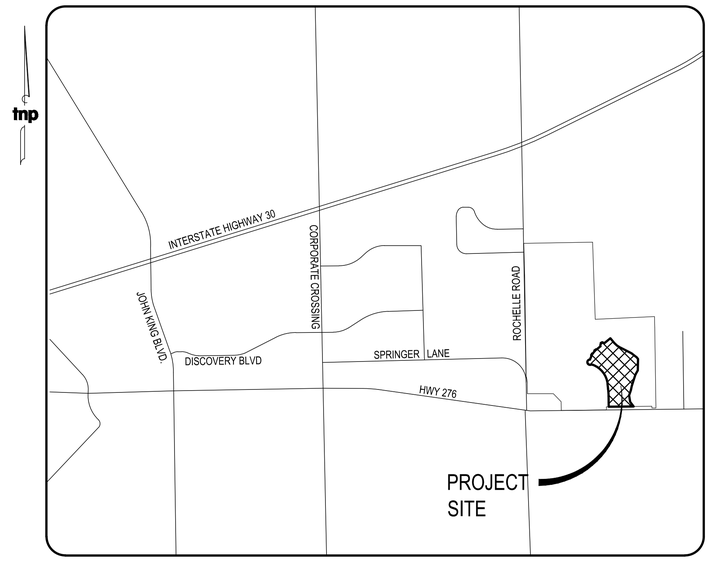
DEVELOPMENT PLANS FOR
DISCOVERY LAKES PHASE 1
CITY OF ROCKWALL
ROCKWALL COUNTY, TEXAS
APRIL 2023

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LOCATION MAP
NOT TO SCALE

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ROCKWALL, TX

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

MATT ATKINS, DATE: 11/15/2021
QUALITY CONTROL REVIEW PERFORMED

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GBPE: PEF007431; TBAE: BR 2673

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TNP JOB NO: SBD20370
ROCKWALL, TX
DISCOVERY LAKES PHASE 1
RECORD DRAWINGS

GENERAL ITEMS

1. All construction shall conform to the requirements set forth in the City of Rockwall's Engineering Department's "Standards of Design and Construction" and the "Standard Specifications for Public Works Construction" by the North Texas Central Council of Governments, 5th edition amended by the City of Rockwall. The CONTRACTOR shall reference the latest City of Rockwall standard details provided in the Rockwall Engineering Departments "Standards of Design and Construction" manual for details not provided in these plans. The CONTRACTOR shall possess one set of the NCTCOG Standard Specifications and Details and the City of Rockwall's "Standards of Design and Construction" manual on the project site at all times
2. Where any conflicting notes, details or specifications occur in the plans the City of Rockwall General Construction Notes, Standards, Details and Specifications shall govern unless detail or specification is more strict.
3. The City of Rockwall Engineering Departments "Standards of Design and Construction" can be found online at: http://www.rockwall.com/engr.asp
4. All communication between the City and the CONTRACTOR shall be through the Engineering Construction Inspector and City Engineer or designated representative only. It is the responsibility of the CONTRACTOR to contact the appropriate department for inspections that do not fall under this approved engineering plan set.
5. Prior to construction, CONTRACTOR shall have in their possession all necessary permits, plans, licenses, etc.
6. The CONTRACTOR shall have at least one original stamped and signed set of approved engineering plans and specifications on-site and in their possession at all times. A stop work order will be issued if items are not on-site. Copies of the approved plans will not be substituted for the required original "approved plans to be on-site".
7. All material submittals, concrete batch designs and shop drawings required for City review and approval shall be submitted by the CONTRACTOR to the City sufficiently in advance of scheduled construction to allow no less than 10 business days for review and response by the City.
8. All site dimensions are referenced to the face of curb or edge of pavement unless otherwise noted.
9. The City requires ten (10%) percent-two (2) year maintenance bond for paving, paving improvements, water systems, wastewater systems, storm sewer systems including detention systems, and associated fixtures and structures which are located within the right-of-ways or defined easements. The two (2) year maintenance bond is to state "from date of City acceptance" as the starting time.
10. A review of the site shall be conducted at twenty (20) months into the two (2) year maintenance period. The design engineer or their designated representative and the CONTRACTOR shall be present to walk the site with the City of Rockwall Engineering Inspection personnel.

EROSION CONTROL & VEGETATION

1. The CONTRACTOR or developer shall be responsible, as the entity exercising operational control, for all permitting as required by the Environmental Protection Agency (EPA) and the Texas Commission on Environmental Quality (TCEQ). This includes, but is not limited to, preparation of the Storm Water Pollution Prevention Plan (SWPPP), the Construction Site Notice (CSN), the Notice of Intent (NOI), the Notice of Termination (NOT) and any Notice of Change (NOC) and is required to pay all associated fees
2. Erosion control devices as shown on the erosion control plan for the project shall be installed prior to the start of land disturbing activities.
3. All erosion control devices are to be installed in accordance with the approved plans, specifications and Storm Water Pollution Prevention Plan (SWPPP) for the project. Erosion control devices shall be placed and in working order prior to start of construction. Changes are to be reviewed and approved by the design engineer and the City of Rockwall prior to implementation.
4. If the Erosion Control Plans and Storm Water Pollution Prevention Plan (SWPPP) as approved cannot appropriately control erosion and off-site sedimentation from the project, the erosion control plan and/or the SWPPP is required to be revised and any changes reported to the Texas Commission on Environmental Quality (TCEQ), when applicable.
5. All erosion control devices shall be inspected weekly by the CONTRACTOR and after all major rain events, or more frequently as dictated in the project Storm Water Pollution Prevention Plan (SWPPP). CONTRACTOR shall provide copies of inspection's reports to the engineering inspection after each inspection.
6. The CONTRACTOR shall not dispose of waste and any materials into streams, waterways or floodplains. The CONTRACTOR shall secure all excavation at the end of each day and dispose of all excess materials.
7. CONTRACTOR shall take all available precautions to control dust. CONTRACTOR shall control dust by sprinkling water or other means as approved by the City Engineer.
8. CONTRACTOR shall establish grass and maintain the seeded area, including watering, until a "Permanent Stand of Grass" is obtained at which time the project will be accepted by the City. A "Stand of Grass" (not winter rye or weeds) shall consist of 75% to 80% coverage of all disturbed areas and a minimum of one-inch (1") in height as determined by the City. No bare spots will be allowed. Re-seeding will be required in all washed areas and areas that don't grow.
9. All City right-of-ways shall be sodded if disturbed. No artificial grass is allowed in any City right-of-way and/or easements.
10. All adjacent streets/alleys shall be kept clean at all times
11. CONTRACTOR shall keep construction site clean at all times, immediately contain all debris and trash, all debris and trash shall be removed at the end of each work day, and all vegetation on the construction site 10-inches or taller in height must be cut immediately.
12. Suspension of all construction activities for the project will be enforced by the City if any erosion control requirements are not meet. Work may commence after deficiency has been rectified.
13. During construction of the project, all soil stockpiles and borrow areas shall be stabilized or protected with sediment trapping measures. The CONTRACTOR is responsible for the temporary protection and permanent stabilization of all soil stockpiles on-site as well as borrow areas and soil intentionally transported from the project site.
14. Where construction vehicles access routes intersect paved or public roads/alleys, construction entrances shall be installed to minimize the transport of sediment by vehicular tracking onto paved surfaces. Where sediment is transferred onto paved or public surfaces, the surface shall be immediately cleaned. Sediment shall be removed from the surface by shoveling or sweeping and transported to a sediment disposal area. Pavement washing shall be allowed only after sediment is removed in this manner.
15. All drainage inlets shall be protected from siltation, ineffective or unmaintained protection devices shall be immediately replaced and the inlet and storm system cleaned. Flushing is not an acceptable method of cleaning.
16. During all dewatering operations, water shall be pumped into an approved filtering device prior to discharge into a receiving outlet.

TRAFFIC CONTROL

1. All new Detouring or Traffic Control Plans are required to be submitted to the City for review and approval a minimum of 21 calendar days prior to planned day of implementation.
2. When the normal function of the roadway is suspended through closure of any portion of the right-of-way, temporary construction work zone traffic control devices shall be installed to effectively guide the motoring public through the area. Consideration for road user safety, worker safety, and the efficiency of road user flow is an integral element of every traffic control zone.
3. All traffic control plans shall be prepared and submitted to the Engineering Department in accordance with the standards identified in Part VI of the most recent edition of the TMUTCD. Lane closures will not occur on roadways without an approval from the Rockwall Engineering Department and an approved traffic control plan. Traffic control plans shall be required on all roadways as determined by the City Engineer or the designated representative.
4. All traffic control plans must be prepared, signed, and sealed by an individual that is licensed as a professional engineer in the State of Texas. All traffic control plans and copies of work zone certification must be submitted for review and approval a minimum of three (3) weeks prior to the anticipated temporary traffic control.
5. The CONTRACTOR executing the traffic control plan shall notify all affected property owners two (2) weeks prior to any the closures in writing and verbally.
6. Any deviation from an approved traffic control plan must be reviewed by the City Engineer or the designated representative. If an approved traffic control plan is not adhered to, the CONTRACTOR will first receive a verbal warning and be required to correct the problem immediately. If the deviation is not corrected, all construction work will be suspended, the lane closure will be removed, and the roadway opened to traffic.
7. All temporary traffic control devices shall be removed as soon as practical when they are no longer needed. When work is suspended for short periods of time at the end of the workday, all temporary traffic control devices that are no longer appropriate shall be removed or covered. The first violation of this provision will result in a verbal warning to the construction foreman. Subsequent violations will result in suspension of all work at the job site for a minimum of 48 hours. All contractors working on City funded projects will be charged one working day for each 24 hour closure.
8. Lane closures on any major or minor arterial will not be permitted between the hours of 6:00 am to 9:00 am and 3:30 pm to 7:00 pm. Where lane closures are needed in a school area, they will not be permitted during peak hours of 7:00 am – 9:00 am and 3:00 pm to 5:00 pm. Closures may be adjusted according to the actual start-finish times of the actual school with approval by the City Engineer. The first violation of this provision will result in a verbal warning to the construction foreman. Subsequent violations will result in suspension of all work at the job site for a minimum of 48 hours. All contractors working on City funded projects will be charged one working day for each 24 hour closure of a roadway whether they are working or not.
9. No traffic signs shall be taken down without permission from the City.
10. No street/roadway will be allowed to be fully closed.

UTILITY LINE LOCATES

1. It is the CONTRACTOR's responsibility to notify utility companies to arrange for utility locates at least 48 hours prior to beginning construction. The completeness and accuracy of the utility data shown on the plans is not guaranteed by the design engineer or the City. The CONTRACTOR is responsible for verifying the depth and location of existing underground utilities proper to excavating, trenching, or drilling and shall be required to take any precautionary measures to protect all lines shown and .or any other underground utilities not on record or not shown on the plans.
2. The CONTRACTOR shall be responsible for damages to utilities
3. CONTRACTOR shall adjust all City of Rockwall utilities to the final grades.
4. All utilities shall be placed underground.
5. CONTRACTOR shall be responsible for the protection of all existing main lines and service lines crossed or exposed by construction operations. Where existing mains or service lines are cut, broken or damaged, the CONTRACTOR shall immediately make repairs to or replace the entire service line with same type of original construction or better. The City of Rockwall can and will intervene to restore service if deemed necessary and charge the CONTRACTOR for labor, equipment, material and loss of water if repairs aren't made in a timely manner by the CONTRACTOR.
6. The City of Rockwall (City utilities) is not part of the Dig Tess or Texas one Call – 811 – line locate system. All City of Rockwall utility line locates are to be scheduled with the City of Rockwall Service Center. 972-771-7730. A 48-hour advance notice is required for all non-emergency line locates.
7. Underground utility lines shall be installed in accordance with the following standards in addition to other applicable criteria:
   a. No more than 500 linear feet of trench may be opened at one time.
   b. Material used for backfilling trenches shall be properly compacted to 95% standard density in order to minimize erosion, settlement, and promote stabilization that the geotechnical engineer recommends.
   c. Applicable safety regulations shall be complied with.
11. This plan details pipes up to 5 feet from the building. Refer to the building plans for building connections. CONTRACTOR shall supply and install pipe adapters as necessary.
12. All underground lines shall be installed, inspected, and approved prior to backfilling.
13. All concrete encasement shall have a minimum of 28 days compressive strength at 3,000 psi (min. 5.5 sack mix).

WATER LINE NOTES

1. The CONTRACTOR shall maintain existing water service at all times during construction.
2. Proposed water lines shall be AWWA C900-16 PVC Pipe (blue in color) for all sizes, DR 14 (PC 305) for pipeline sizes 12-inch and smaller, and DR 18 (PC 235) for 14-inch and larger water pipelines unless otherwise shown on water plan and profiles sheets. Proposed water lines shall be constructed with minimum cover of 4 feet for 6-inch through 8-inch, 5 feet for 12-inch through 18-inch and 6 feet for 20-inch and larger.
3. Proposed water line embedment shall be NCTCOG Class 'B-3' as amended by the City of Rockwall's engineering standards of design and construction manual.
4. CONTRACTOR shall coordinate the shutting down of all water lines with the City of Rockwall Engineering Inspector and Water Department. The City shall operate all water valves. Allow 5 business days from the date of notice to allow City personnel time to schedule a shut down. Two additional days are required for the CONTRACTOR to notify residents in writing of the shut down after the impacted area has been identified. Water shut downs impacting businesses during their normal operation hours is not allowed. CONTRACTOR is required to coordinate with the Rockwall Fire Department regarding any fire watch requirements as well as any costs incurred when the loss of fire protection to a structure occurs.
5. CONTRACTOR shall furnish and install gaskets on water lines between all dissimilar metals and at valves (both existing and proposed).
6. All fire hydrants and valves removed and salvaged shall be returned to the City of Rockwall Municipal Service Center.
7. Blue EMS pads shall be installed at every change in direction, valve, curb stop and service tap on the proposed water line and every 250'.
8. All water valve hardware and valve extensions, bolts, nuts and washers shall be 316 stainless steel.
9. All fire hydrants bolts, nuts and washers that are buried shall be 316 stainless steel.
10. Abandoned water lines to remain in place shall be cut and plugged and all void spaces within the abandoned line shall be filled with grout, flowable fill or an expandable permanent foam product. Valves to be abandoned in place shall have any extensions and the valve box removed and shall be capped in concrete.
11. All fire hydrants will have a minimum of 5 feet of clearance around the appurtenance including but not limited to parking spaces and landscaping.
12. All joints are to be megalug joints with thrust blocking.
13. Water and sewer mains shall be kept 10 feet apart (parallel) or when crossing 2 feet vertical clearance.
14. CONTRACTOR shall maintain a minimum of 4 feet of cover on all water lines.
15. All domestic and irrigation services are required to have a testable backflow device with a double check valve installed per the City of Rockwall regulations at the property line and shown on plans.

WASTEWATER LINE NOTES

1. The CONTRACTOR shall maintain existing wastewater service at all times during construction.
2. Wastewater line for 4-inch through 15-inch shall be Green PVC – SDR 35 (ASTM D3034) [less 10 ft cover] and SDR 26 (ASTM D3034) [10 ft or more cover]. For 18-inch and lager wastewater line shall be Green PVC – PS 46 (ASTM F679) [less 10 ft cover] and PS 115 (ASTM F679) [10 ft or more cover]. No services will be allowed on a sanitary sewer line deeper than 10 feet.
3. Proposed wastewater line embedment shall be NCTCOG Class 'H' as amended by the City of Rockwall's public works standard design and construction manual.
4. Green EMS pads shall be installed at every 250', manhole, clean out and service lateral on proposed wastewater lines.
5. CONTRACTOR shall CCTV all existing wastewater lines that are to be abandoned to ensure that all laterals are accounted for and transferred to proposed wastewater lines prior to abandonment.
6. All abandoned wastewater and force main lines shall be cut and plugged and all void spaces within the abandoned line shall be filled with grout, flowable fill or an expandable permanent foam product.
7. Existing manholes and cleanouts not specifically called to be relocated shall be adjusted to match final grades.
8. All wastewater pipes and public services shall be inspected by photographic means (television and DVD) prior to final acceptance and after franchise utilities are installed. The CONTRACTOR shall furnish a DVD to the Engineering Construction Inspector for review. Pipes shall be cleaned prior to TV inspection of the pipes. Any sags, open joints, cracked pipes, etc. shall be repaired or removed by the CONTRACTOR at the CONTRACTOR's expense. A television survey will be performed as part of the final testing in the twentieth (20^{th}) month of the maintenance period.
9. All manholes (public or private) shall be fitted with inflow prevention. The inflow prevention shall conform to the measures called out in standard detail R-5031.
10. All new or existing manholes being modified shall have corrosion protection being Raven Liner 405 epoxy coating, ConShield, or approved equal.. Consheild must have terracotta color dye mixed in the precast and cast-in-place concrete. Where connections to existing manholes are made the CONTRACTOR shall rehab manhole as necessary and install a 125 mil thick coating of Raven Liner 405 or approved equal.
11. All new or existing manholes that are to be placed in pavement shall be fitted with a sealed (gasketed) rim and cover to prevent inflow.
12. If an existing wastewater main or trunk line is called out to be replaced in place a wastewater bypassing pump plan shall be required and submitted to the Engineering Construction Inspector and City Engineer for approval prior to implementation. Bypass pump shall be fitted with an auto dialer and conform to the City's Noise Ordinance. Plan shall be to the City sufficiently in advance of scheduled construction to allow no less than 10 business days for review and response by the City.
13. CONTRACTOR shall maintain a minimum of 4 feet of cover on all wastewater lines.

GENERAL CONSTRUCTION NOTES
Sheet 1 of 2
October 2020

CITY OF ROCKWALL
ENGINEERING DEPARTMENT

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RECORD DRAWINGS

no.	revision	by	date

tnp

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STATE OF TEXAS
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scale
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Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
GENERAL NOTES

tnp project SBD20370
sheet 1 of 51

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DEMOLITION, REMOVAL, DISPOSAL AND EXCAVATION NOTES

1. All pavements to be removed and replaced shall be saw cut to full depth along neat squared lines shown in the plans.
2. Proposed concrete pavement shall be constructed with longitudinal butt construction joints at all connections to existing concrete pavement.
3. All public concrete pavement to be removed and replaced shall be full panel replacement, 1-inch thicker and on top of 6-inch thick compacted flexbase.
4. No excess excavated material shall be deposited in low areas or along natural drainage ways without written permission from the affected property owner and the City of Rockwall. No excess excavation shall be deposited in the City Limits without a permit from the City of Rockwall. If the CONTRACTOR places excess materials in these areas without written permission, the CONTRACTOR will be responsible for all damages resulting from such fill and shall remove the material at their own cost.

PAVING AND GRADING

1. All detention systems are to be installed and verified for design compliance along with the associated storm sewer and outflow structures, prior to the start of any paving operations (including building foundations). Erosion protection shall be placed at the pond outflow structures, silt fence along the perimeter of the pond along with any of the associated erosion BMPs noted on the erosion control plan, and the sides and bottom of the detention system shall have either sod or anchored seeded curlex installed prior to any concrete placement.
2. All paving roadway, driveways, fire lanes, drive-isles, parking, dumpster pads, etc. sections shall have a minimum thickness, strength, reinforcement, joint type, joint spacing and subgrade treatment shall at a minimum conform to the City standards of Design and Construction and table below.

Street/Pavement Type	Minimum Thickness (inches)	Strength 28-Day (psi)	Minimum Cement (sacks / CY)		Steel Reinforcement	
			Machine placed	Hand Placed	Bar #	Spacing (O.C.E.W.)
Arterial	10”	3,600	6.0	6.5	#4 bars	18”
Collector	8”	3,600	6.0	6.5	#4 bars	18”
Residential	6”	3,600	6.0	6.5	#3 bars	24”
Alley	7”-5”-7”	3,600	6.0	6.5	#3 bars	24”
Fire Lane	6”	3,600	6.0	6.5	#3 bars	24”
Driveways	6”	3,600	6.0	6.5	#3 bars	24”
Barrier Free Ramps	6”	3,600	N/A	6.5	#3 bars	24”
Sidewalks	4”	3,000	N/A	5.5	#3 bars	24”
Parking Lot/Drive Aisles	5”	3,000	5.0	5.5	#3 bars	24”
Dumpster Pads	7”	3,600	6.0	6.5	#3 bars	24”

3. Reinforcing steel shall be tied (100%). Reinforcing steel shall be set on plastic chairs. Bar laps shall be minimum 30 diameters. Sawed transverse dummy joints shall be spaced every 15 feet or 1.25 time longitudinal butt joint spacing whichever is less. Sawing shall occur within 5 to 12 hours after the pour, including sealing. Otherwise, the section shall be removed and longitudinal butt joint constructed.
4. No sand shall be allowed under any paving.
5. All concrete mix design shall be submitted to the City for review and approval prior to placement.
6. Fly ash may be used in concrete pavement locations provided that the maximum cement reduction does not exceed 20% by weight per C.Y. of concrete. The fly ash replacement shall be 1.25 lbs. per 1.0 lb. cement reduction.
7. All curb and gutter shall be integral (monolithic) with the pavement.
8. All fill shall be compacted by sheep's foot roller to a minimum 95% standard proctor. Maximum loose lift for compaction shall be 8 inches. All lifts shall be tested for density by an independent laboratory. All laboratory compaction reports shall be submitted to the City Engineering Construction Inspector once results are received. All reports will be required prior to final acceptance.
9. All concrete compression tests and soil compaction/density tests are required to be submitted to the City’s Engineering Inspector immediately upon results.
10. All proposed sidewalks shall include barrier free ramps at intersecting streets, alleys, etc. Barrier free ramps (truncated dome plate in Colonial or brick red color) shall meet current City and ADA requirements and be approved by the Texas Department of Licensing and Regulation (TDLR).
11. All public sidewalks shall be doweled into pavement where it abuts curbs and driveways. Expansion joint material shall be used at these locations.
12. All connection of proposed concrete pavement to existing concrete pavement shall include a longitudinal butt joint as the load transfer device. All longitudinal butt joints shall be clean, straight and smooth (not jagged in appearance)
13. Cracks formed in concrete pavement shall be repaired or removed by the CONTRACTOR at the City's discretion. CONTRACTOR shall replace existing concrete curbs, sidewalk, paving, a gutters as indicated on the plans and as necessary to connect to the existing infrastructure, including any damage caused by the CONTRACTOR.
14. All residential lots will require individual grading plans submitted during the building permit process that correspond with the engineered grading and drainage area plans.
15. Approval of this plan is not an authorization to grade adjacent properties when the plans or field conditions warrant off-site grading. Written permission must be obtained and signed from the affected property owner(s) and temporary construction easements may be required. The written permission shall be provided to the City as verification of approval by the adjacent property owner(s). Violation of this requirement will result in suspension of all work at the job site until issue has been rectified.
16. All cut or fill slopes of non-paved areas shall be a maximum of 4:1 and minimum of 1%.
17. CONTRACTOR agrees to repair any damage to property and the public right-of-way in accordance with the City Standards of Design and Construction.
18. CONTRACTOR shall protect all monuments, iron pins/rods, and property corners during construction.
19. CONTRACTOR shall ensure positive drainage so that runoff will drain by gravity flow to new or existing drainage inlets or sheet flow per these approved plans.

