texas State Comptroller's *State of Texas Holiday Schedule*.

National Holidays

National Holidays were derived from the Texas State Comptroller's *State of Texas Holiday Schedule*. This also aligned with the previously established list of observed national holidays outlined in the SAT District *CTD Scheduling Guidelines*.

TABLE 1: NATIONAL HOLIDAYS - EXAMPLE OVERVIEW (2020 - 2026)

	2020	2021	2022	2023	2024	2025	2026
New Year's Day	1-Jan	1-Jan	1-Jan	1-Jan	1-Jan	1-Jan	1-Jan
Memorial Day	25-May	31-May	30-May	29-May	27-May	26-May	25-May
Independence Day	4-Jul	4-Jul	4-Jul	4-Jul	4-Jul	4-Jul	4-Jul
Labor Day	7-Sep	6-Sep	5-Sep	4-Sep	2-Sep	1-Sep	7-Sep
Thanksgiving Day	26-Nov	25-Nov	24-Nov	23-Nov	28-Nov	27-Nov	26-Nov
Christmas Day	25-Dec	25-Dec	25-Dec	25-Dec	25-Dec	25-Dec	25-Dec

State Holidays

State Holidays were derived from the Texas State Comptroller's *State of Texas Holiday Schedule*. This also aligned with the previously established list of observed state holidays outlined in the SAT District *CTD Scheduling Guidelines*.

Note: Per the SAT District CTD Scheduling Guidelines, Good Friday, Rosh Hashanah, and Yom Kipper are not included in the district calendars. Texas Independence Day is also not included as a blackout date at this time.

TABLE 2: STATE HOLIDAYS - EXAMPLE OVERVIEW (2020 - 2026)

	2020	2021	2022	2023	2024	2025	2026
Confederate Heroes Day	19-Jan	19-Jan	19-Jan	19-Jan	19-Jan	19-Jan	19-Jan
Martin Luther King Jr. Day	20-Jan	18-Jan	17-Jan	16-Jan	15-Jan	20-Jan	19-Jan
President's Day	17-Feb	15-Feb	21-Feb	20-Feb	19-Feb	17-Feb	16-Feb
Cesar Chavez Day	31-Mar	31-Mar	31-Mar	31-Mar	31-Mar	31-Mar	31-Mar
San Jacinto Day	21-Apr	21-Apr	21-Apr	21-Apr	21-Apr	21-Apr	21-Apr
Emancipation Day	19-Jun	19-Jun	19-Jun	19-Jun	19-Jun	19-Jun	19-Jun
LBJ Day	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug	27-Aug

Veteran's Day	11-Nov	11-Nov	11-Nov	11-Nov	11-Nov	11-Nov	11-Nov
Day after Thanksgiving	27-Nov	26-Nov	25-Nov	24-Nov	29-Nov	28-Nov	27-Nov
Day before Christmas	24-Dec	24-Dec	24-Dec	24-Dec	24-Dec	24-Dec	24-Dec
Day after Christmas	26-Dec	26-Dec	26-Dec	26-Dec	26-Dec	26-Dec	26-Dec

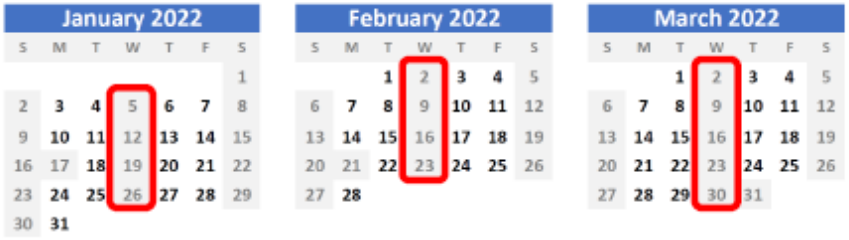
Weekends

Weekends are assumed as Saturdays and Sundays. A five-day workweek would exclude both Saturdays and Sundays. A six-day workweek would exclude Sundays only. A seven-day workweek would not exclude Saturdays or Sundays.