DRAINAGE / STORM SEWER NOTES

1. The CONTRACTOR shall maintain drainage at all times during construction. Ponding of water in streets, drives, trenches, etc. will not be allowed. Existing drainage ways shall not be blocked or removed unless explicitly stated in the plans or written approval is given by the City.
2. All structural concrete shall be 4200 psi compressive strength at 28 days minimum 7.0 sack mix, air entrained, unless noted otherwise. Fly ash shall not be allowed in any structural concrete.
3. Proposed storm sewer embedment shall be NCTCOG Class 'B' as amended by the City of Rockwall's Engineering Department Standards of Design and Construction Manual.
4. All public storm pipe shall be a minimum of 18-inch reinforced concrete pipe (RCP), Class III, unless otherwise noted.
5. All storm pipe entering structures shall be grouted to assure connection at the structure is watertight.
6. All storm structures shall have a smooth uniform poured mortar invert from invert in to invert out.
7. All storm sewer manholes in paved areas shall be flush with the paving grade, and shall have traffic bearing ring and covers.
8. All storm sewer pipes and laterals shall be inspected by photographic means (television and DVD) prior to final acceptance and after franchise utilities are installed. The CONTRACTOR shall furnish a DVD to the Engineering Construction Inspector for review. Pipes shall be cleaned prior to TV inspection of the pipes. Any sags, open joints, cracked pipes, etc. shall be repaired or removed by the CONTRACTOR at the CONTRACTOR’s expense. A television survey will be performed as part of the final testing in the twentieth (20^{th}) month of the maintenance period.

RETAINING WALLS

1. All retaining walls, regardless of height, will be reviewed and approved by the City Engineering Department
2. All retaining walls (including foundation stem walls), regardless of height, will be constructed of rock/stone/brick or rock/stone/brick faced. No smooth concrete walls are allowed. Wall materials shall be the same for all walls on the project.
3. All portions, including footings, tie-backs, and drainage backfill, of the wall shall be on-site and not encroach into any public easements or right-of-way. The entire wall shall be in one lot and shall not be installed along a lot line.
4. All walls 3 feet and taller will be designed and signed/sealed by a registered professional engineer in the State of Texas. The wall design engineer is required to inspect the wall construction and supply a signed/sealed letter of wall construction compliance to the City of Rockwall along with wall as-builts prior to City Engineering acceptance.
5. No walls are allowed in detention easements. A variance to allow retaining walls in a detention easement will require approval by the Planning and Zoning Commission with appeals being heard by the City Council.

FINAL ACCEPTANCE AND RECORD DRWINGS/AS-BUILTS

1. Final Acceptance shall occur when all the items on the Checklist for Final Acceptance have been completed and signed-off by the City. An example of the checklist for final acceptance has been included in the Appendix of the Standards of Design and Construction. Items on the checklist for final acceptance will vary per project and additional items not shown on the check list may be required.
2. After improvements have been constructed, the developer shall be responsible for providing to the City “As Built” or “Record Drawings”. The Design Engineer shall furnish all digital files of the project formatted in Auto Cad 14, or 2000 format or newer and Adobe Acrobat (.pdf) format with a CD-ROM disk or flash drive. The disk or drive shall include a full set of plans along with any landscaping, wall plans, and details sheets.
3. Submit 1-set of printed drawings of the “Record Drawings” containing copies of all sheets to the Engineering Construction Inspector for the project. The printed sheets will be reviewed by the inspector PRIOR to producing the “Record Drawing” digital files on disk or flash drive. This will allow any revisions to be addressed prior to producing the digital files.
4. Record Drawing Disk drawings shall have the Design Engineers seal, signature and must be stamped and dated as “Record Drawings” or “As Built Drawings” on all sheets.
5. The City of Rockwall will not accept any Record Drawing disk drawings which include a disclaimer. A disclaimer shall not directly or indirectly state or indicate that the design engineer or the design engineer’s surveyor/surveyors did not verify grades after construction, or that the Record Drawings were based solely on information provided by the construction contractor/contractors. Any Record Drawings which include like or similar disclaimer verbiage will not be accepted by the City of Rockwall.
6. Example of Acceptable Disclaimer: “To the best of our knowledge ABC Engineering, Inc., hereby states that this plan is As-Built. This information provided is based on surveying at the site and information provided by the contractor.”

GENERAL CONSTRUCTION NOTES
Sheet 2 of 2
October 2020

CITY OF ROCKWALL
ENGINEERING DEPARTMENT

385 S. Goliad
Rockwall, Texas 75087

P (972) 771-7746
F (972) 771-7748

RECORD DRAWINGS

no.	revision	by	date

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS — CAMERON A. SLOWN — LICENSED PROFESSIONAL ENGINEER — No. 106317
4/5/2023

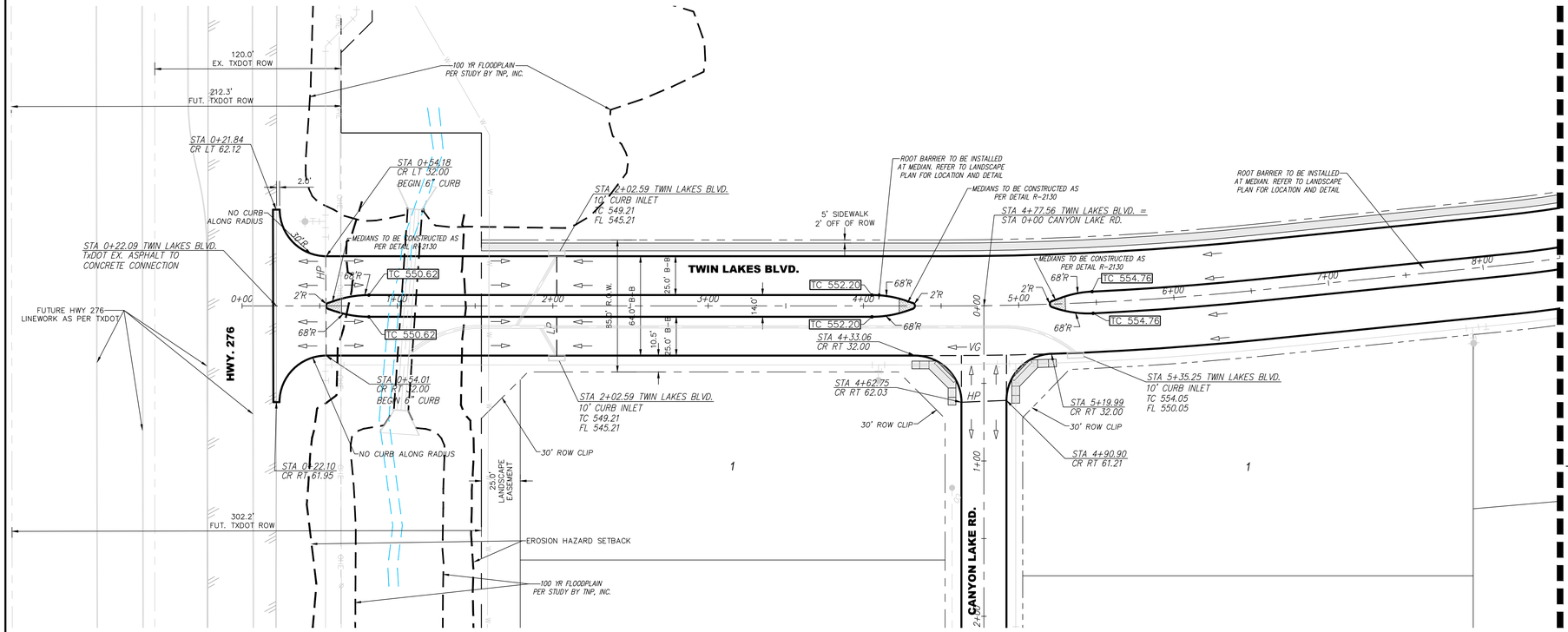
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when bar is 1 inch long
horiz N/A
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
GENERAL NOTES

tnp project SBD20370
sheet 2 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-GENERAL NOTES.dwg,dwg at Apr 05, 2023-7:02am by cslown



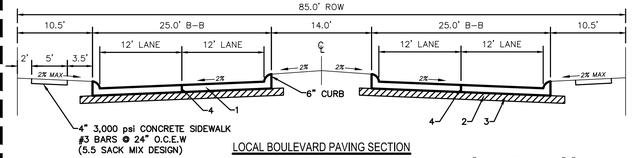
LEGEND

- RIGHT-OF-WAY
- ROADWAY CENTERLINE ALIGNMENT
- PROPOSED EASEMENT LINE
- PROPOSED BARRIER FREE RAMP
- TC 12.48 • PROPOSED SPOT ELEVATION
- PROPOSED FLOW DIRECTION
- VG PROPOSED VALLEY GUTTER
- HP PROPOSED HIGH/LOW POINT
- CR PROPOSED CURB RETURN
- CPI PROPOSED CURB POINT INTERSECTION

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tnp

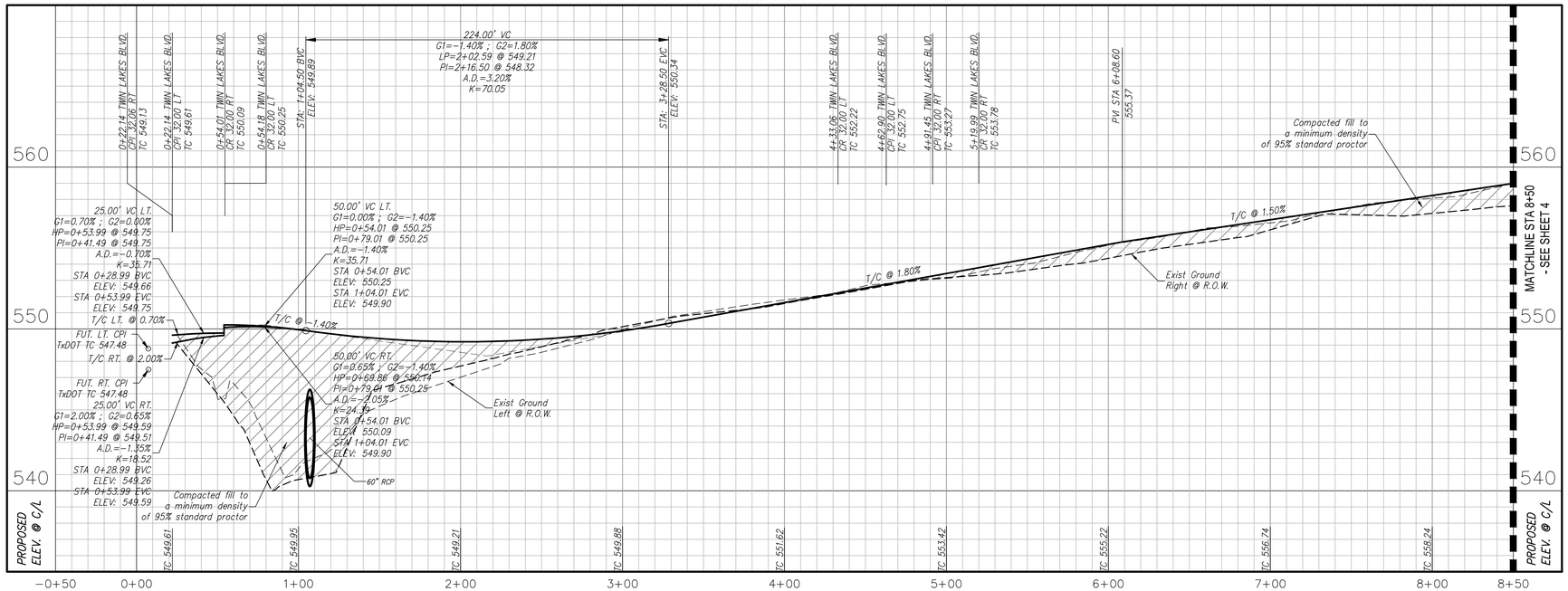
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SCALE IN FEET
1" = 40'



LOCAL BOULEVARD PAVING SECTION

NOTES:
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4 SAWED LONGITUDINAL CONTRACTION OR CONSTRUCTION JOINT.



RECORD DRAWINGS

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STATE OF TEXAS — CAMERON A. SLOWN — 106317 — LICENSED PROFESSIONAL ENGINEER
4/5/2023

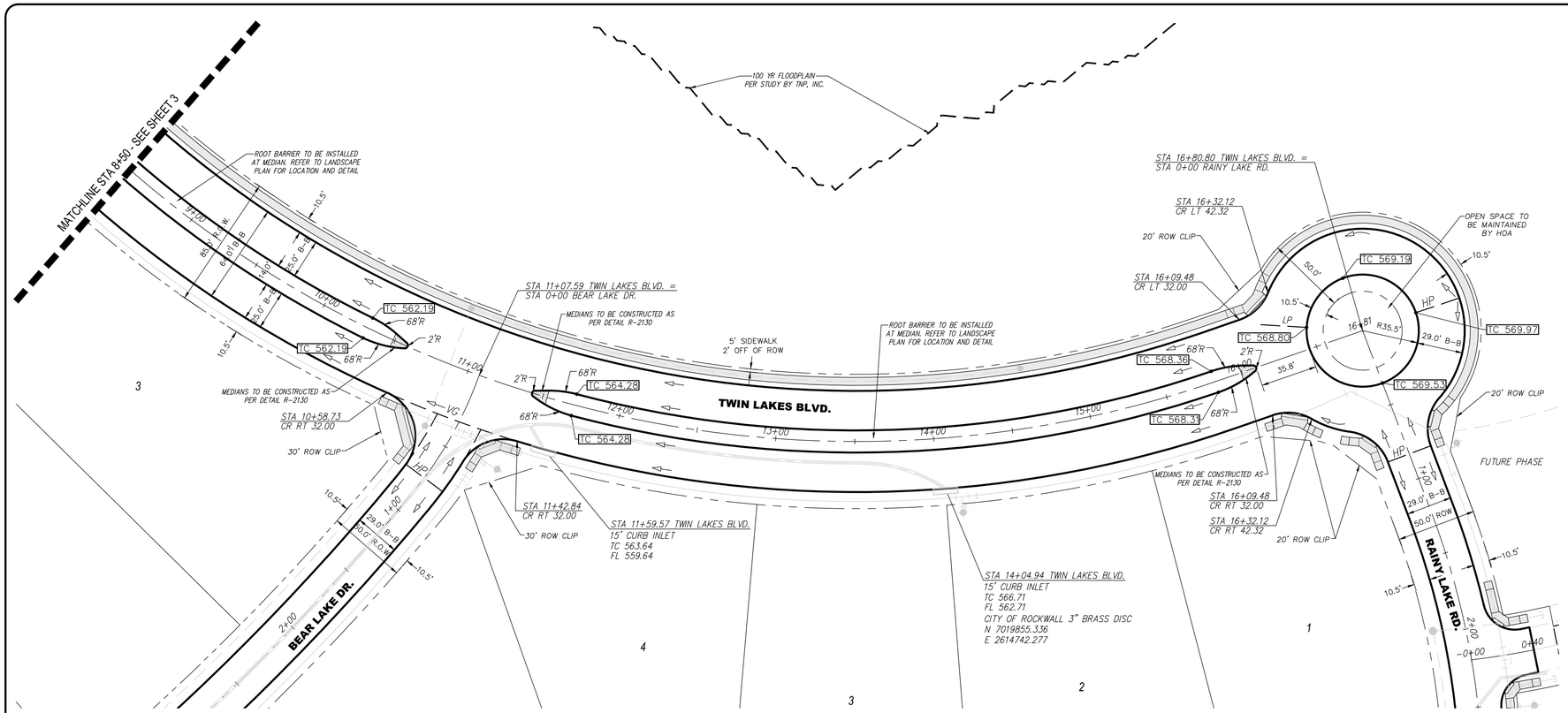
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vert	1"=4'
	APR 2023

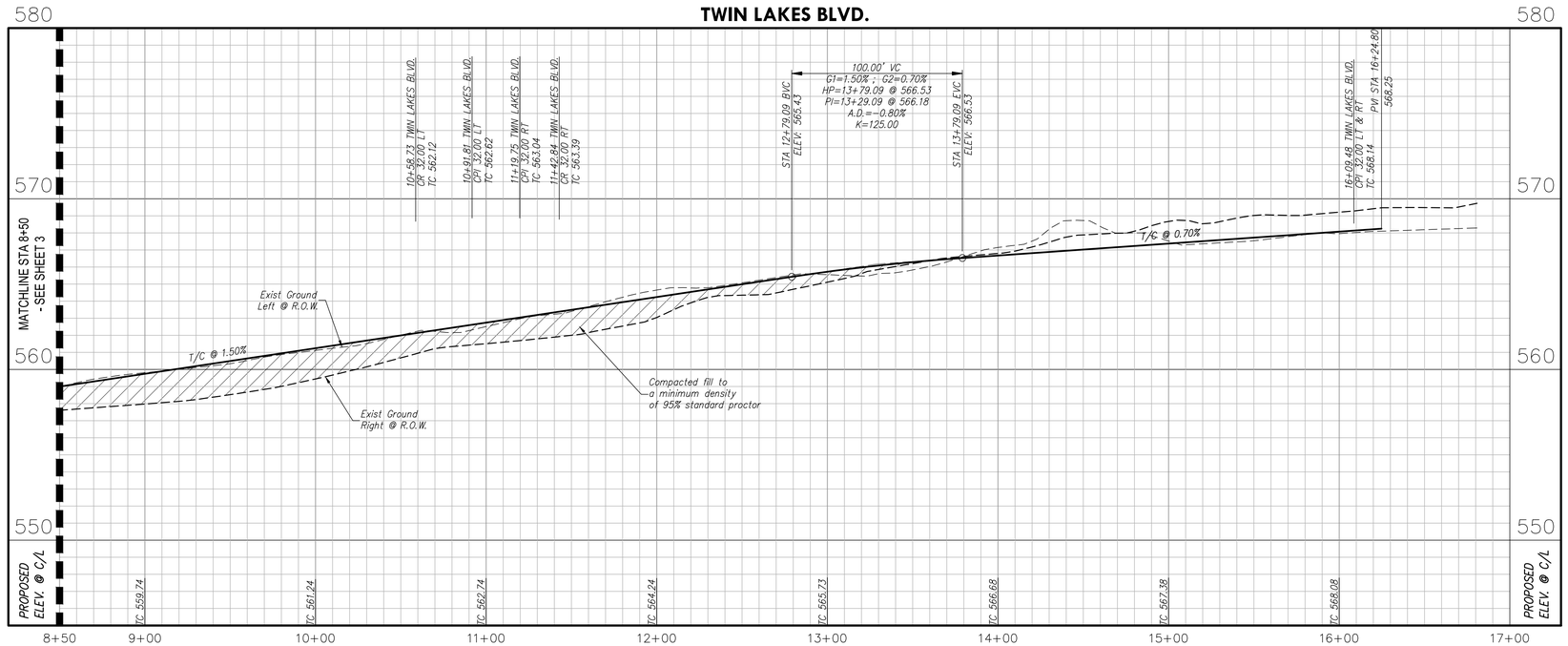
DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING PLAN & PROFILE -TWIN LAKES BLVD.

tnp project SBD20370
sheet 3 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-PAVING 1.dwg at Apr 05, 2023-7:03am by cslown





LEGEND

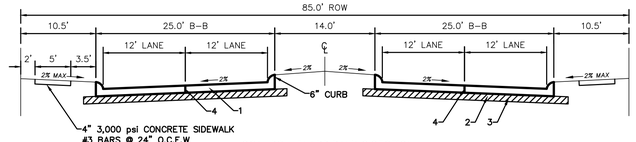
- RIGHT-OF-WAY
- ROADWAY CENTERLINE ALIGNMENT
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- PROPOSED BARRIER FREE RAMP
- TC 12.48 • PROPOSED SPOT ELEVATION
- PROPOSED FLOW DIRECTION
- VG PROPOSED VALLEY GUTTER
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- CPI PROPOSED CURB POINT INTERSECTION

tnp

40 20 0 40

SCALE IN FEET
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RECORD DRAWINGS

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tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
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GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS · CAMERON A. SLOWN · 106317 · LICENSED PROFESSIONAL ENGINEER
4/5/2023

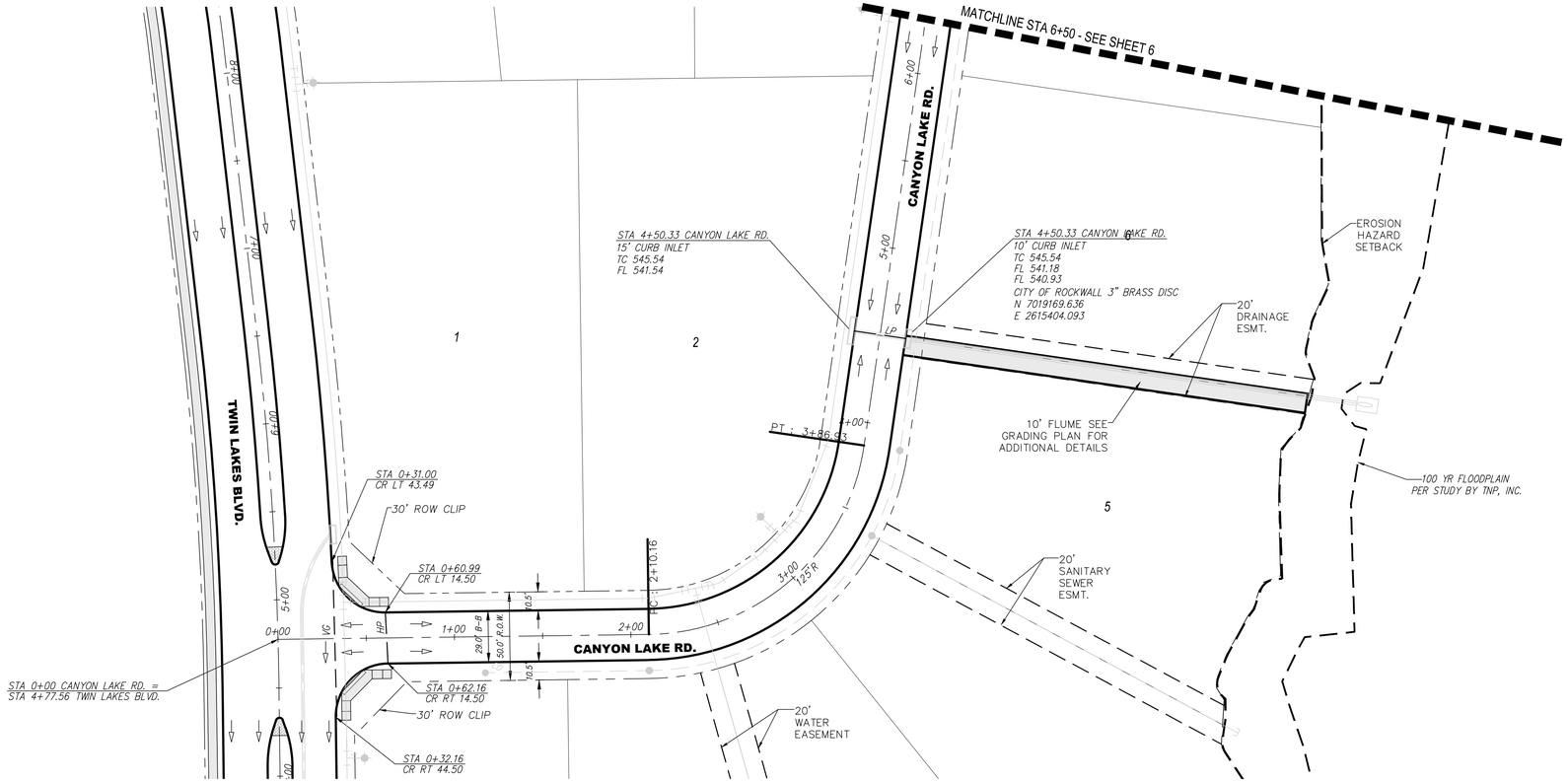
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vert	1"=4'
APR 2023	

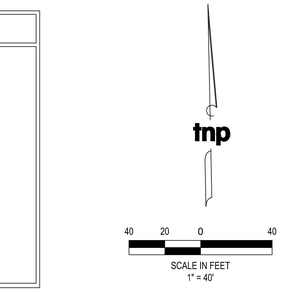
DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING PLAN & PROFILE - TWIN LAKES BLVD.

tnp project SBD20370
sheet 4 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-PAVING 1.dwg at Apr 06, 2023-7:03am by cslown

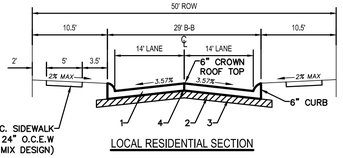




LEGEND

- RIGHT-OF-WAY
- ROADWAY CENTERLINE ALIGNMENT
- PROPOSED EASEMENT LINE
- PROPOSED BARRIER FREE RAMP
- TC 12.48 • PROPOSED SPOT ELEVATION
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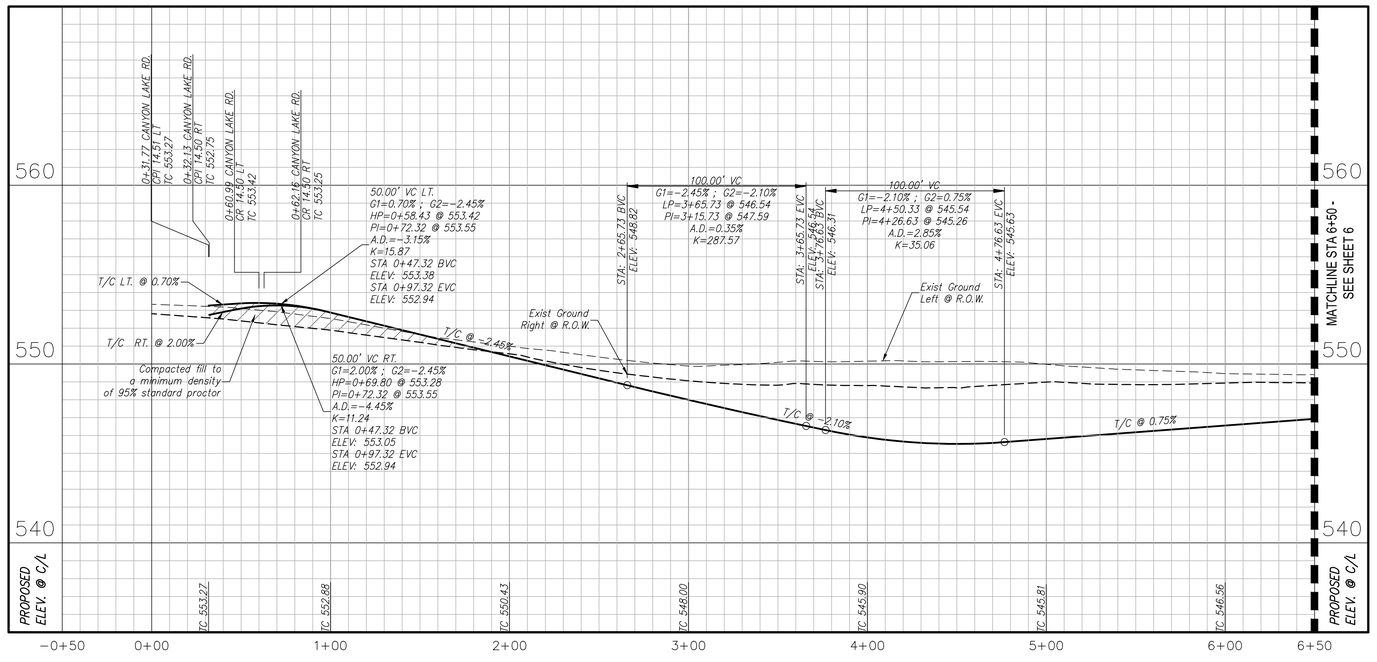


LOCAL RESIDENTIAL SECTION

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CANYON LAKE RD.



RECORD DRAWINGS

no.	revision	by	date

tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

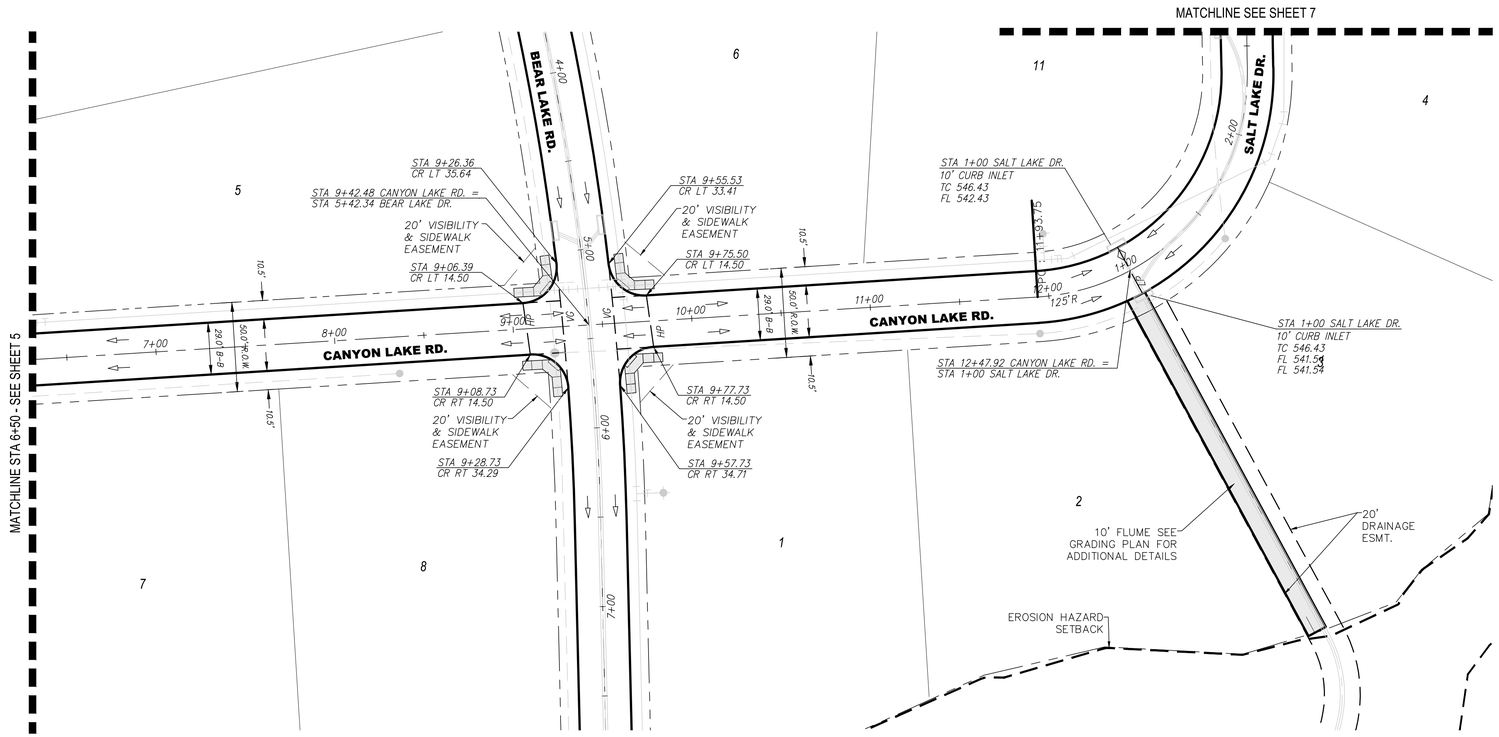
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horiz	1"=40'
vert	1"=4'
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING PLAN & PROFILE - CANYON LAKE RD.

tnp project SBD20370
sheet 5 of 51

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LEGEND

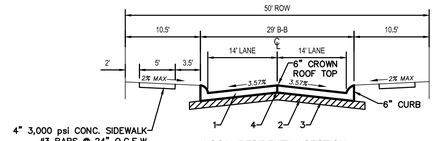
- RIGHT-OF-WAY
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tnp

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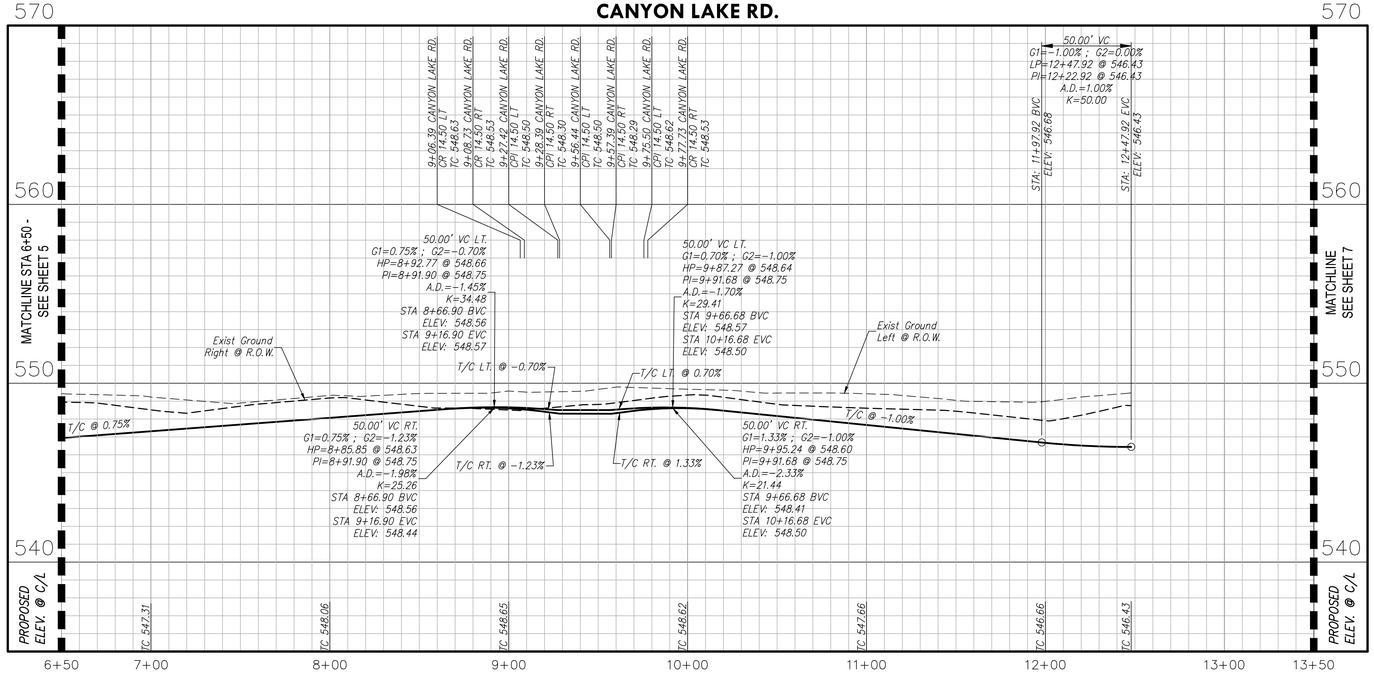
SCALE IN FEET
1" = 40'



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teague nall and perkins, inc
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Allen, Texas 75013
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STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

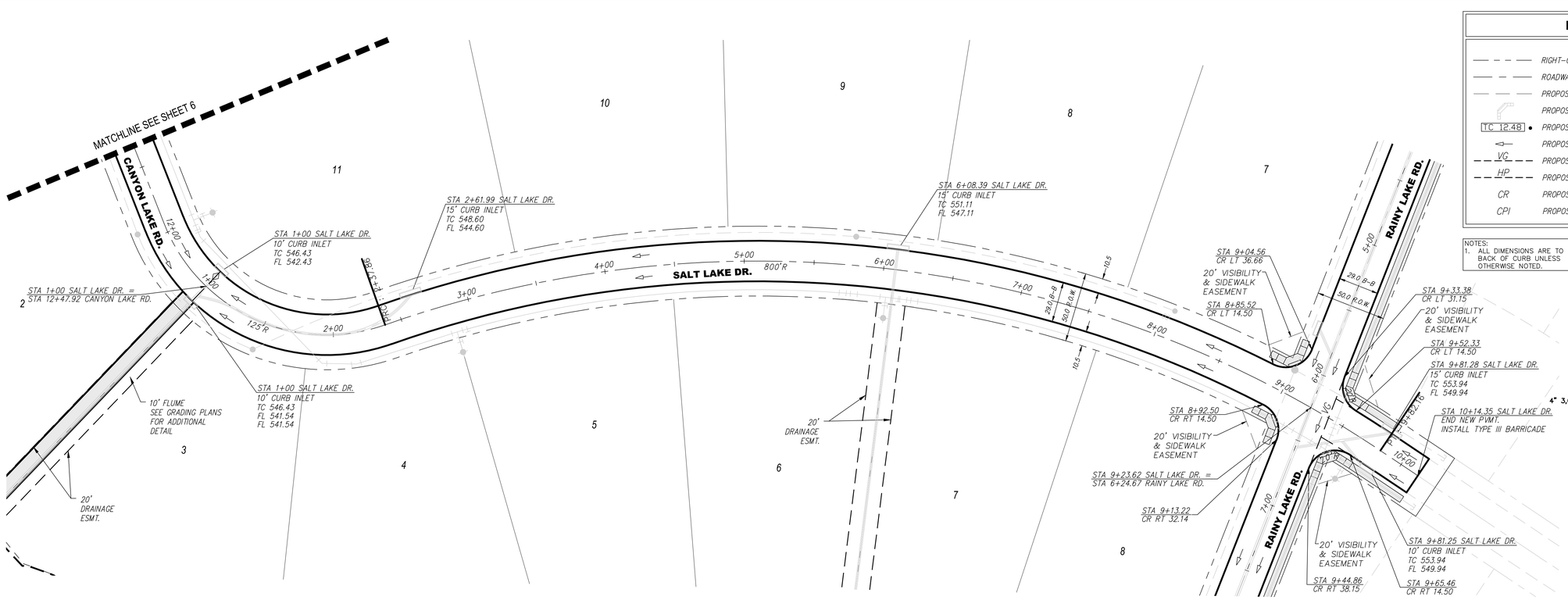
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horiz 1"=40'
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APR 2023

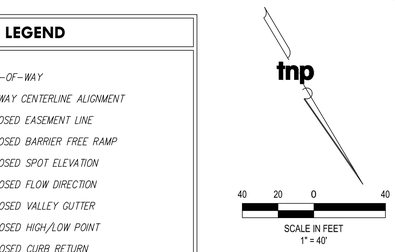
DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING PLAN & PROFILE - CANYON LAKE RD.

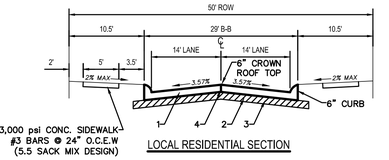
tnp project SBD20370
sheet 6 of 51

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NOTES:
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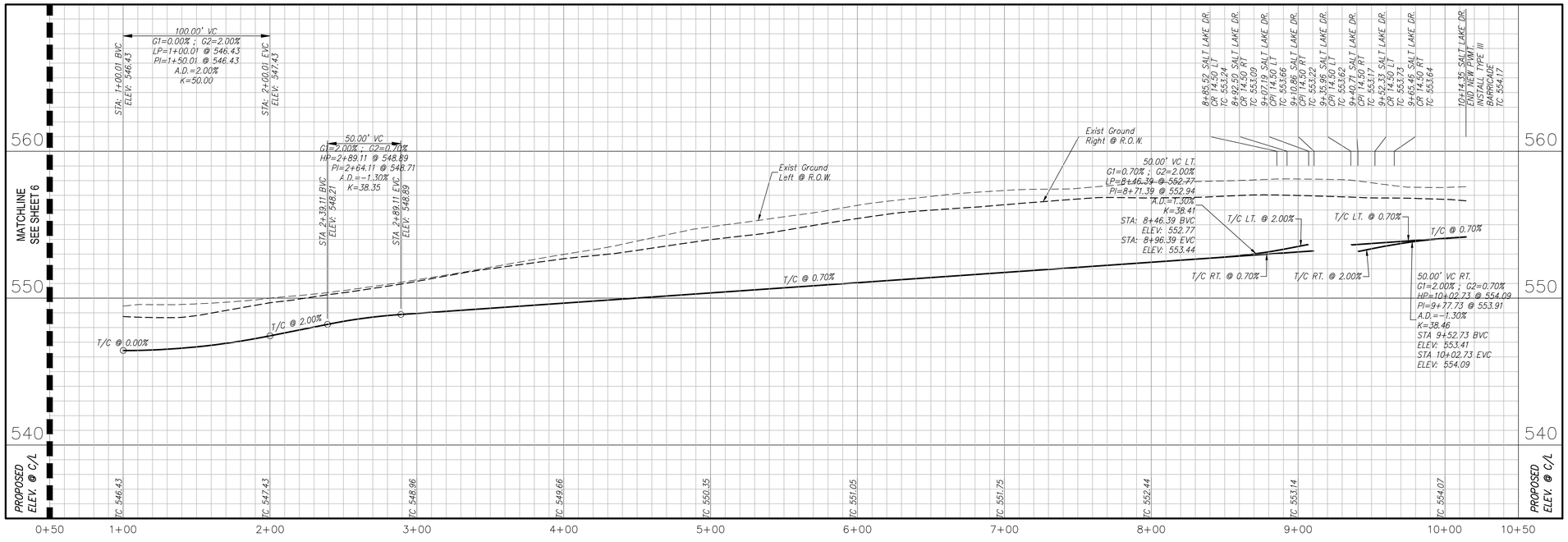
4" 3,000 psi CONC. SIDEWALK
#3 BARS @ 24" O.C.E.W
(5.5 SACK MIX DESIGN)

LOCAL RESIDENTIAL SECTION

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SALT LAKE DR.