Weather Days

For simplicity and consistency, weather days have been assumed as every Wednesday. This makes the weather days very visible and easily adaptable while avoiding overlap with weekend non-workdays. This assumption provides the equivalent of ~4 days/month of non-workdays due to weather. For a five-day workweek, this assumption provides an average of ~16 days/month of workdays. This aligns with previously established averages outlined in the SAT District *CTD Scheduling Guidelines*.

FIGURE 1: WEATHER DAYS - EXAMPLE OVERVIEW (FIRST QUARTER OF 2022)

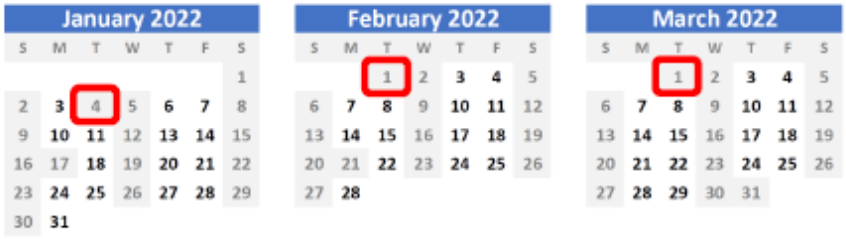


Note: Weather days have not been adjusted to align with seasonal weather patterns.

Wet Day

To accommodate for annually averaged historical trends in weather patterns, one additional "wet day" is included in the Dirt Calendar. This wet day has been assumed as the first Tuesday of each month. This makes the wet day very visible and easily adaptable while avoiding overlap with weekend non-workdays and most holidays. This assumption provides the equivalent of ~5 days/month of non-workdays due to weather (~4 weather days + 1 wet day). For a five-day workweek, this assumption provides an average of ~15 days/month of workdays.

FIGURE 1: WET DAY - EXAMPLE OVERVIEW (FIRST QUARTER OF 2022)



Note: Wet days have not been adjusted to align with seasonal weather patterns.

Additional Weather Considerations

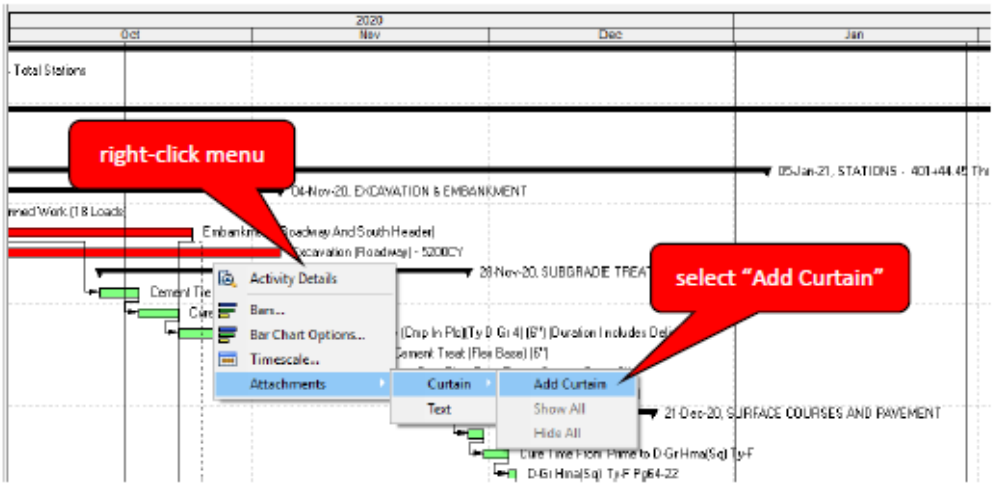
Asphalt Season

A new asphalt calendar has not been created as part of the 2020 calendar revision efforts. It is the preference of the SAT Construction Office to use a curtain rather than a calendar to represent cold weather considerations for paving operations.