RECORD DRAWINGS

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tnp

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STATE OF TEXAS · CAMERON A. SLOWN · 106317 · LICENSED PROFESSIONAL ENGINEER

4/5/2023

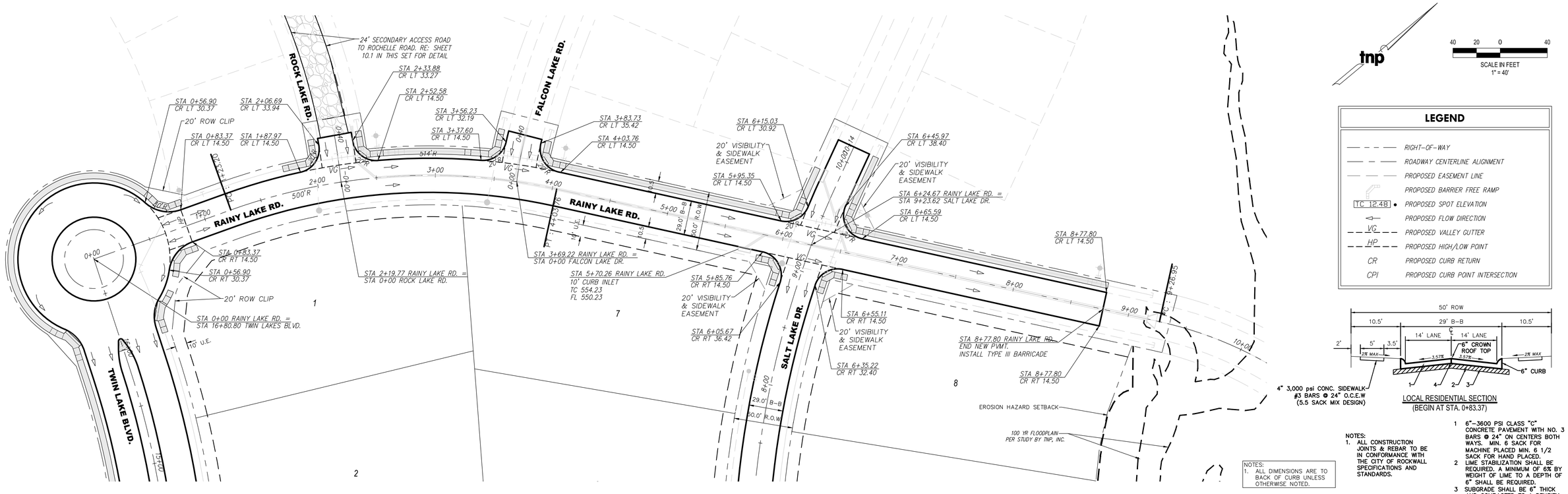
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APR 2023	

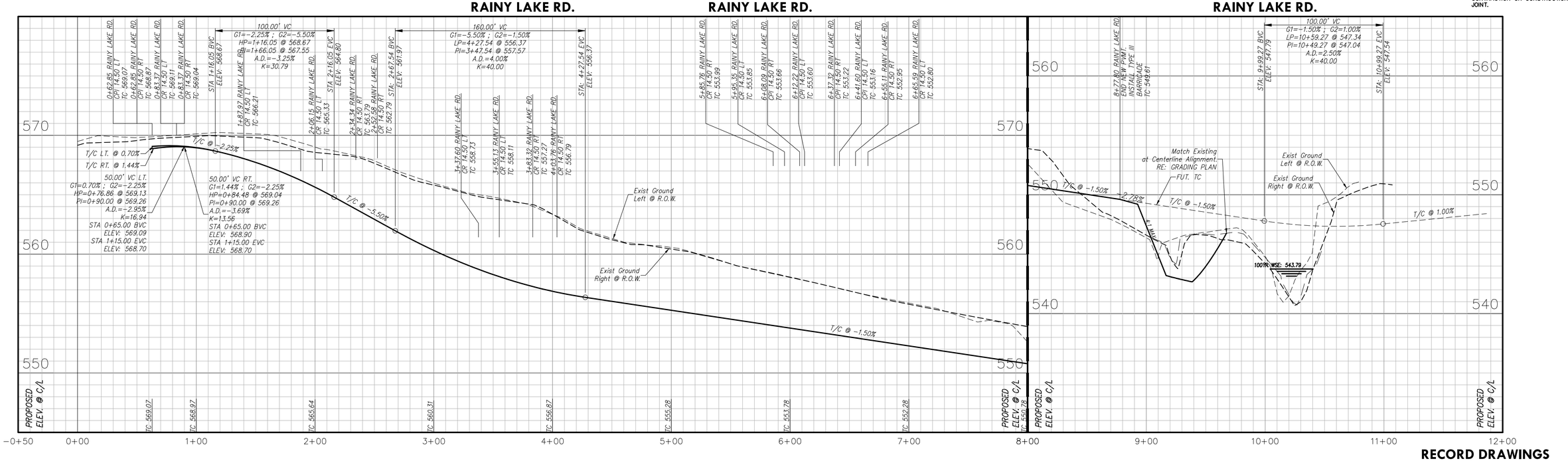
DISCOVERY LAKES, LLC.
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PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING PLAN & PROFILE - SALT LAKE DR.

tnp project SBD20370
sheet 7 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-PAVING 3.dwg at Apr 05, 2023-7:04am by cslown





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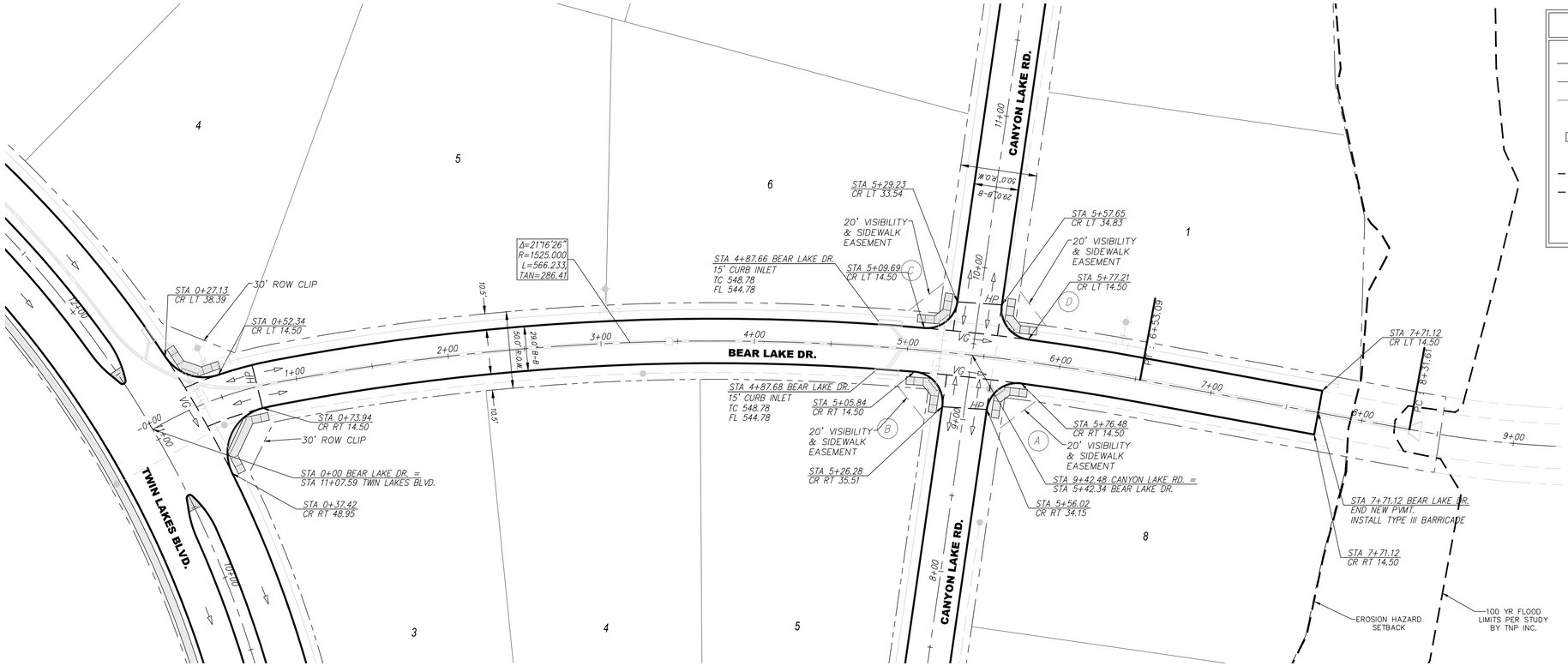
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APR 2023	

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PH: 972.960.9941

Rockwall, Texas
Improvements for
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PAVING PLAN & PROFILE - RAINY LAKE RD.

tnp project SBD20370
sheet 8 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-PAVING 4.dwg at Apr 05, 2023-7:06am by cslown



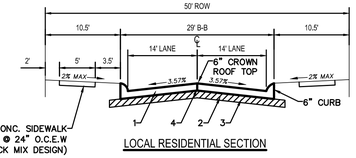
LEGEND

- RIGHT-OF-WAY
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- PROPOSED EASEMENT LINE
- PROPOSED BARRIER FREE RAMP
- TC 12.48 • PROPOSED SPOT ELEVATION
- PROPOSED FLOW DIRECTION
- VG PROPOSED VALLEY GUTTER
- HP PROPOSED HIGH/LOW POINT
- CR PROPOSED CURB RETURN
- CPI PROPOSED CURB POINT INTERSECTION

tnp

40 20 0 40

SCALE IN FEET
1" = 40'



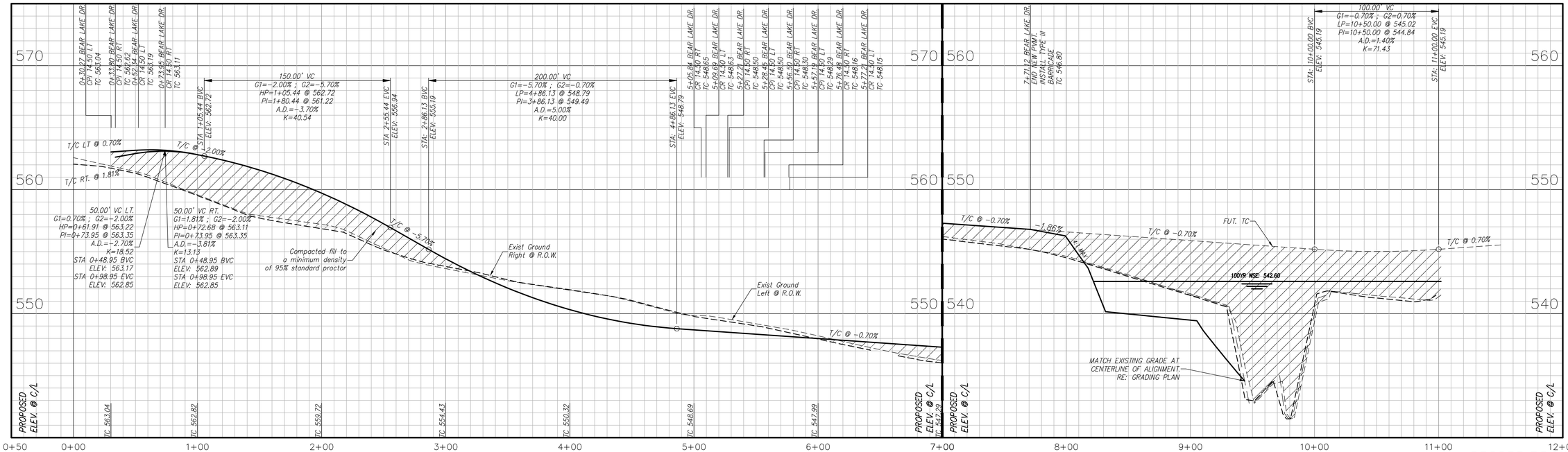
4" 3,000 psi CONC. SIDEWALK
#3 BARS @ 24" O.C.E.W
(5.5 SACK MIX DESIGN)

LOCAL RESIDENTIAL SECTION

NOTES:
1. ALL CONSTRUCTION JOINTS & REBAR TO BE IN CONFORMANCE WITH THE CITY OF ROCKWALL SPECIFICATIONS AND STANDARDS.

1 6"-3600 PSI CLASS "C" CONCRETE PAVEMENT WITH NO. 3 BARS @ 24" ON CENTERS BOTH WAYS. MIN. 6 SACK FOR MACHINE PLACED MIN. 6 1/2 SACK FOR HAND PLACED.
2 LIME STABILIZATION SHALL BE REQUIRED. A MINIMUM OF 6% BY WEIGHT OF LIME TO A DEPTH OF 6" SHALL BE REQUIRED.
3 SUBGRADE SHALL BE 6" THICK AND COMPACTED TO A DENSITY NOT LESS THAN 95% AT 0%-4% OF OPTIMUM MOISTURE CONTENT.
4 SAWED LONGITUDINAL CONTRACTION OR CONSTRUCTION JOINT.

NOTES:
1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.



RECORD DRAWINGS

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teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS · 106317 · LICENSED PROFESSIONAL ENGINEER · CAMERON A. SLOWN
4/5/2023

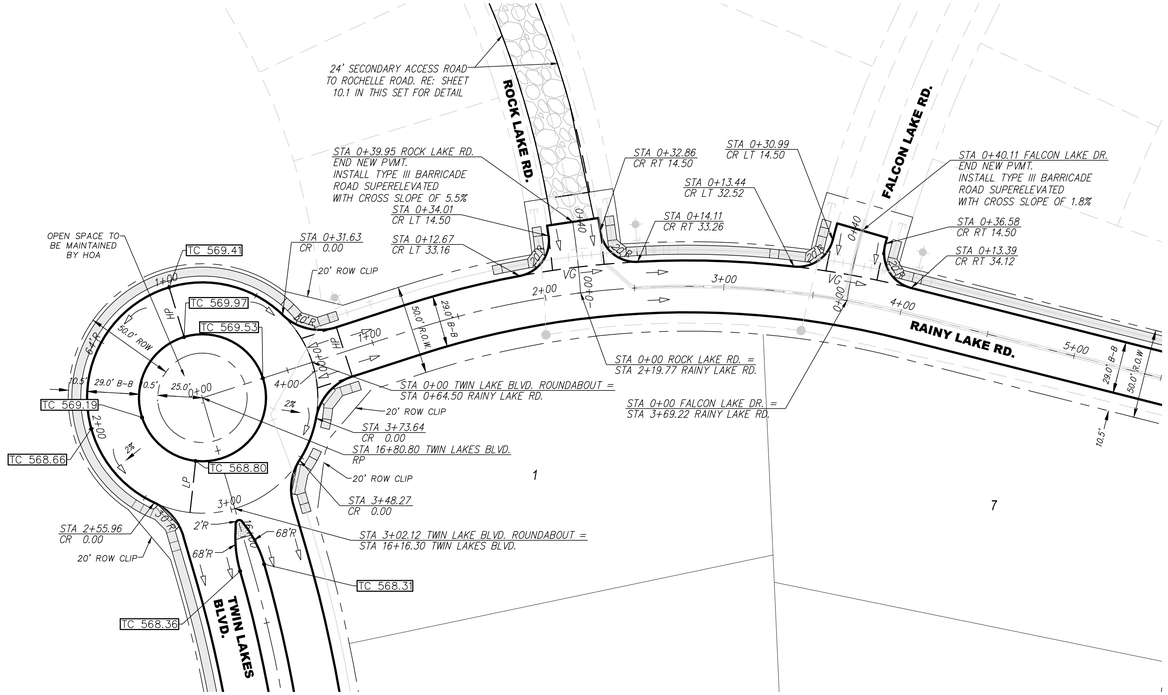
scale	
when bar is 1 inch long	
horiz	1"=40'
vert	1"=4'
	APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING PLAN & PROFILE - BEAR LAKE DR.

tnp project SBD20370
sheet 9 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-PAVING 5.dwg at Apr 05, 2023-7:05am by cslown



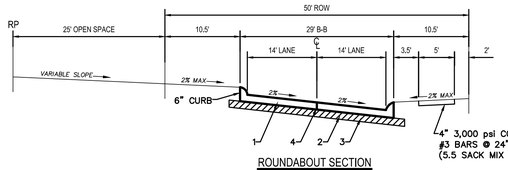
LEGEND	
	RIGHT-OF-WAY
	ROADWAY CENTERLINE ALIGNMENT
	PROPOSED EASEMENT LINE
	PROPOSED BARRIER FREE RAMP
TC 12.48	PROPOSED SPOT ELEVATION
	PROPOSED FLOW DIRECTION
VG	PROPOSED VALLEY GUTTER
HP	PROPOSED HIGH/LOW POINT
CR	PROPOSED CURB RETURN
CPI	PROPOSED CURB POINT INTERSECTION

NOTES:
1. ALL DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.

tnp

40 20 0 40

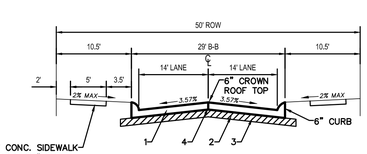
SCALE IN FEET
1" = 40'



ROUNDABOUT SECTION
(ENDS AT STA. 0+83.37 RAINY LAKE)

NOTES:
1. ALL CONSTRUCTION JOINTS & REBAR TO BE IN CONFORMANCE WITH THE CITY OF ROCKWALL SPECIFICATIONS AND STANDARDS.

1 10"-3600 PSI CLASS "C" CONCRETE PAVEMENT WITH NO. 4 BARS @ 18" ON CENTERS BOTH WAYS. MIN. 6 SACK FOR MACHINE PLACED MIN. 6 1/2 SACK FOR HAND PLACED.
2 LIME STABILIZATION SHALL BE REQUIRED. A MINIMUM OF 6% BY WEIGHT OF LIME TO A DEPTH OF 6" SHALL BE REQUIRED (27LBS/SY).
3 SUBGRADE SHALL BE 6" THICK AND COMPACTED TO A DENSITY NOT LESS THAN 95% AT 0%-4% OF OPTIMUM MOISTURE CONTENT.
4 SAWED LONGITUDINAL CONTRACTION OR CONSTRUCTION JOINT.

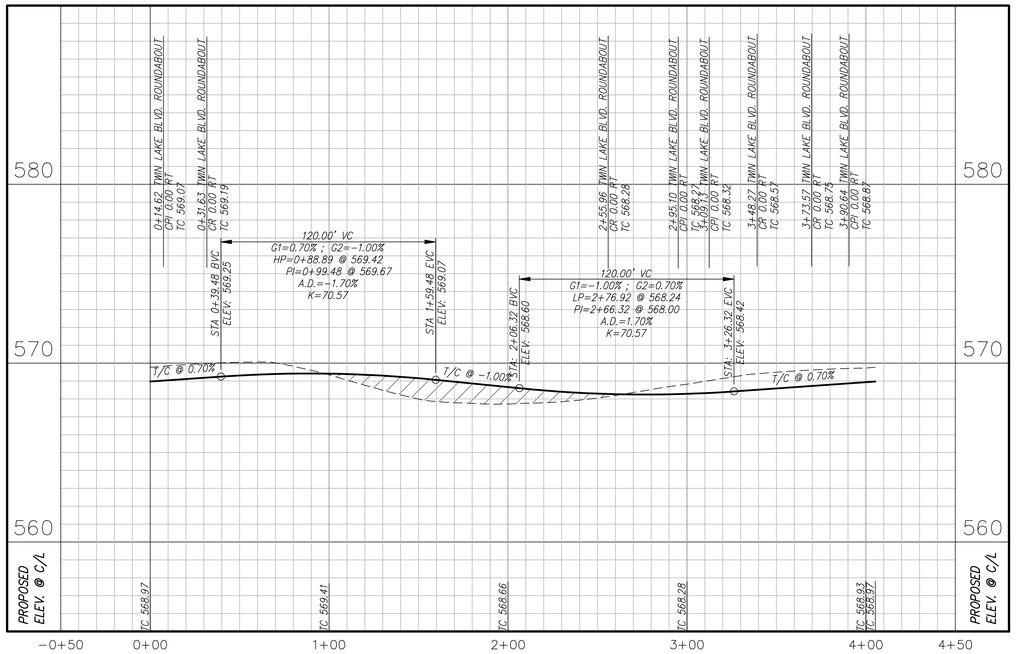


LOCAL RESIDENTIAL SECTION

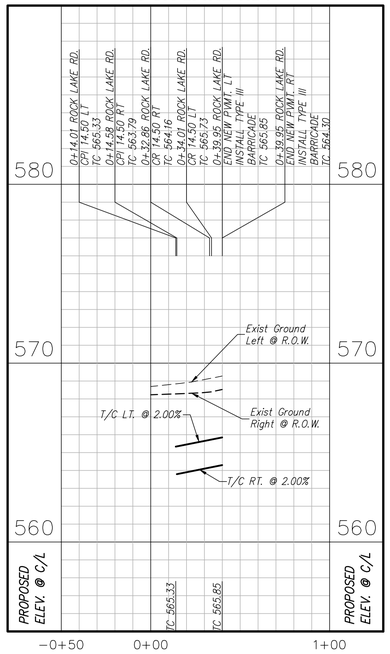
NOTES:
1. ALL CONSTRUCTION JOINTS & REBAR TO BE IN CONFORMANCE WITH THE CITY OF ROCKWALL SPECIFICATIONS AND STANDARDS.