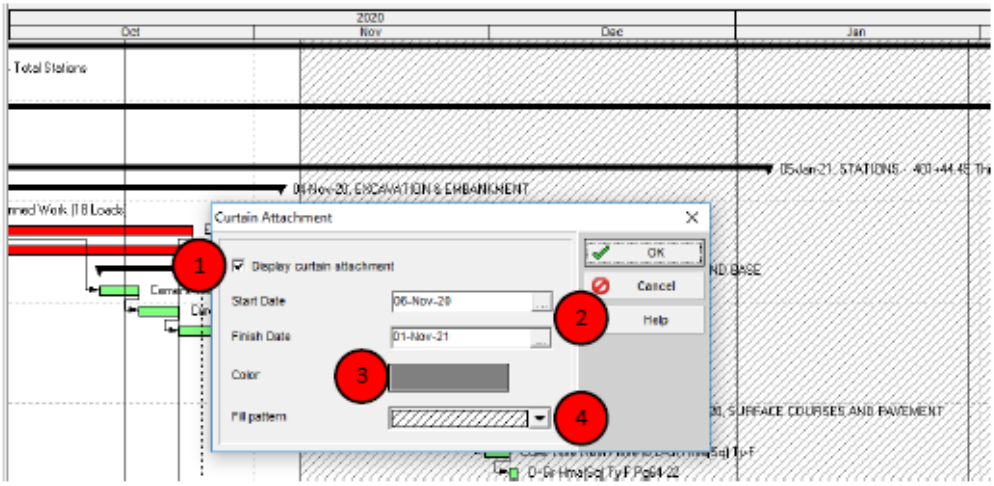
Note: A curtain has no impact on the schedule activities or calculations. Use of the curtain is for visual representation of a time period in which weather impacts should be considered. If an adjust to the schedule is desired, the adjustment must be made manually to the activity details.

The steps below outline the procedure to create a curtain in P6.

Right-click in the Gantt Chart area. Choose Attachments > Curtain > Add Curtain.

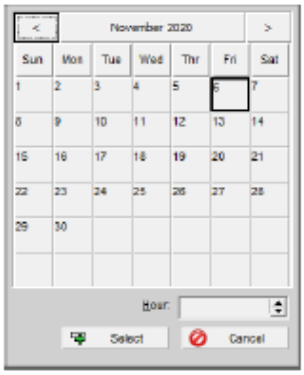


Use the Curtain Attachment dialog box to set the desired options.

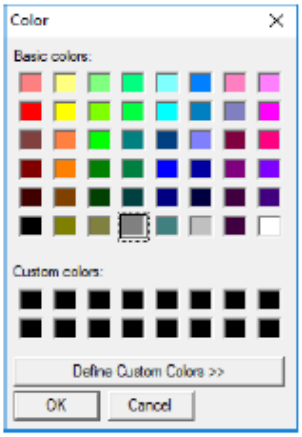


1. Check the box to "Display curtain attachment".

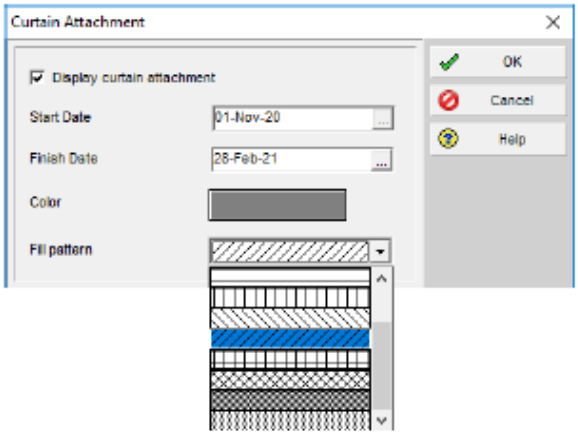
2. Use the date pickers to choose the desired "Start Date" and "Finish Date" for the curtain.