1 6"-3600 PSI CLASS "C" CONCRETE PAVEMENT WITH NO. 3 BARS @ 24" ON CENTERS BOTH WAYS. MIN. 6 SACK FOR MACHINE PLACED MIN. 6 1/2 SACK FOR HAND PLACED.
2 LIME STABILIZATION SHALL BE REQUIRED. A MINIMUM OF 6% BY WEIGHT OF LIME TO A DEPTH OF 6" SHALL BE REQUIRED.
3 SUBGRADE SHALL BE 6" THICK AND COMPACTED TO A DENSITY NOT LESS THAN 95% AT 0%-4% OF OPTIMUM MOISTURE CONTENT.
4 SAWED LONGITUDINAL CONTRACTION OR CONSTRUCTION JOINT.

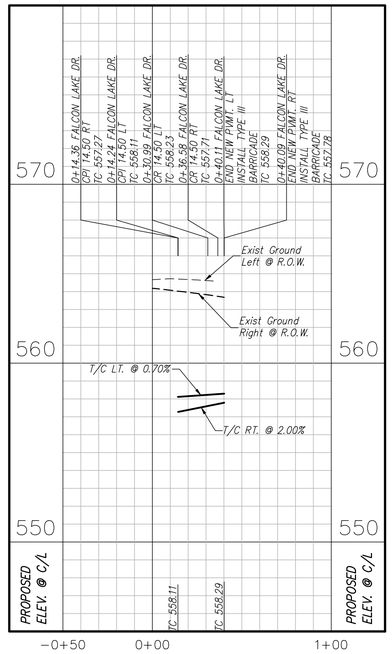
TWIN LAKE BLVD. ROUNDABOUT



ROCK LAKE RD.



FALCON LAKE DR.



RECORD DRAWINGS

no.	revision	by	date

tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
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GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

scale	
when bar is 1 inch long	
horiz	1"=40'
vert	1"=4'
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING PLAN & PROFILE - TWIN LAKES ROUND-A-BOUT

tnp project SBD20370
sheet 10 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-PAVING 6.dwg at Apr 05, 2023-7:06am by cslown

no.	revision	by	date

tnp

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STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED
PROFESSIONAL ENGINEER
4/5/2023

scale	
when bar is 1 inch long	
horiz	1"=40'
vert	1"=4'
APR 2023	

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DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING PLAN - SECONDARY ENTRANCE

tnp project	
SBD20370	
sheet	10.1
of	51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-PAVING 7 SECONDARY ENTRANCE.dwg at Apr 05, 2023-7:07am by cslown

MATCH LINE - SHEET 12



LEGEND

- GRADING FLOW DIRECTION
- 536 EXISTING CONTOUR
- 35.3 FINISH GRADE
- 34.4 NG EXISTING GRADE
- TW 32.9 / BW 32.4 WALL GRADE
- PROPOSED RETAINING WALL

NOTES:
1. ALL RETAINING WALLS TO BE ROCK OR STONE.
2. WALLS 3' AND TALLER TO BE ENGINEERED.
3. NO WALLS WITHIN EASEMENTS.
4. THE HOME BUILDER SHALL PROVIDE INDIVIDUAL LOT GRADING PLANS THAT CONFORM TO THE DRAINAGE AREA MAP OF THIS PLAN SET AND TO BE REVIEWED AND APPROVED BY CITY OF ROCKWALL PRIOR TO ISSUANCE OF BUILDING PERMIT.

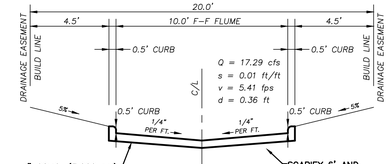
tnp

60 30 0 60

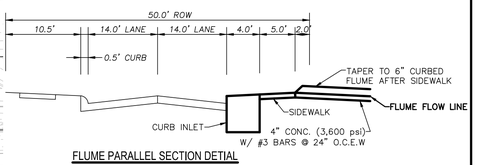
SCALE IN FEET
1" = 60'

CAUTION !!! CAUTION !!! CAUTION !!!

EXISTING UTILITIES AND UNDERGROUND FACILITIES INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY VARIOUS OWNERS OF THE FACILITIES. THE ENGINEER DOES NOT ACCEPT THE RESPONSIBILITY FOR THE UTILITY LOCATIONS SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY BOTH HORIZONTALLY AND VERTICALLY THE LOCATION OF ALL EXISTING UTILITIES AND UNDERGROUND FACILITIES PRIOR TO CONSTRUCTION, TO TAKE NECESSARY PRECAUTIONS IN ORDER TO PROTECT ALL FACILITIES ENCOUNTERED, AND TO NOTIFY THE ENGINEER PROMPTLY OF ALL CONFLICTS OF THE WORK WITH EXISTING FACILITIES. THE CONTRACTOR SHALL PRESERVE AND PROTECT ALL EXISTING UTILITIES FROM DAMAGE DURING CONSTRUCTION. ANY DAMAGE BY THE CONTRACTOR TO EXISTING UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.



10' FLUME DETAIL



FLUME PARALLEL SECTION DETIAL

RECORD DRAWINGS

no.	revision	by	date

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825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
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GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

scale when bar is 1 inch long	
horiz	1"=60'
vert	N/A
	APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas

Improvements for

DISCOVERY LAKES - PHASE 1

GRADING PLAN

tnp project SBD20370

sheet 11 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-GRID.dwg at Apr 05, 2023-7:07am by cslown

NOTES:
1. ALL RETAINING WALLS TO BE ROCK OR STONE.
2. WALLS 3' AND TALLER TO BE ENGINEERED.
3. NO WALLS WITHIN EASEMENTS.
4. THE HOME BUILDER SHALL PROVIDE INDIVIDUAL LOT GRADING PLANS THAT CONFORM TO THE DRAINAGE AREA MAP OF THIS PLAN SET AND TO BE REVIEWED AND APPROVED BY CITY OF ROCKWALL PRIOR TO ISSUANCE OF BUILDING PERMIT.
5. ALL FILL TO BE COMPACTED TO 95% WITH A SHEEP'S FOOT ROLLER.

LEGEND

- GRADING FLOW DIRECTION
- 536 EXISTING CONTOUR
- 35.3 FINISH GRADE
- 34.4 NG EXISTING GRADE
- TW 32.9 / BW 32.4 WALL GRADE
- PROPOSED RETAINING WALL

tnp

60 30 0 60
SCALE IN FEET
1" = 60'

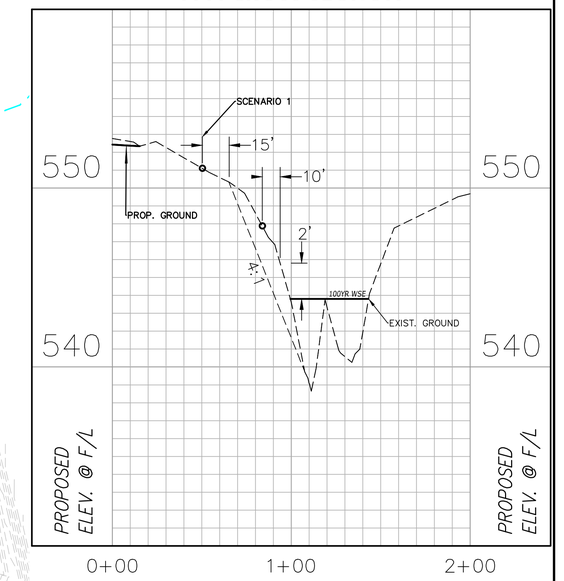
SALT LAKE DR.
RAINY LAKE RD.
FALCON LAKE DR.
ROCK LAKE RD.
TWIN LAKES BLVD.
BEAR LAKE DR.
CANYON LAKE RD.
SALT LAKE DR.
RAINY LAKE RD.

100 YR WSEL 543.79
100 YR WSEL 543.75
100 YR WSEL 543.61
100 YR WSEL 543.21
100 YR WSEL 542.60
100 YR WSEL 565.05
100 YR WSEL 565.05

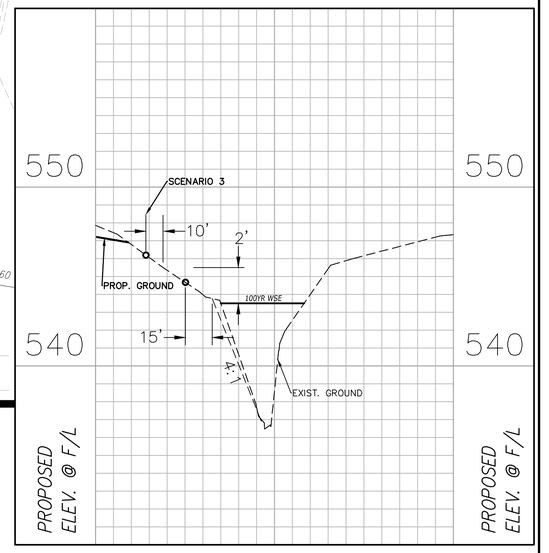
100 YR FLOODPLAIN PER STUDY BY TNP, INC.
GRADING TO HALT AT THE TREE LINE ONLY SIDEYARD SWALES AND STORM PIPE TO BE GRADED PAST TREE LINE
EROSION CONTROL HAZARD SETBACK
FLUME
20' DE
10' UE
TOP OF BERM 469.0 4:1 MAX SIDE SLOPES
HP

MATCH LINE - SHEET 11

A-A CROSS SECTION

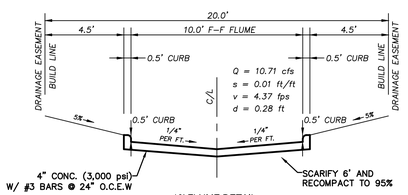


B-B CROSS SECTION

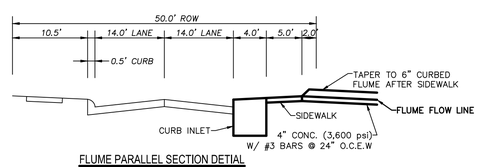


CAUTION !!! CAUTION !!! CAUTION !!!

EXISTING UTILITIES AND UNDERGROUND FACILITIES INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY VARIOUS OWNERS OF THE FACILITIES. THE ENGINEER DOES NOT ACCEPT THE RESPONSI-BILITY FOR THE UTILITY LOCATIONS SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY BOTH HORIZONTALLY AND VERTICALLY THE LOCATION OF ALL EXISTING UTILITIES AND UNDERGROUND FACILITIES PRIOR TO CONSTRUCTION, TO TAKE NECESSARY PRECAUTIONS IN ORDER TO PROTECT ALL FACILITIES ENCOUNTERED, AND TO NOTIFY THE ENGINEER PROMPTLY OF ALL CONFLICTS OF THE WORK WITH EXISTING FACILITIES. THE CONTRACTOR SHALL PRESERVE AND PROTECT ALL EXISTING UTILITIES FROM DAMAGE DURING CONSTRUCTION. ANY DAMAGE BY THE CONTRACTOR TO EXISTING UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.



10' FLUME DETAIL



FLUME PARALLEL SECTION DETIAL

RECORD DRAWINGS

no.	revision	by	date

tnp
teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

scale	
when bar is 1 inch long	
horiz	1"=60'
vert	N/A
	APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
GRADING PLAN

tnp project SBD20370
sheet 12 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-GRD.dwg at Apr 05, 2023-7:59am by cslown

PREDEVELOPED DRAINAGE AREA CALCULATIONS

Drainage Area No.	Time of Conc. (min.)	Intensity I_{100} (in/hr)	Runoff Coefficient C	Area (ac.)	Q_{100} (cfs)
1	20	8.30	0.35	36.17	105.09
33A*	20	8.30	0.35	21.06	188.00
TOTAL				57.23	293.09

NOTE: 100 YR STORM INTENSITY IS BASED ON VALUES PROVIDED BY CITY OF ROCKWALL

NOTES:
* Q100 PROVIDED IN FLOOD STUDY BY TNP.

LEGEND

- EX CONTOURS
- FLOW DIRECTION
- DRAINAGE DIVIDE
- 30 — DRAINAGE AREA
- 1.05 — AREA
- 5.04 — RUNOFF, CFS

100 year Open Areas
Tc = 20 min
C = 0.35
I = 8.30
A = Area
Q=(0.35)(8.30)(A)

tnp

100 50 0 100
SCALE IN FEET
1" = 100'

100 YR FLOODPLAIN

1
36.17
105.09

BOUNDARY

100 YR FLOODPLAIN
PER STUDY BY TNP, INC.

33A*
188.0

100 YR FLOODPLAIN

REMAINDER OF 308 ON 276, L.P.
VOL. 3662, PG. 315 D.R.R.C.T.

STATE OF TEXAS EASEMENT FOR HIGHWAY PURPOSES
PERMANENT CHANNEL OR DRAINAGE EASEMENT
VOL. 82, PG. 583 D.R.R.C.T.

STATE OF TEXAS
VOL. 72, PG. 112 D.R.R.C.T.

STATE OF TEXAS
VOL. 45, PG. 253 D.R.R.C.T.

STATE HIGHWAY 276

RECORD DRAWINGS

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GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER

4/5/2023

scale
when bar is 1 inch long
horiz 1"=100'
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PRE DEVELOPED DRAINAGE MAP

tnp project SBD20370
sheet 13 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-DAM PRE.dwg at Apr 05, 2023-7:08am by cslown



DRAINAGE AREA CALCULATIONS						
Drainage Area No.	Time of Conc. (min.)	Intensity I_{100} (in/hr)	Runoff Coefficient C	Area (ac.)	Q_{100} (cfs)	REMARKS
1	10	9.80	0.50	1.77	8.67	FLOWS TO INLET #1
2	10	9.80	0.50	2.30	11.27	FLOWS TO INLET #2
3	10	9.80	0.50	1.79	8.77	FLOWS TO INLET #3
4	10	9.80	0.50	1.49	7.30	FLOWS TO INLET #4
5	10	9.80	0.50	1.23	6.03	FLOWS TO INLET #5
6	10	9.80	0.50	0.96	4.70	FLOWS TO INLET #6
7	10	9.80	0.50	1.88	9.21	FLOWS TO INLET #7
8	10	9.80	0.50	0.98	4.80	FLOWS TO INLET #8
9	10	9.80	0.50	2.55	12.50	FLOWS TO INLET #9
10	10	9.80	0.50	1.64	8.04	FLOWS TO INLET #10
11	10	9.80	0.50	1.06	5.19	FLOWS TO INLET #11
12	10	9.80	0.50	1.37	6.71	FLOWS TO INLET #12
13	10	9.80	0.50	2.46	12.05	FLOWS TO INLET #13
14	10	9.80	0.50	0.83	4.07	FLOWS TO INLET #14
15	10	9.80	0.50	1.51	7.40	FLOWS TO INLET #15
16	10	9.80	0.50	1.69	8.28	FLOWS TO INLET #16
17	10	9.80	0.50	1.18	5.78	FLOWS TO INLET #17
18	10	9.80	0.50	1.81	8.87	FLOWS TO INLET #18
19	10	9.80	0.50	0.61	2.99	FLOWS TO INLET #19
20	10	9.80	0.50	5.70	27.93	FLOWS TO CREEK
21	10	9.80	0.50	0.70	3.43	FLOWS TO CREEK
22	10	9.80	0.50	5.18	25.38	FLOWS TO CREEK
23	10	9.80	0.50	1.28	6.27	FLOWS TO CREEK
33A*	20	8.30	0.35	21.06	188.00	FLOWS TO CULVERT
TOTAL				63.03	393.65	

NOTE: 100 YR STORM INTENSITY IS BASED ON VALUES PROVIDED BY CITY OF ROCKWALL

NOTES:
* Q100 PROVIDED IN FLOOD STUDY BY TNP.

RECORD DRAWINGS

no.	revision	by	date

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GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS 106317 CAMERON A. SLOWN LICENSED PROFESSIONAL ENGINEER
4/5/2023

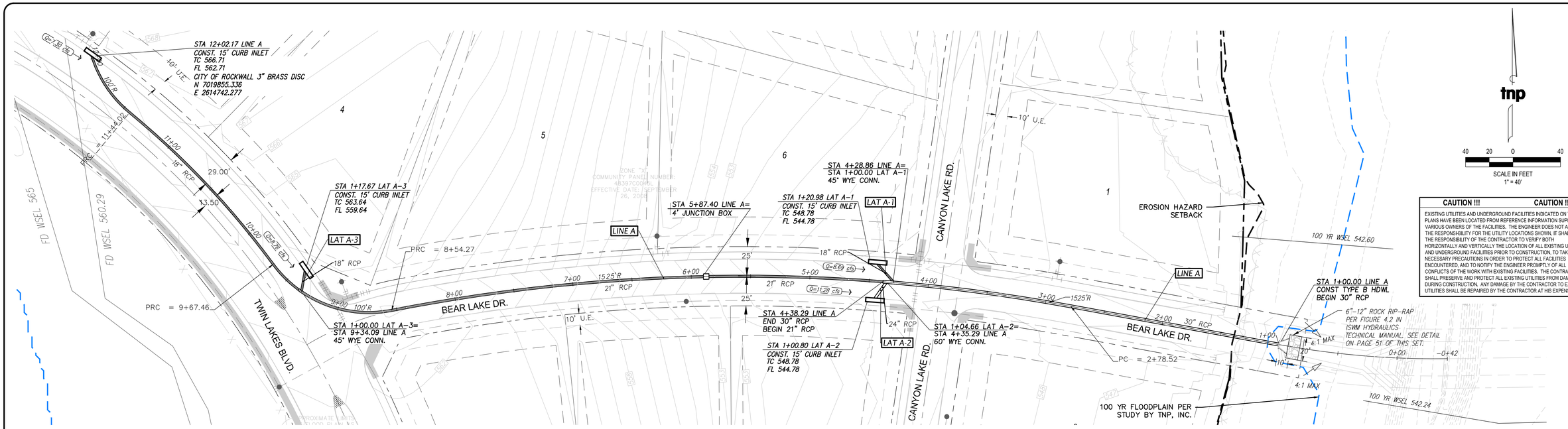
scale
when bar is 1 inch long
horiz 1"=100'
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

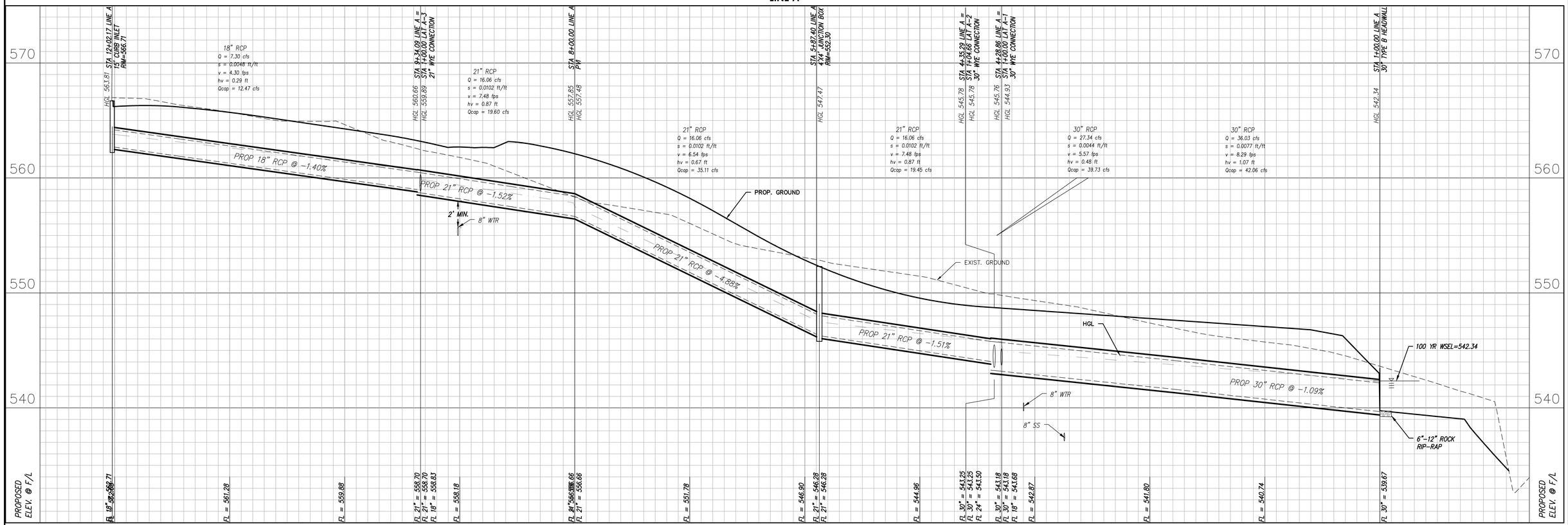
Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
DRAINAGE AREA MAP

tnp project SBD20370
sheet 14 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-DAM.dwg at Apr 05, 2023-at 10am by cslown



LINE A



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STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

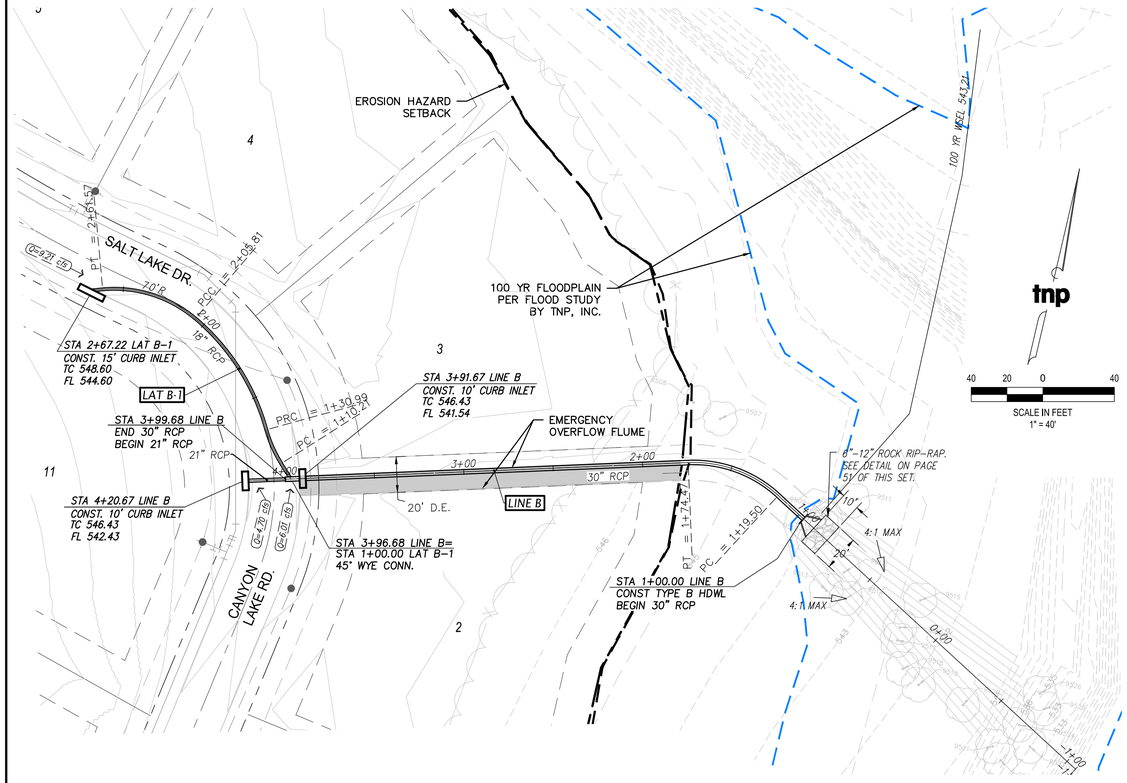
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APR 2023	

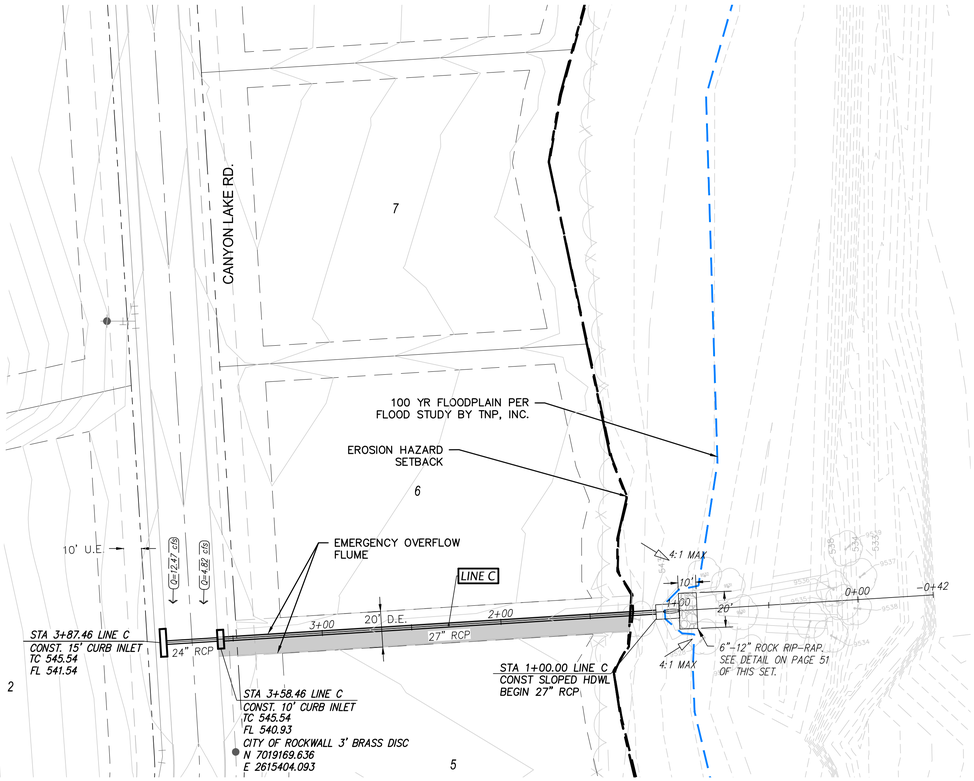
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PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
STORM DRAIN PLAN & PROFILE - LINE A

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sheet 15 of 51

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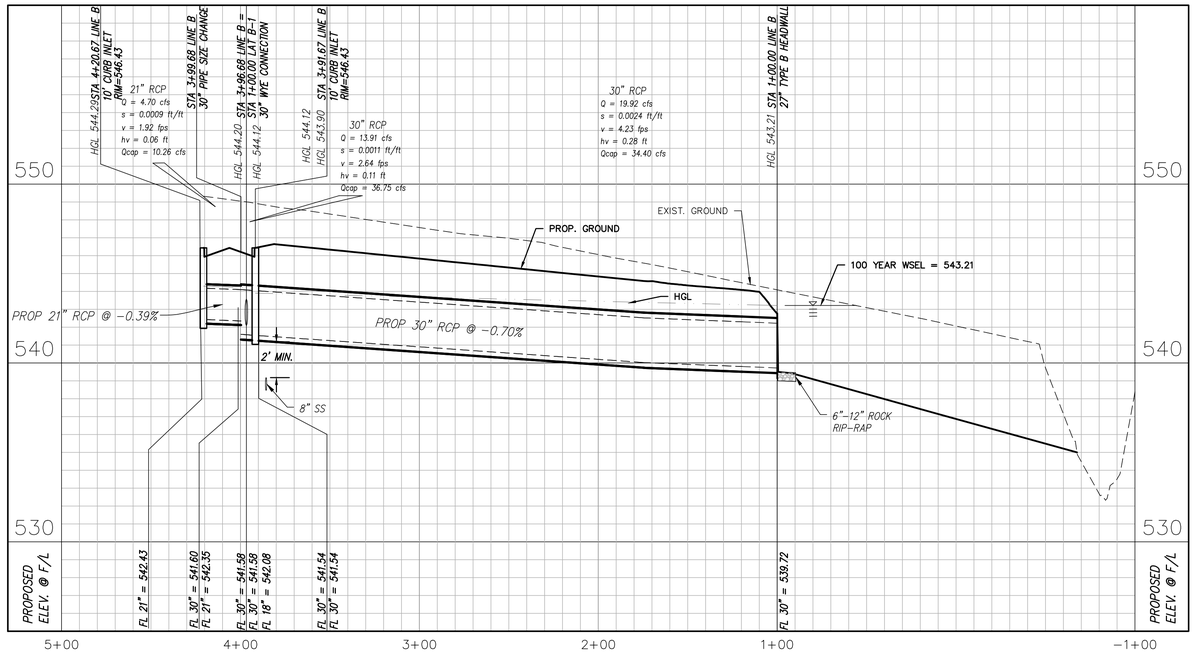




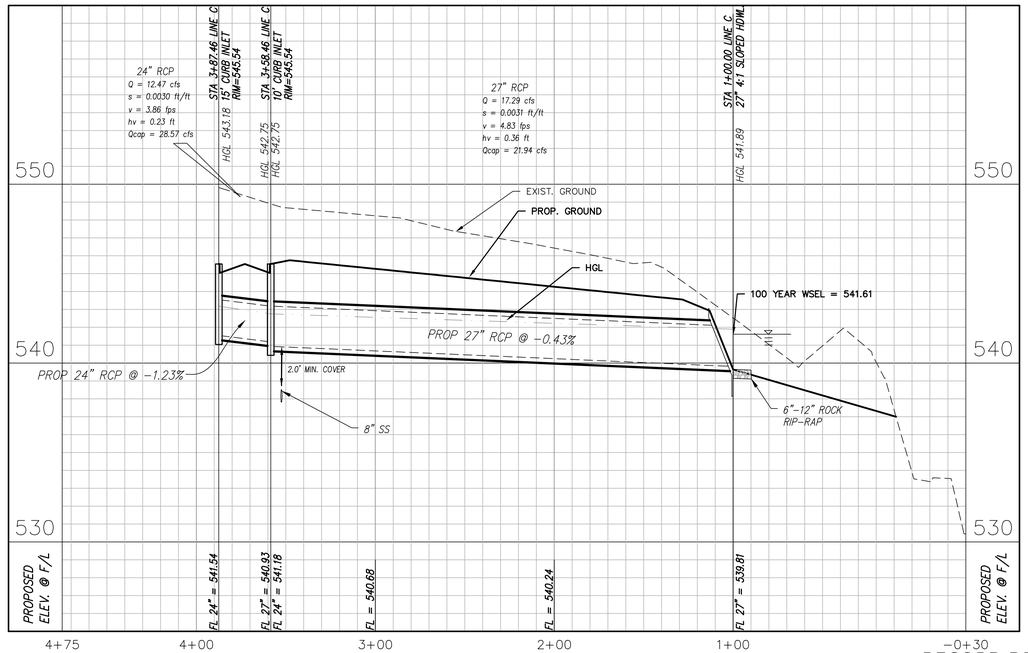
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LINE B



LINE C



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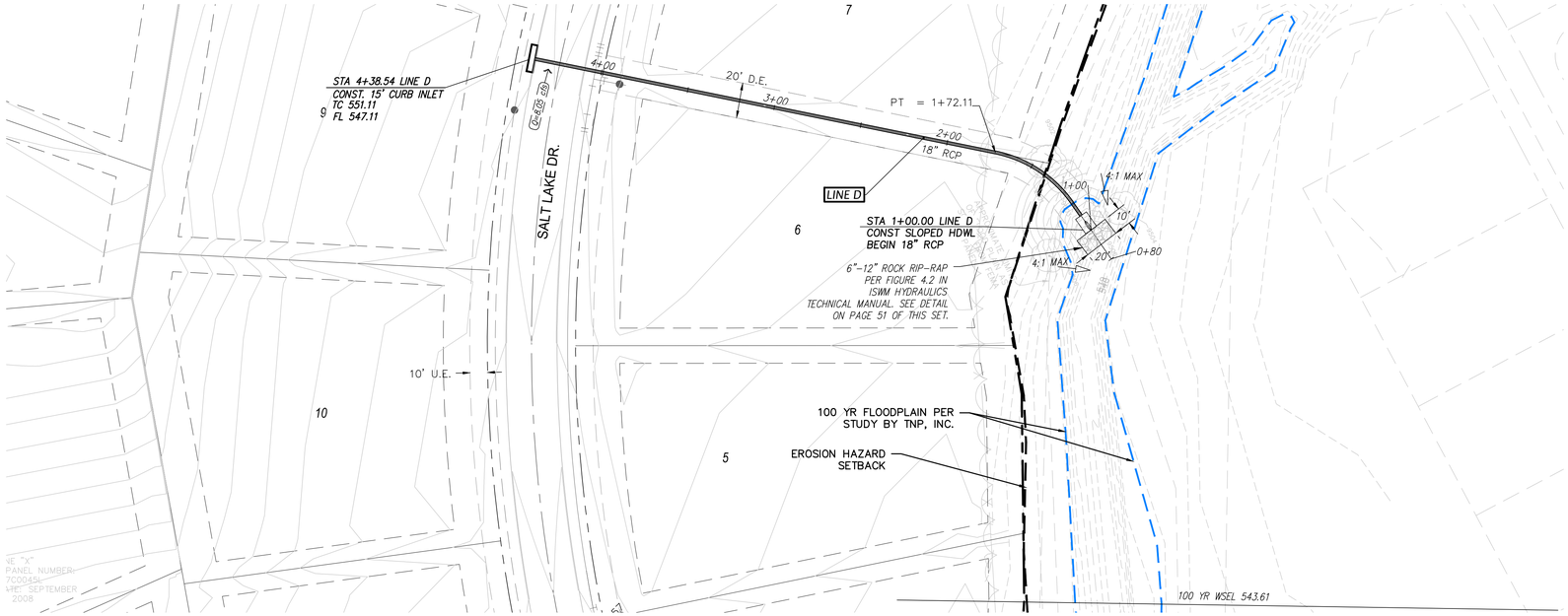
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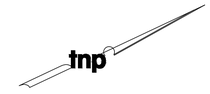
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STORM DRAIN PLAN & PROFILE - LINES B & C

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sheet 16 of 51

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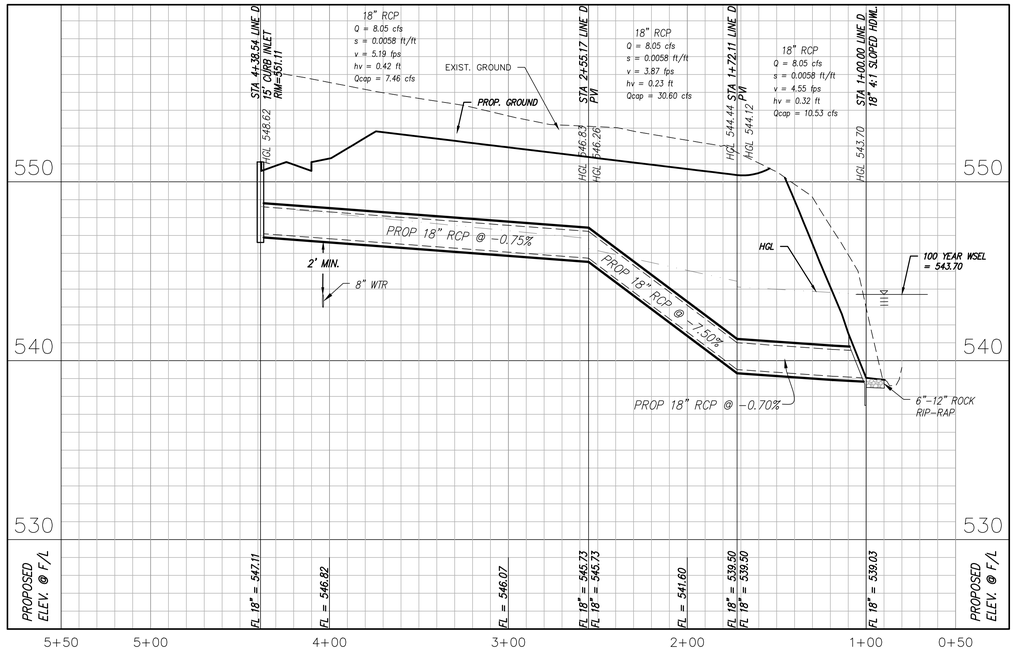
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SCALE IN FEET
1" = 40'

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LINE D



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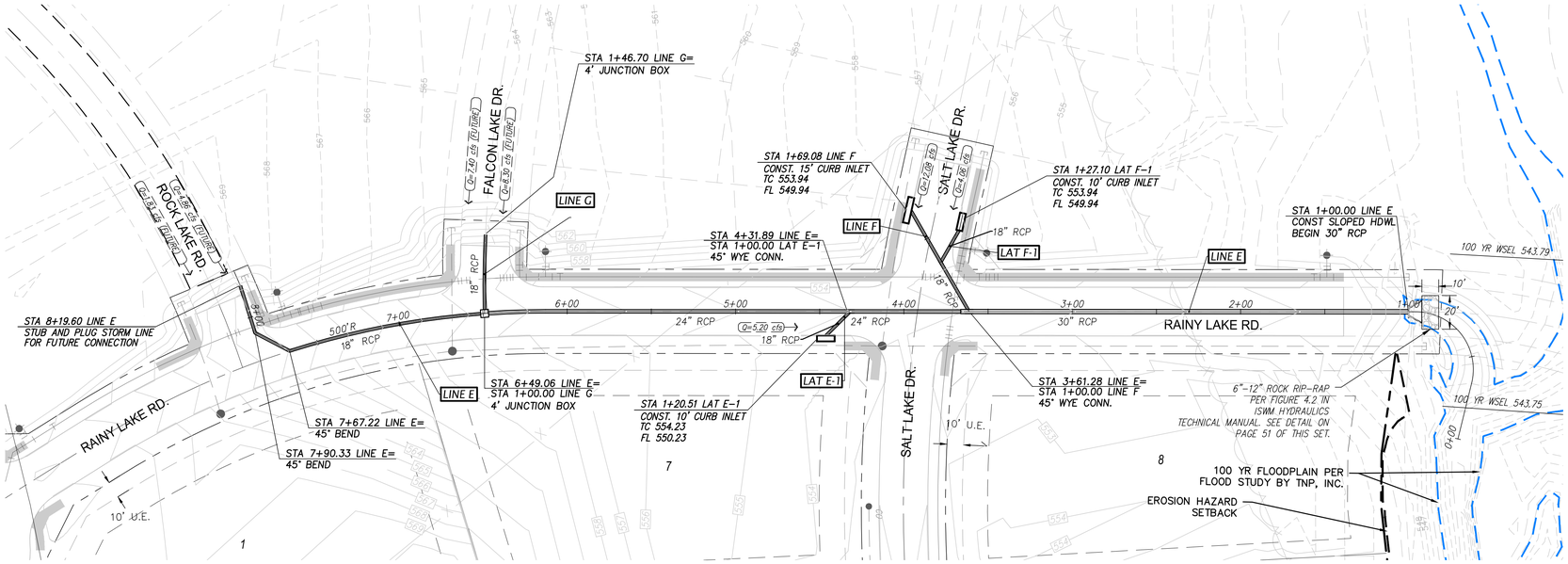
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APR 2023

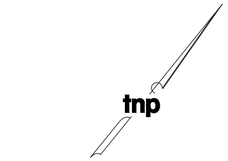
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STORM DRAIN PLAN & PROFILE - LINE D

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sheet 17 of 51

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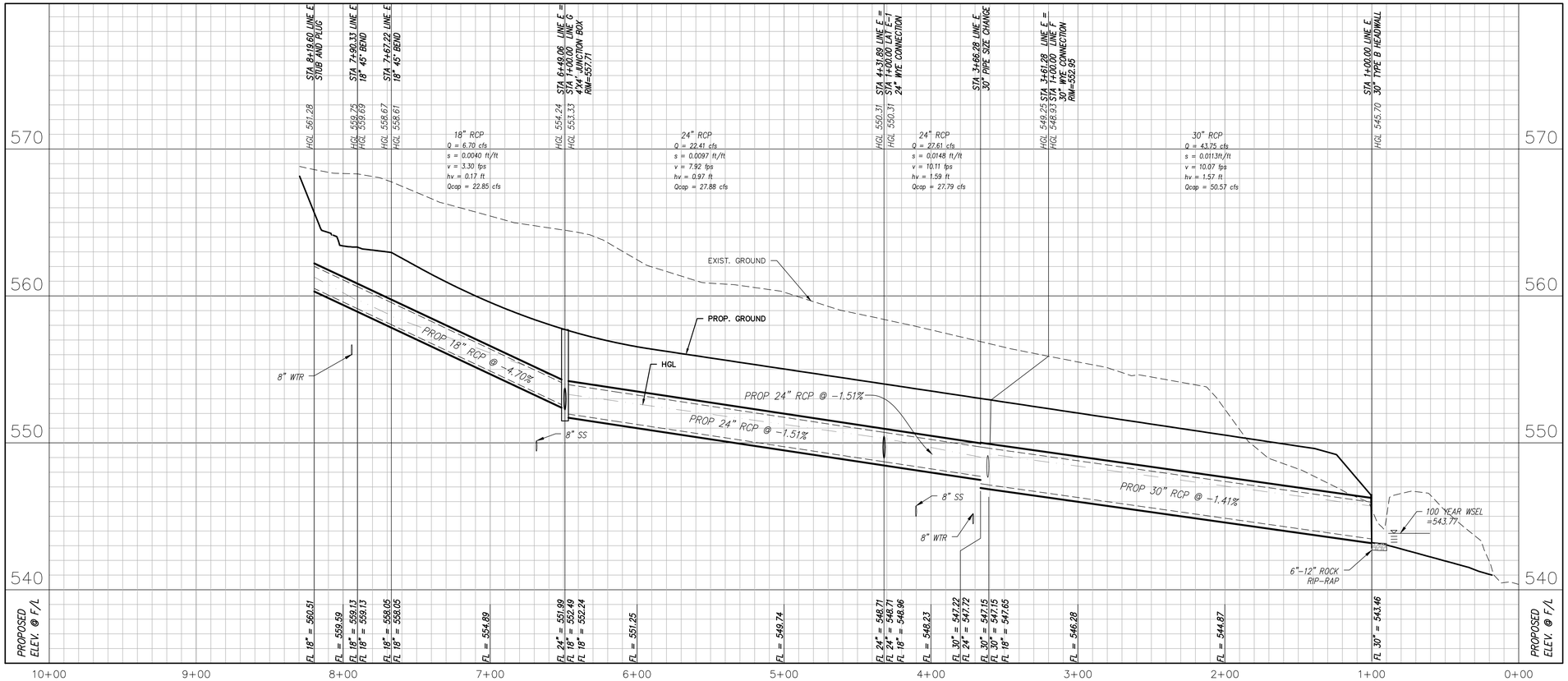