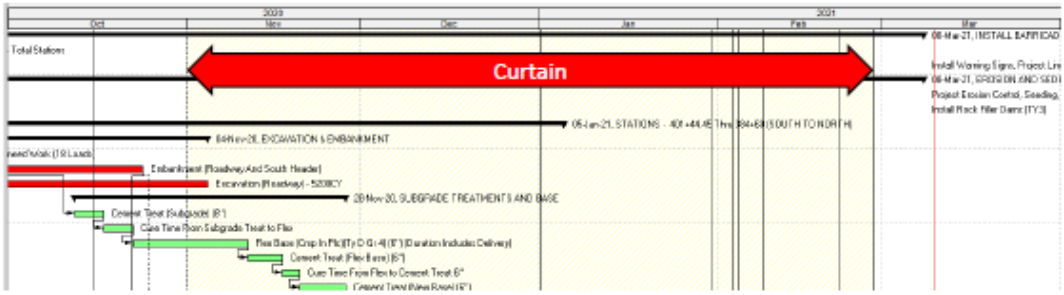
3. Choose the desired "Color" of the curtain.



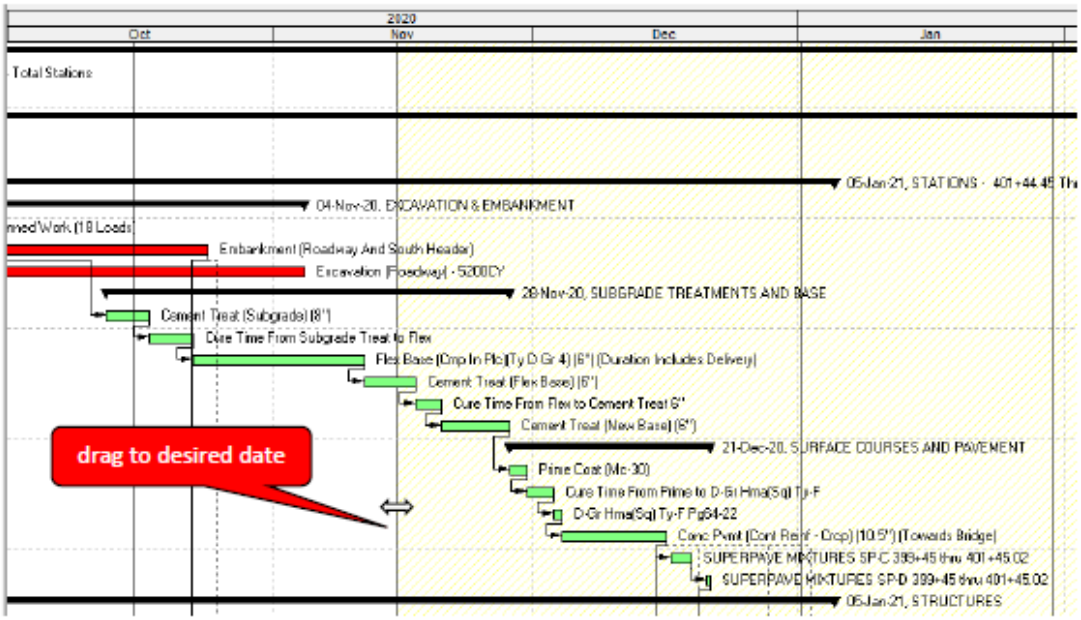
4. Choose the desired "Fill pattern" of the curtain element.



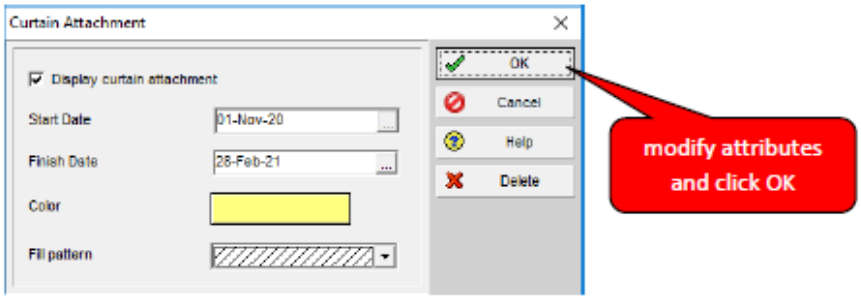
Click OK. The resulting curtain will display in the Gantt Chart.



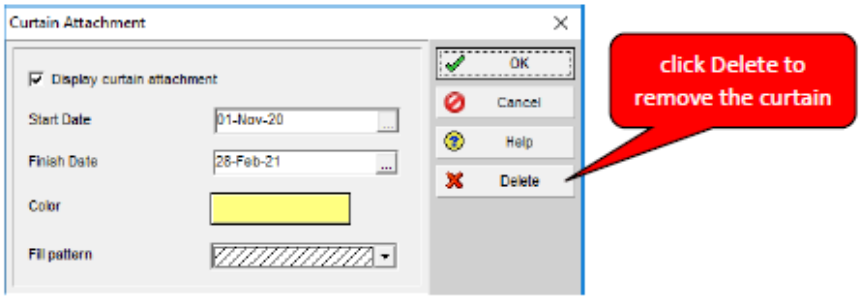
The limits of the curtain can be modified directly in the Gantt Chart by dragging the curtain edge line to a new location.



To modify the appearance of the curtain, double-click on the curtain. The Curtain Attachment dialog box will appear. Make the desired edits as previously outlined and click OK.



To remove the curtain, double-click on the curtain. The Curtain Attachment dialog box will appear. Make the desired edits as previously outlined and click OK.



Appendix F, Void Mitigation Guide

1. Include the following plan sheets and pay items.
    a. Void Mitigation sheets
    b. Item 0506, SANDBAGS FOR EROSION CONTROL
    c. Item 0506, BIODEG EROSN CONT LOGS (INSTL) (8")
    d. Item 0506, BIODEG EROSN CONT LOGS (REMOVE)
    e. Item 0420, CL A CONC (MISC)
    f. Item 0481, PIPE (PVC) (SCH 80) (6 IN)

2. Include the TCEQ Contact Info

3. Add the following to General notes for Item 7, Item 100, and Item 416
    a. Item 7 – Void Mitigation

    Using explosives is not allowed.

    The project area is a known karst area. Fractured material, boulders, underground voids, ground water, unstable material, and drastically varying strata can be expected. The Contractor shall work with TxDOT and TxDOT's partners to allow access and on site monitoring of excavation.

    All voids require an email notification to TxDOT designated representative within 2 hours of discovery. The email will require location information (GPS coordinates and approximate Station Number), dates of discovery, video/picture documentation, size, etc. Contractor shall supply a camera and digital picture/video documentation of all voids and provide a measurement of the size of the void. For voids that cannot be safely explored, another device (i.e., a trench box) shall be provided to document the void. Contact the District Construction Office for an example void notification email that shall be followed. This work is subsidiary.

    A dry void that is less than 1 CF in volume or less than 6 in. in all directions will not require action beyond notification. TxDOT will respond within 6 business days from time of email notification to provide guidance to the Contractor.

    All voids that require action shall be temporarily covered with a plastic tarp (overlap edge of void minimum of 3 ft.) or plywood (overlap edge of void minimum of 1 ft.). Sand bags will be utilized to keep the tarp and plywood in place, and helping to maintain humidity within the void. Erosion control logs shall be placed around the feature at an offset of 10' from the nearest edge. A 50-foot buffer zone around all edges of the feature shall be immediately established, using orange safety fence supported by T-posts or construction barrels. Work within this buffer zone shall be suspended. The logs, safety fence, barrels,

T-posts, and sandbags will be paid using the appropriate bid item or silt fence. The tarp and plywood are subsidiary.

If a single void delay is greater than 6 charge days and impacts the critical path per the latest schedule, time will be suspended starting on the 7th charge day until the response has been provided. Overhead or barricades will not be paid during this delay. If a single void delay is greater than 20 charge days and impacts the critical path, barricades and overhead will be paid for the charge days beyond the initial 20 days. If the accumulation of all suspended days is greater than 40 charge days and impacted the critical path, barricades and overhead will be paid for the charge days beyond the 40 days.

Overhead will be reimbursed at 6 percent in accordance with Item 4.6.2.

Barricades will be reimbursed on a daily rate calculated by the dividing the bid monthly rate by the number of charge days for the month. Days for reimbursement will be calculated based on time charge method and not calendar days.