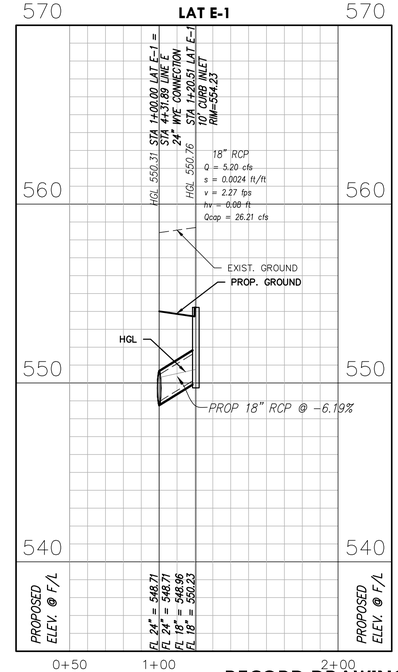


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LINE E





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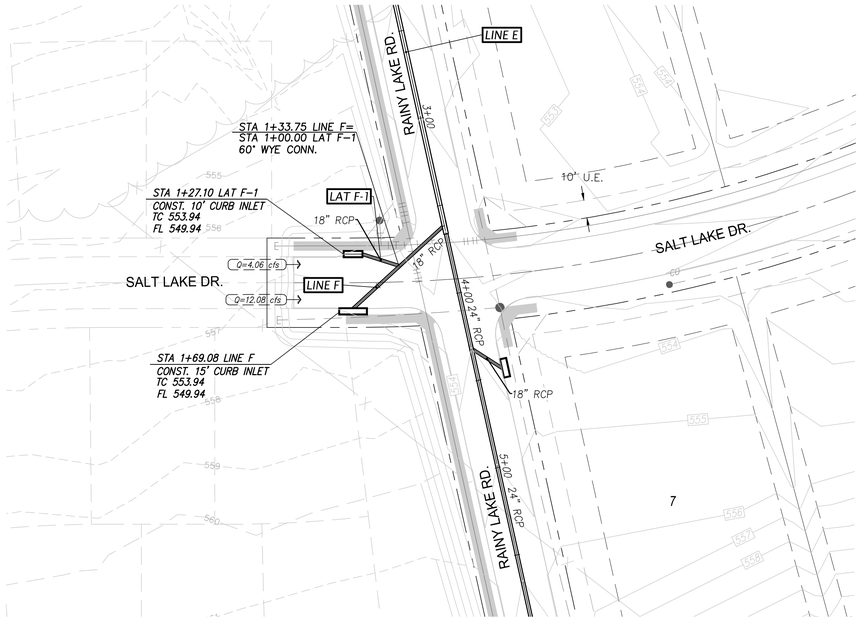
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APR 2023

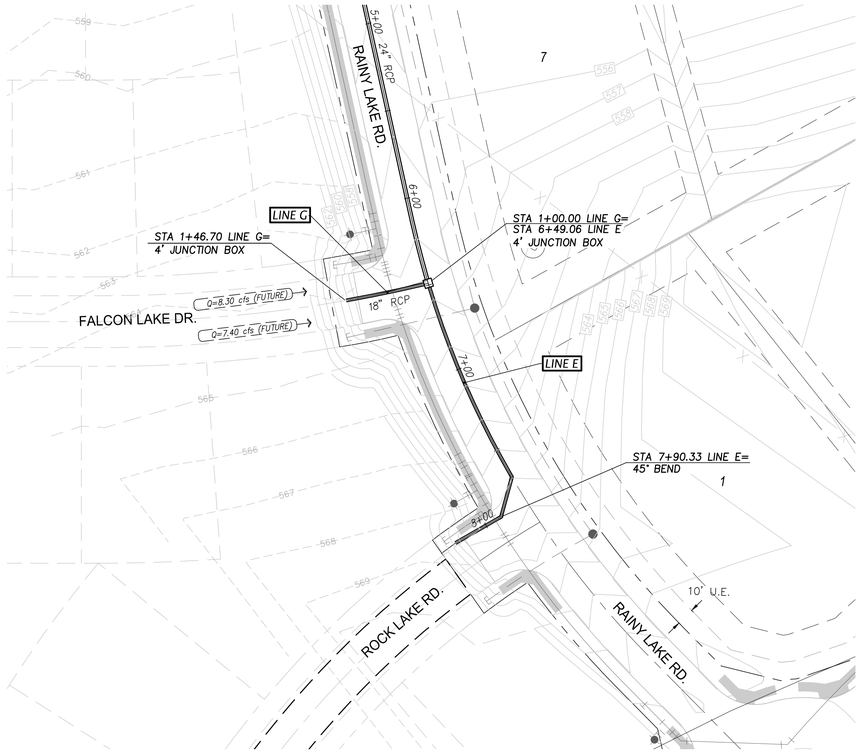
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STORM DRAIN PLAN & PROFILE - LINE E

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LEGEND

———	RIGHT-OF-WAY
— — —	ROADWAY CENTERLINE ALIGNMENT
———	PROPOSED EASEMENT LINE
*	PROPOSED BARRIER FREE RAMP
TC 12.48 •	PROPOSED SPOT ELEVATION
⟵	PROPOSED FLOW DIRECTION
VG	PROPOSED VALLEY GUTTER
HP	PROPOSED HIGH/LOW POINT
CR	PROPOSED CURB RETURN
CPI	PROPOSED CURB POINT INTERSECTION

tnp

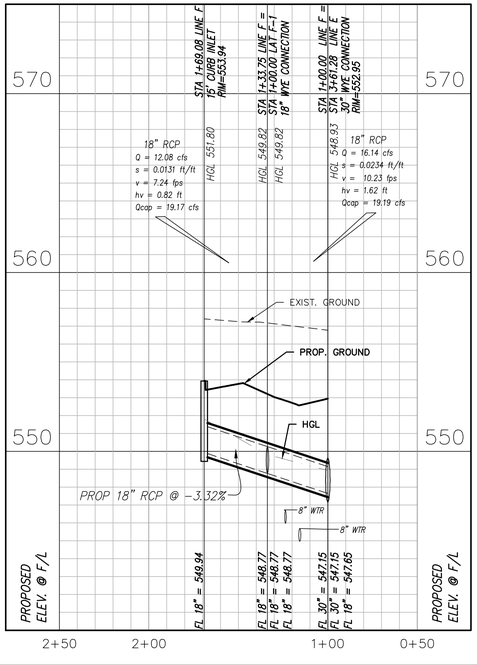
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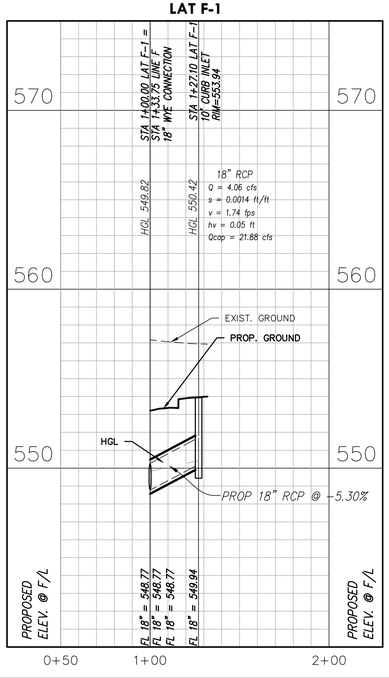
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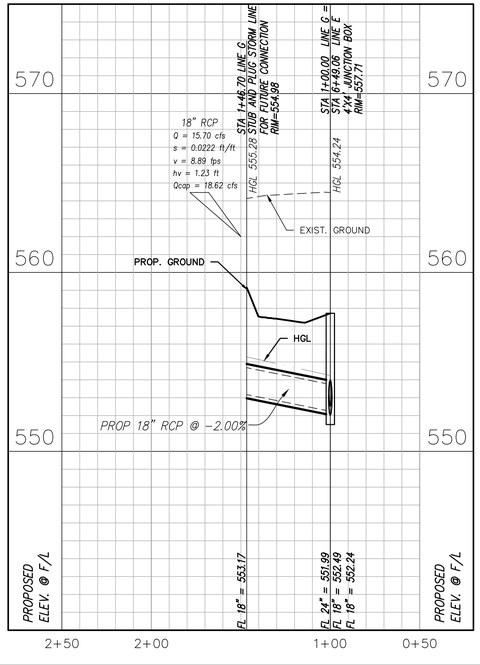
LINE F



LAT F-1



LINE G



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STATE OF TEXAS
CAMERON A. SLOWN
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LICENSED PROFESSIONAL ENGINEER

4/5/2023

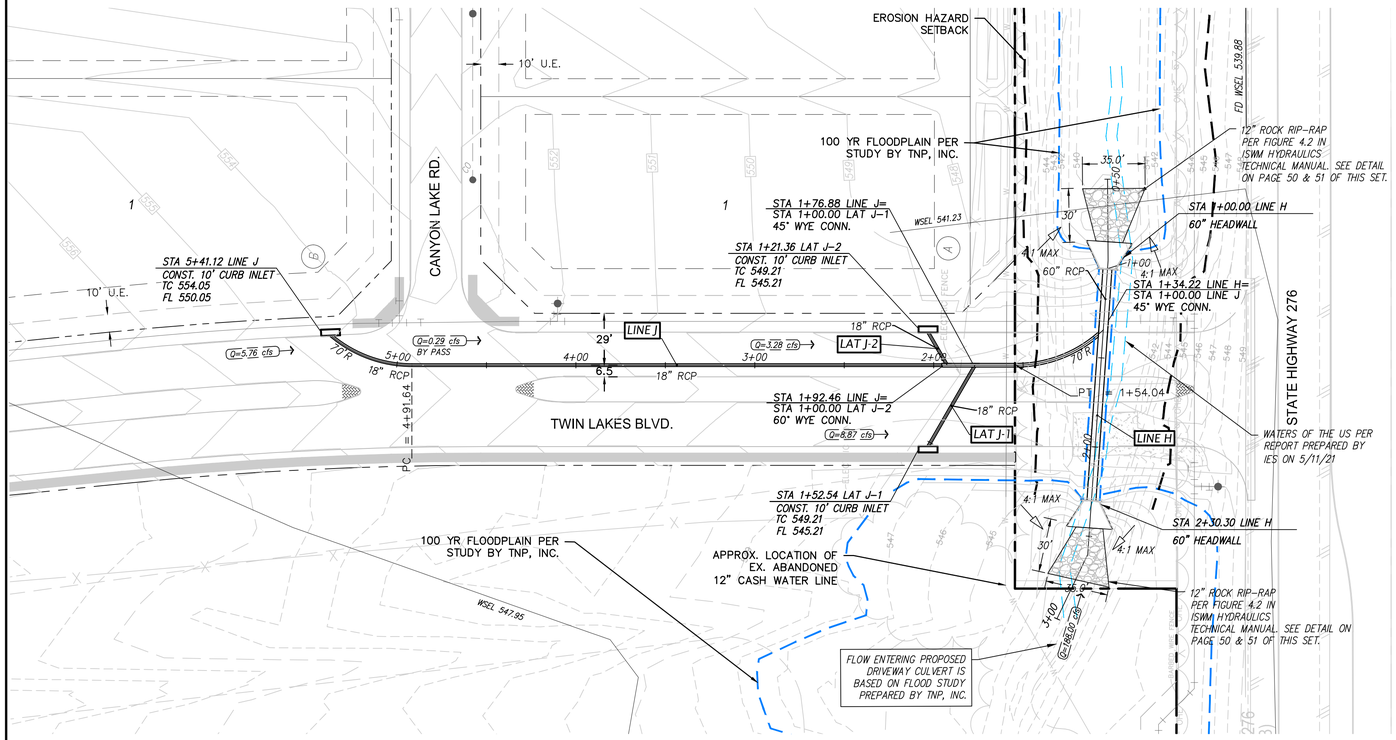
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	APR 2023

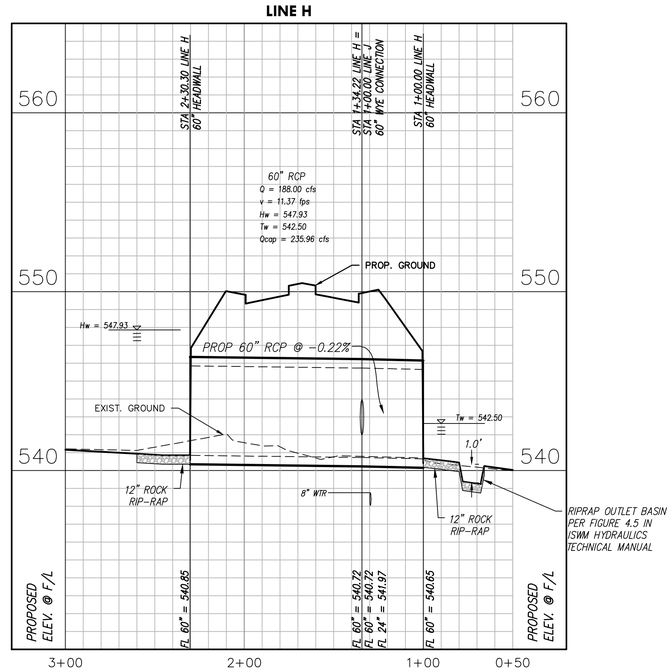
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Improvements for
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STORM DRAIN PLAN & PROFILE - LINES F & G

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sheet 19 of 51

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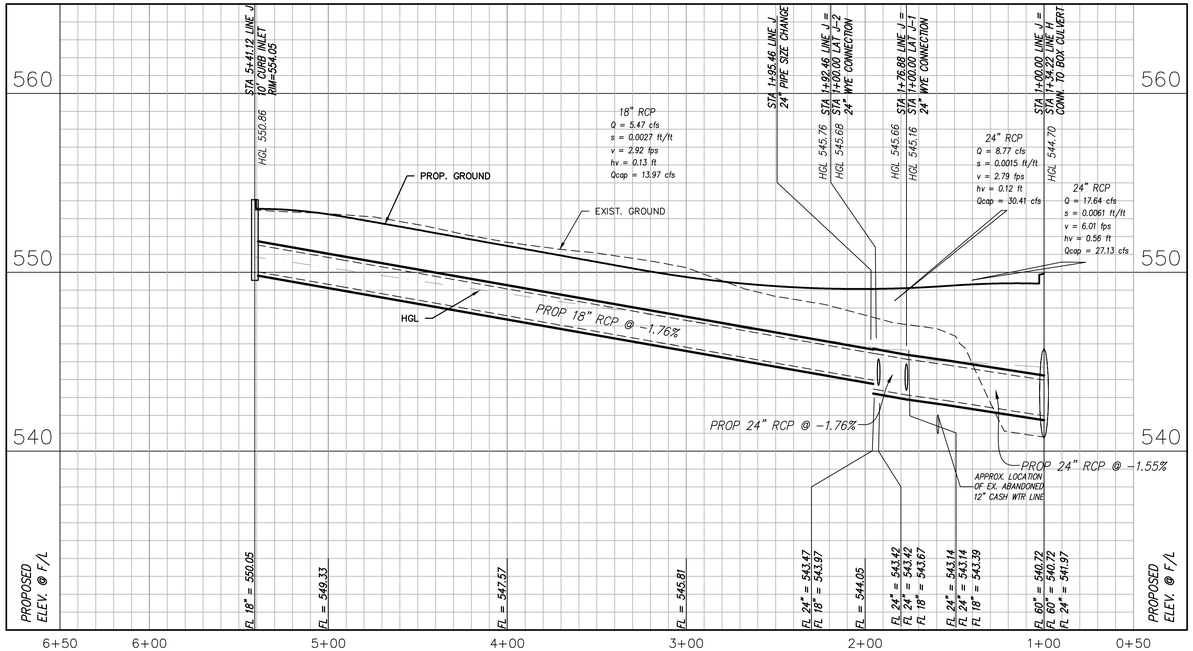
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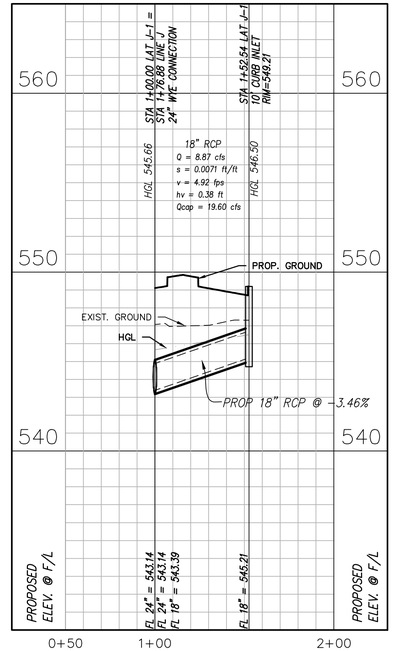
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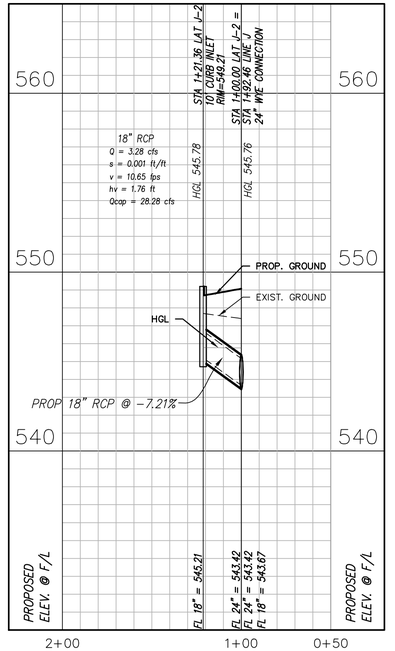
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1" = 40'

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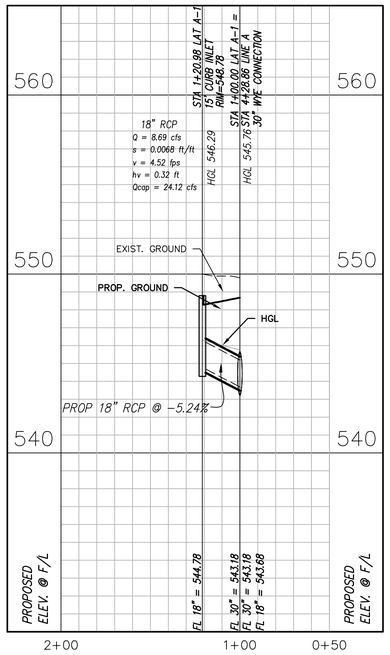
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STORM DRAIN PLAN & PROFILE - LINES H & J

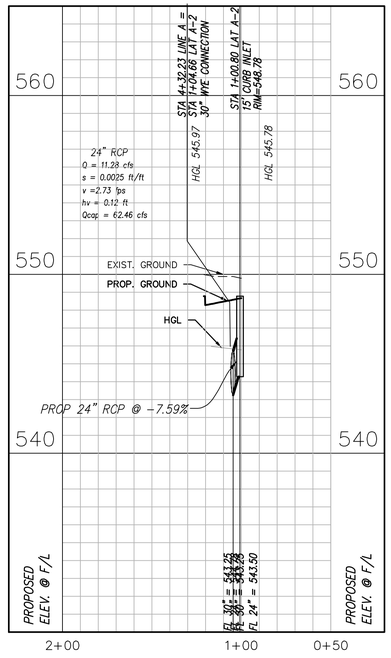
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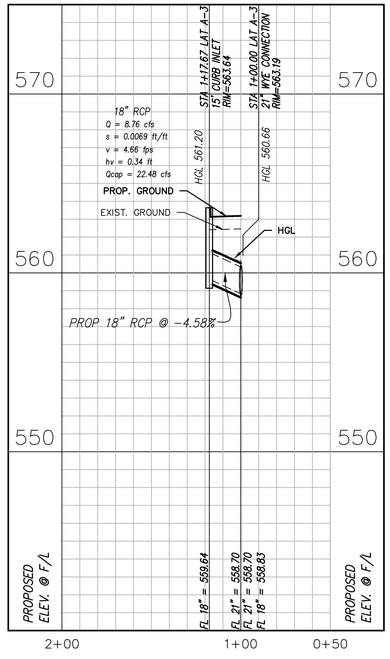
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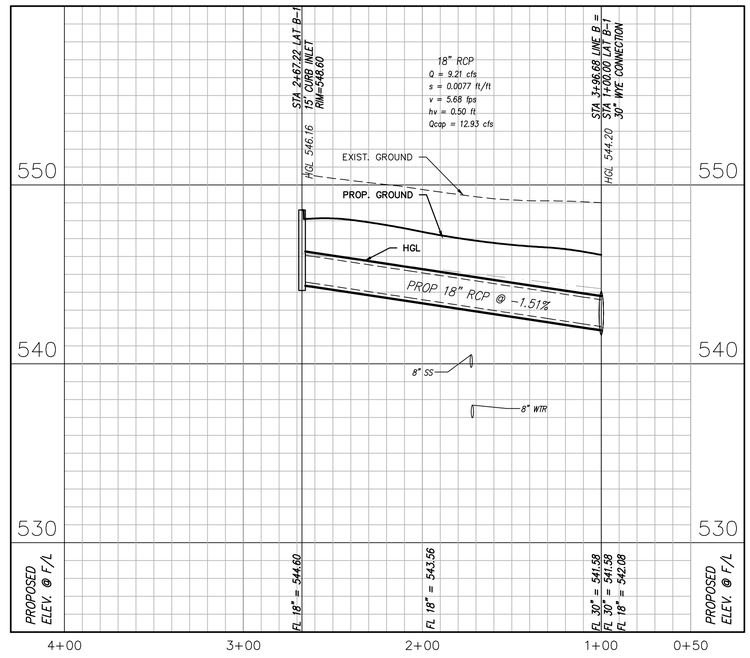
LAT A-2