All delays caused by a void and the duration for implementation of a response are non-compensable for labor, equipment, standby, mobilizations, and cost escalations.

Concrete will be paid using Class A Conc (Misc). Concrete will be unreinforced.

Quantities under 4 CY may be hand mixed on site using 5000psi rated bag mix concrete. Aggregate or other backfill will be paid by overrun of the existing embankment item. Filter fabric over the aggregate is subsidiary. Sandbags shall be paid using Sandbags for Erosion Control. The sandbags shall be polypropylene and filled with pea gravel. Connector pipe shall be paid using Pipe (PVC) (SCH 80) (6 IN).

b. Item 100 Prep ROW

Clear all trees required per plans as early as possible. Once clearing begins, perform the work as a continuous operation until complete.

Strip and stockpile the topsoil in each phase in a continuous operation. Provide TxDOT a 120 hour notice prior to completion of the work for each phase. Delay the start of all excavation for 48 hours upon completion of topsoil removal. TxDOT will provide approval to proceed with excavation after inspection of the stripped area.

This delay is non compensable.

c. Item 416 Drilled Shafts

Refer to Item 7 for void notes and mitigation process.

Submit installation plan for review no later than 2 months before construction.

During non-work hours open holes shall be covered and surrounded by erosion control logs at an offset of 10’ from the edge of the opening. This work is subsidiary.

Video documentation shall be conducted of a drill shaft once excavation is complete and prior to placing reinforcement. This work is subsidiary.

Concrete used to fill the voids will be paid using Class A Conc (Misc) item but will use the Class of concrete as required by the specification. Quantity of concrete will be based on visual inspection provided by the Contractor. If visual inspection is unable to determine the size of the void the concrete for payment will be measured as the additional concrete beyond the amount required to place a clean shaft plus 10 percent waste.

The use of drilling fluids, underwater placement, or slurry method will not be allowed if a void is exposed during drilling. The contractor shall use appropriate industry approved methods to provide a product in compliance with the specifications. Additional time or compensation will not be allowed for use of alternate methods or casing installation.

If a large void requires the permanent placement of casing, casing shall be in accordance with Item 416. Casing that remains will be paid by invoice from supplier with mark up in accordance with material for Item 9.7. Labor, equipment, additional time, etc. will not be compensable. If the casing installation impacts the critical path per the latest schedule, time will be suspended beginning when casing installation begins until the casing is installed.

Void delays will be compensated in accordance with Item 7 general notes. Core holes are required for all drill shafts.

Appendix G, SAT General ITS Planning Guidelines

1. Existing ITS infrastructure to remain in place unless otherwise noted or if relocation is needed.

2. Existing ITS infrastructure to remain operational during construction or temporary locations to be designed.

3. Use 2 – 3”conduits to be installed on one side of corridor. Provide 144 SM FOC within duct bank to connect communication HUB’s/ITS Control Cabinets. The Fiber connection should be a home run connection with no splices.

4. Provide 12 SM FOC within duct bank to connect ITS Devices to communication HUB/ITS Control Cabinet. The Fiber connection should be a home run connection with no splices.

6. Use hanger detail to install typical RM multi-duct standard under bridge deck for existing bridges.

7. Generally max power run to be kept to 500 feet.

8. Convert existing ITS devices to fiber connection and Digital equipment (IP).

9. Recommend installation of HUB(s)/ITS Control Cabinets based on designated communication topology locations.

10. ITS Ground Boxes are to be used along the main duct bank trunk line.

11. TY “D” Ground boxes are to be used for lateral runs to devices.

12. Maximum duct bank pull length is 700 ft.

13. Devices: Closed Circuit Television Cameras (CCTV) All CCTV to have PTZ capabilities, using high resolution.

14. CCTV locations should consider topography and line of sight in location placement.

15. Located at 1 mile intervals in rural areas (1/2 mile camera view depending on topography and line of sight restraints).

16. Located at ½ mile or less intervals in urban/core area (1/4 mile camera view or less depending on topography and line of sight restraints).

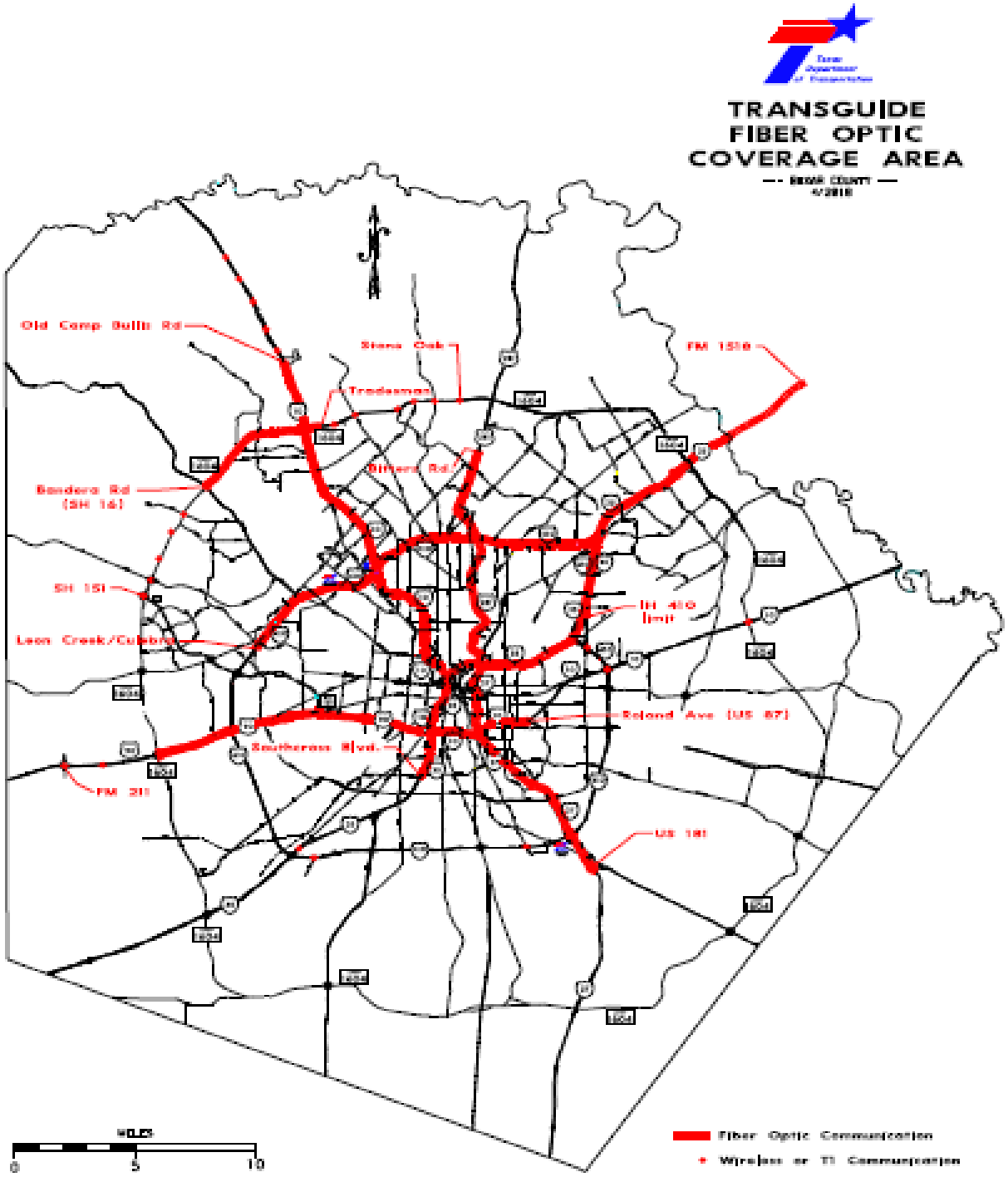
17. Mount additional CCTV to bridge structures at interchange areas to provide view of direct connector bridge roadways.

18. Bluetooth Traffic Sensors. Existing to remain.

19. Additional Bluetooth at CCTV locations, where applicable.

Appendix H, ITS Location Map

POC: Chris Delazerda / Andres Astorga



Appendix I, Projects that Intersect or Cross SH 130 Segments 5 & 6 ROW

Notes: See Memo below for projects that intersect or cross SH 130 segments 5 & 6 ROW

To: Mario Jorge, P.E.,
District Engineer - San Antonio

CC: Jonathan Bean, P.E., Transportation Planning & Development Will Lockett, P.E., Area Engineer, New Braunfels

From: Beau B. Buchanan, P.E.
SH 130 Project Manager
Project Finance, Debt and Strategic Contracts Division

Subject TxDOT Design Projects Intersecting or Crossing SH 130 5 & 6 facility Right of Way

This memo serves as the basis for the submission and review procedural instructions for District projects which will intersect or cross the SH 130 Segments 5 & 6 facility Right of Way. These types of projects could include, but are not limited to, new roadways, roadway widenings, overlays/sealcoats, traffic control device installation, signing, striping, illumination, intelligent transportation systems, utility installation or relocation projects or any project which might intrude into the SH 130 right of way including the portions of US 183 that are within the SH 130 5 & 6 facility right of way.

Pursuant to the Facility Concession Agreement (FCA) executed March 22, 2007 between TxDOT and the SH 130 Concession Company, LLC (Developer), TxDOT shall allow the Developer to review all design plans which would involve a crossing of the SH 130 5 & 6 ROW. These reviews would take place at all preliminary planning phases and incremental design phases (30%, 60%, 90% etc.) as well as the final design. If it is deemed necessary, the district could request the Developer's presence at any of the design/planning project meetings. This request would need to be made through me. In addition, all pertinent associated design reports prepared for the project may be requested from TxDOT by the Developer for review such as but not limited to geotechnical, pavement, hydraulic, signing, striping, lighting, traffic, and traffic control. Many of these reviews are considered courtesy reviews, however if there are any potential impacts to the Developer's infrastructure or impacts which could affect toll revenue generation, the Developer would have the right to provide comment that may potentially cause project design change.

The District should electronically submit all project phase submissions (schematic, 30%, 60%, 90%, Final) to me. The submissions can be submitted via TxDOT Drop Box or email to me. When submitting please include a brief narrative on project information, status, current projected schedule and contact information for responsible party for the project. In addition, please include a blank comment matrix form with the original submission (example is attached) for the Developer's use.

This comment matrix and any review markups if necessary will be returned to TxDOT after each submission for their information and records.

Per the FCA the Developer has fourteen (14) calendar days upon receipt to perform their review and provide comments. If the Developer does not return comments within the allotted 14 calendar days, it will be considered as a "No Comment/Not Reviewed" resolution for that phase of the project. No comments from the Developer on early phases of the project does not relieve TxDOT from submitting later phases to the Developer. If the Developer does not return comments on the Final design phase of the project, then it will be considered as a "No Exceptions Taken" status and TxDOT should consider their coordination efforts complete.

Developer comments will be returned by myself or my appointed representative to the District's Responsible Party for the Project via email or the TxDOT Drop Box.

Should there be comments that TxDOT takes exception to or disagrees with, the District should contact me to request a conference call or face to face comment resolution meeting with the Developer.

The goal of this process is to establish a clear line for the transfer of information between TxDOT and the Developer to help avoid potential conflicts and minimize delays to the Districts projects. Thank you for your cooperation in this coordination effort and please call me at (210) 610-4805 should you have any questions.

Attachment: Comment Matrix

Mr. Mario Jorge, P.E. September 25, 2017

Appendix J, Additional References (TxDOT.gov)

https://www.txdot.gov/about/districts/san-antonio-district/standards-forms.html

- SAT Cost Estimate SOP
- SAT Pavement Design SOP
- SAT Process – PS&E Plan review
- Go / No-Go Decision Tool
- Project Scoping Tool (SC-Overlay-Rehab)