LAT A-3



LAT B-1



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4/5/2023

scale
when bar is 1 inch long
horiz 1"=40'
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sheet 21 of 51

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System ID	Conduit Properties														Incremental Drainage Area																											
	Collection Point Station		Distance	# of Barrels	Selected	Conduit Material	Conduit	Wetted	Hydraulic	Manning's	Flowline	Flowline	Pipe	Inlet	Drainage	Run-off	Incremental	Accumulated	Upstream	Design Storm	Intensity	Storm Water	Pipe Capacity	Partial	Velocity	Time in	Friction	Friction	HGL		Headloss Calculations											
	Upstream	Downstream	Between		Pipe Size	Type	Area of Flow	Perimeter	Radius	n value	Elevation	Elevation	Slope S	ID	Area "A"	Coefficient	"CA"	"CA"	Tc	Frequency	"I"	Runoff	Q(cap)	Flow	In Sewer	Conduit	Slope Sf	Head Loss	Elevation	Elevation	V1^2/2g	V2^2/2g	Junction Type	Coefficient	HeadLoss	Design	Top of Curb	Pipe Cover	HGL Depth	Remarks
	Station	Station	Points		(in)		(ft^2)	(ft)	(ft)		Upstream	Downstream	(ft/ft)		(Acres)	"C"				(years)	(in/hr)	Q (cfs)	cfs	(YES/NO)	(fps)	(min)	(ft/ft)	(ft)	Upstream	Downstream				Kj	HL	HGL	Elevation	Upstream	Below T/C	
LINE A	4+28.86	1+00.00	328.86	1	30	RCP	4.91	7.85	0.625	0.013	543.18	539.75	0.0104		0.00	0.50	0.00	3.68	12.24	100	9.80	36.02	42.00	YES	8.29	0.66	0.00767	2.522	544.93	542.34	0.48	1.07	45 deg Wye	0.50	0.83	545.76	548.29	2.61	2.53	
LAT A-1	1+20.98	1+00.00	20.98	1	18	RCP	1.77	4.71	0.375	0.013	544.78	543.68	0.0524	1	1.77	0.50	0.89	0.89	10.00	100	9.80	8.67	24.12	YES	4.52	0.08	0.00678	0.142	545.90	545.76	0.00	0.32	Curb Inlet	1.25	0.40	546.29	548.78	2.50	2.49	
LINE A	4+35.29	4+28.86	6.43	1	30	RCP	4.91	7.85	0.625	0.013	543.25	543.18	0.0109		0.00	0.50	0.00	2.79	12.22	100	9.80	27.34	42.91	NO	5.57	0.02	0.00442	0.028	545.78	545.76	0.87	0.48	60 deg Wye	0.35	0.00	545.78	548.33	2.58	2.55	
LAT A-2	1+16.88	1+00.00	16.88	1	24	RCP	3.14	6.28	0.500	0.013	544.78	543.50	0.0758	2	2.30	0.50	1.15	1.15	10.00	100	9.80	11.27	62.46	YES	2.73	0.10	0.00247	0.042	545.83	545.78	0.00	0.12	Curb Inlet	1.25	0.14	545.97	548.78	2.00	2.81	
LINE A	5+87.40	4+35.29	152.11	1	21	RCP	2.41	5.50	0.438	0.013	546.28	544.00	0.0150		0.00	0.50	0.00	1.64	11.88	100	9.80	16.07	19.45	YES	7.48	0.34	0.01023	1.557	547.47	545.78	0.67	0.87	Junc. Box	0.05	0.00	547.47	552.30	4.27	4.83	
LINE A	8+00.00	5+87.40	212.60	1	21	RCP	2.41	5.50	0.438	0.013	556.66	546.28	0.0488		0.00	0.50	0.00	1.64	11.34	100	9.80	16.07	35.11	YES	6.55	0.54	0.01023	2.176	557.48	547.47	0.29	0.67	Vert. Bend	0.00	0.00	557.48	558.71	0.30	1.23	
LINE A	9+34.09	8+00.00	134.09	1	21	RCP	2.41	5.50	0.438	0.013	558.70	556.66	0.0152		0.00	0.50	0.00	1.64	11.04	100	9.80	16.07	19.60	YES	7.48	0.30	0.01023	1.372	559.89	557.85	0.29	0.87	60 deg Wye	0.35	0.77	560.66	563.19	2.74	2.53	
LAT A-3	1+17.67	1+00.00	17.67	1	18	RCP	1.77	4.71	0.375	0.013	559.64	558.83	0.0461	3	1.79	0.50	0.90	0.90	10.00	100	9.80	8.77	22.62	YES	4.67	0.06	0.00693	0.123	560.78	560.66	0.00	0.34	Curb Inlet	1.25	0.42	561.20	563.64	2.50	2.44	
LINE A	12+02.17	9+34.09	268.08	1	18	RCP	1.77	4.71	0.375	0.013	562.71	558.95	0.0140	4	1.49	0.50	0.75	0.75	10.00	100	9.80	7.30	12.47	YES	4.30	1.04	0.00480	1.288	563.52	560.66	0.00	0.29	Curb Inlet	1.25	0.29	563.81	566.71	2.50	2.90	

System ID	Conduit Properties														Incremental Drainage Area																											
	Collection Point Station		Distance	# of Barrels	Selected	Conduit Material	Conduit	Wetted	Hydraulic	Manning's	Flowline	Flowline	Pipe	Inlet	Drainage	Run-off	Incremental	Accumulated	Upstream	Design Storm	Intensity	Storm Water	Pipe Capacity	Partial	Velocity	Time in	Friction	Friction	HGL		Headloss Calculations											
	Upstream	Downstream	Between		Pipe Size	Type	Area of Flow	Perimeter	Radius	n value	Elevation	Elevation	Slope S	ID	Area "A"	Coefficient	"CA"	"CA"	Tc	Frequency	"I"	Runoff	Q(cap)	Flow	In Sewer	Conduit	Slope Sf	Head Loss	Elevation	Elevation	V1^2/2g	V2^2/2g	Junction Type	Coefficient	HeadLoss	Design	Top of Curb	Pipe Cover	HGL Depth	Remarks
	Station	Station	Points		(in)		(ft^2)	(ft)	(ft)		Upstream	Downstream	(ft/ft)		(Acres)	"C"				(years)	(in/hr)	Q (cfs)	cfs	(YES/NO)	(fps)	(min)	(ft/ft)	(ft)	Upstream	Downstream				Kj	HL	HGL	Elevation	Upstream	Below T/C	
LINE B	3+91.67	1+00.00	291.67	1	30	RCP	4.91	7.85	0.625	0.013	541.54	539.50	0.0070	5	1.23	0.50	0.62	2.04	10.24	100	9.80	19.94	34.40	YES	4.23	1.15	0.00235	0.686	543.90	543.21	0.06	0.28	Curb Inlet (inline)	1.00	0.22	544.12	546.38	2.34	2.26	
LINE B	3+96.68	3+91.67	5.01	1	30	RCP	4.91	7.85	0.625	0.013	541.58	541.54	0.0080		0.00	0.50	0.00	1.42	10.21	100	9.80	13.92	36.75	YES	2.64	0.03	0.00114	0.006	544.12	544.12	0.06	0.11	45 deg Wye	0.50	0.08	544.20	546.04	1.96	1.84	
LAT B-1	2+67.22	1+00.00	167.22	1	18	RCP	1.77	4.71	0.375	0.013	544.60	542.08	0.0151	7	1.88	0.50	0.94	0.94	10.00	100	9.80	9.21	12.93	YES	5.68	0.49	0.00765	1.279	545.53	544.20	0.00	0.50	Curb Inlet	1.25	0.63	546.16	548.69	2.59	2.53	
LINE B	4+20.67	3+96.68	23.99	1	21	RCP	2.41	5.50	0.438	0.013	542.43	542.33	0.0042	6	0.96	0.50	0.48	0.48	10.00	100	9.80	4.70	10.26	YES	1.92	0.21	0.00088	0.021	544.22	544.20	0.00	0.06	Curb Inlet	1.25	0.07	544.29	546.38	2.20	2.09	

System ID	Conduit Properties														Incremental Drainage Area																											
	Collection Point Station		Distance	# of Barrels	Selected	Conduit Material	Conduit	Wetted	Hydraulic	Manning's	Flowline	Flowline	Pipe	Inlet	Drainage	Run-off	Incremental	Accumulated	Upstream	Design Storm	Intensity	Storm Water	Pipe Capacity	Partial	Velocity	Time in	Friction	Friction	HGL		Headloss Calculations											
	Upstream	Downstream	Between		Pipe Size	Type	Area of Flow	Perimeter	Radius	n value	Elevation	Elevation	Slope S	ID	Area "A"	Coefficient	"CA"	"CA"	Tc	Frequency	"I"	Runoff	Q(cap)	Flow	In Sewer	Conduit	Slope Sf	Head Loss	Elevation	Elevation	V1^2/2g	V2^2/2g	Junction Type	Coefficient	HeadLoss	Design	Top of Curb	Pipe Cover	HGL Depth	Remarks
	Station	Station	Points		(in)		(ft^2)	(ft)	(ft)		Upstream	Downstream	(ft/ft)		(Acres)	"C"				(years)	(in/hr)	Q (cfs)	cfs	(YES/NO)	(fps)	(min)	(ft/ft)	(ft)	Upstream	Downstream				Kj	HL	HGL	Elevation	Upstream	Below T/C	
LINE C	3+58.46	1+00.00	258.46	1	27	RCP	3.98	7.07	0.563	0.013	540.93	539.64	0.0050	8	0.98	0.50	0.49	1.77	10.12	100	9.80	17.30	21.94	YES	4.83	0.89	0.00310	0.802	542.69	541.89	0.25	0.36	Curb Inlet (inline)	1.00	0.00	542.69	545.65	2.47	2.96	
LINE C	3+87.46	3+58.46	29.00	1	24	RCP	3.14	6.28	0.500	0.013	541.54	541.18	0.0124	9	2.55	0.50	1.28	1.28	10.00	100	9.80	12.50	25.27	YES	3.98	0.12	0.00303	0.088	542.78	542.69	0.00	0.25	Curb Inlet	1.25	0.31	543.09	545.65	2.11	2.56	

System ID	Conduit Properties														Incremental Drainage Area																											
	Collection Point Station		Distance	# of Barrels	Selected	Conduit Material	Conduit	Wetted	Hydraulic	Manning's	Flowline	Flowline	Pipe	Inlet	Drainage	Run-off	Incremental	Accumulated	Upstream	Design Storm	Intensity	Storm Water	Pipe Capacity	Partial	Velocity	Time in	Friction	Friction	HGL		Headloss Calculations											
	Upstream	Downstream	Between		Pipe Size	Type	Area of Flow	Perimeter	Radius	n value	Elevation	Elevation	Slope S	ID	Area "A"	Coefficient	"CA"	"CA"	Tc	Frequency	"I"	Runoff	Q(cap)	Flow	In Sewer	Conduit	Slope Sf	Head Loss	Elevation	Elevation	V1^2/2g	V2^2/2g	Junction Type	Coefficient	HeadLoss	Design	Top of Curb	Pipe Cover	HGL Depth	Remarks
	Station	Station	Points		(in)		(ft^2)	(ft)	(ft)		Upstream	Downstream	(ft/ft)		(Acres)	"C"				(years)	(in/hr)	Q (cfs)	cfs	(YES/NO)	(fps)	(min)	(ft/ft)	(ft)	Upstream	Downstream				Kj	HL	HGL	Elevation	Upstream	Below T/C	
LINE D	1+72.11	1+00.00	72.11	1	18	RCP	1.77	4.71	0.375	0.013	539.50	539.00	0.0069		0.00	0.50	0.00	0.82	10.95	100	9.80	8.04	8.77	NO	4.55	0.26	0.00582	0.420	544.12	543.70	0.23	0.32	Vert. Bend	0.00	0.32	544.44	550.96	9.96	6.52	
LINE D	2+55.17	1+72.11	83.06	1	18	RCP	1.77	4.71	0.375	0.013	545.73	539.50	0.0750		0.00	0.50	0.00	0.82	10.59	100	9.80	8.04	28.85	YES	3.87	0.36	0.00582	0.484	546.26	544.44	0.00	0.23	Vert. Bend	0.00	0.23	546.49	552.97	5.74	6.48	
LINE D	4+38.54	2+55.17	183.37	1	18	RCP	1.77	4.71	0.375	0.013	547.11	545.73	0.0075	10	1.64	0.50	0.82	0.82	10.00	100	9.80	8.04	9.14	YES	5.14	0.59	0.00582	1.067	548.19	546.81	0.00	0.41	Curb Inlet	1.25	0.41	548.60	551.05	2.44	2.45	

System ID	Conduit Properties														Incremental Drainage Area																											
	Collection Point Station		Distance	# of Barrels	Selected	Conduit Material	Conduit	Wetted	Hydraulic	Manning's	Flowline	Flowline	Pipe	Inlet	Drainage	Run-off	Incremental	Accumulated	Upstream	Design Storm	Intensity	Storm Water	Pipe Capacity	Partial	Velocity	Time in	Friction	Friction	HGL		Headloss Calculations											
	Upstream	Downstream	Between		Pipe Size	Type	Area of Flow	Perimeter	Radius	n value	Elevation	Elevation	Slope S	ID	Area "A"	Coefficient	"CA"	"CA"	Tc	Frequency	"I"	Runoff	Q(cap)	Flow	In Sewer	Conduit	Slope Sf	Head Loss	Elevation	Elevation	V1^2/2g	V2^2/2g	Junction Type	Coefficient	HeadLoss	Design	Top of Curb	Pipe Cover	HGL Depth	Remarks
	Station	Station	Points		(in)		(ft^2)	(ft)	(ft)		Upstream	Downstream	(ft/ft)		(Acres)	"C"				(years)	(in/hr)	Q (cfs)	cfs	(YES/NO)	(fps)	(min)	(ft/ft)	(ft)	Upstream	Downstream				Kj	HL	HGL	Elevation	Upstream	Below T/C	
LINE E	3+61.28	1+00.00	261.28	1	30	RCP	4.91	7.85	0.625	0.013	547.15	543.20	0.0151		0.00	0.50	0.00	4.46	11.43	100	9.80	43.71	50.57	YES	10.06	0.43	0.01129	2.951	548.93	545.70	1.58	1.57	60 deg Wye	0.35	0.00	548.93	552.95	3.30	4.03	
LINE F	1+33.75	1+00.00	33.75	1	18	RCP	1.77	4.71	0.375	0.013	548.54	547.65	0.0332	LINE F	0.00	0.50	0.00	1.65	10.08	100	9.80	16.12	19.19	YES	10.22	0.06	0.02343	0.791	549.82	548.93	0.81	1.62	60 deg Wye	0.35	0.00	549.82	552.95	2.94	3.39	
LINE E	4+31.89	3+61.28	70.61	1	24	RCP	3.14	6.28	0.500	0.013	548.71	547.65	0.0150		0.00	0.50	0.00	2.82	11.32	100	9.80	27.59	27.79	YES	10.10	0.12	0.01479	1.044	550.31	549.25	0.97	1.58	45 deg Wye	0.50	0.00	550.31	554.01	3.30	3.70	
LAT E-1	1+20.51	1+00.00	20.51	1	18	RCP	1.77	4.71	0.375	0.013	550.23	548.96	0.0619	11	1.06	0.50	0.53	0.53	10.00	100	9.80	5.19	26.21	YES	2.26	0.15	0.00243	0.050	550.67	550.31	0.00	0.08	Curb Inlet	1.25	0.10	550.76	554.23	2.50	3.47	
LINE E	6+49.06	4+31.89	217.17	1	24	RCP	3.14	6.28	0.500	0.013	551.99	548.71	0.0151		0.00	0.50	0.00	2.29	10.86	100	9.80	22.39	27.88	YES	7.91	0.46	0.00975	2.116	553.33	550.31	0.17	0.97	60 deg Junction	0.35	0.91	554.24	557.71	3.72	3.47	
LINE G	1+46.70	1+00.00	46.7	1	18	RCP	1.77	4.71	0.375	0.013	553.70	552.24	0.0313	LINE G	3.20	0.50	1.60	1.60	10.00	100	9.80	15.68	18.62	NO	8.87	0.09	0.02216	1.035	555.28	554.24	1.22	1.22	End	0.35	0.00	555.28	557.45	3.96	3.88	
LINE E	7+67.22	6+49.06	118.16	1	18	RCP	1.77	4.71	0.375	0.013	558.05	552.49	0.0471		0.00	0.50	0.00	0.69	10.26	100	9.80	6.71	22.85	YES	3.30	0.60	0.00406	0.480	558.61	554.24	0.17	0.17	45 deg Bend	0.37	0.06	558.67	562.96	3.41	4.29	
LINE E	7+90.33	7+67.22	23.11	1	18	RCP	1.77	4.71	0.375	0.013	559.13	558.05	0.0467		0.00	0.50	0.00	0.69	10.15	100	9.80	6.71	22.77	YES	3.30	0.12	0.00406	0.094	559.69	558.67	0.17	0.17	45 deg Bend	0.37	0.06	559.75	563.33	2.70	3.58	
LINE E	8+19.60	7+90.33	29.27	1	18	RCP	1.77	4.71	0.375	0.013	560.51	559.13	0.0471		1.37	0.50	0.69	0.69	10.00	100	9.80	6.71	22.87	YES	3.30	0.15	0.00406	0.119	561.07	559.75	0.00	0.17	Curb Inlet	1.25	0.21	561.28	564.51	2.50	3.23	

System ID	Conduit Properties														Incremental Drainage Area																											
	Collection Point Station		Distance	# of Barrels	Selected	Conduit Material	Conduit	Wetted	Hydraulic	Manning's	Flowline	Flowline	Pipe	Inlet	Drainage	Run-off	Incremental	Accumulated	Upstream	Design Storm	Intensity	Storm Water	Pipe Capacity	Partial	Velocity	Time in	Friction	Friction	HGL		Headloss Calculations											
	Upstream	Downstream	Between		Pipe Size	Type	Area of Flow	Perimeter	Radius	n value	Elevation	Elevation	Slope S	ID	Area "A"	Coefficient	"CA"	"CA"	Tc	Frequency	"I"	Runoff	Q(cap)	Flow	In Sewer	Conduit	Slope Sf	Head Loss	Elevation	Elevation	V1^2/2g	V2^2/2g	Junction Type	Coefficient	HeadLoss	Design	Top of Curb	Pipe Cover	HGL Depth	Remarks
	Station	Station	Points		(in)		(ft^2)	(ft)	(ft)		Upstream	Downstream	(ft/ft)		(Acres)	"C"				(years)	(in/hr)	Q (cfs)	cfs	(YES/NO)	(fps)	(min)	(ft/ft)	(ft)	Upstream	Downstream				Kj	HL	HGL	Elevation	Upstream	Below T/C	
LINE F	1+33.75	1+00.00	33.75	1	18	RCP	1.77	4.71	0.375	0.013	548.77	547.65	0.0332		0.00	0.50	0.00	1.65	10.08	100	9.80	16.12	19.19	YES	10.22	0.06	0.02343	0.791	549.82	548.93	0.81	1.62	60 deg Wye	0.30	0.00	549.82	553.21	2.94	3.39	
LAT F-1	1+27.10	1+00.00	27.10	1	18	RCP	1.77	4.71	0.375	0.013	549.94	548.77	0.0432	14	0.83	0.50	0.42	0.42	10.00	100	9.80	4.07	21.88	YES	1.75	0.26	0.00149	0.040	550.36	549.82	0.05	0.05	Curb Inlet	1.25	0.06	550.42	553.94	2.50	3.52	
LINE F	1+69.08	1+33.75	35.33	1	18	RCP	1.77	4.71	0.375	0.013	549.94	548.77	0.0331	13	2.46	0.50	1.23	1.23	10.00	100	9.80	12.05	19.17	YES	7.23	0.08	0.01310	0.463	550.78	549.82	0.81	0.81	Curb Inlet	1.25	1.01	551.79	553.94	2.50	2.15	

System ID	Conduit Properties														Incremental Drainage Area																											
	Collection Point Station		Distance	# of Barrels	Selected	Conduit Material	Conduit	Wetted	Hydraulic	Manning's	Flowline	Flowline	Pipe	Inlet	Drainage	Run-off	Incremental	Accumulated	Upstream	Design Storm	Intensity	Storm Water	Pipe Capacity	Partial	Velocity	Time in	Friction	Friction	HGL		Headloss Calculations											
	Upstream	Downstream	Between		Pipe Size	Type	Area of Flow	Perimeter	Radius	n value	Elevation	Elevation	Slope S	ID	Area "A"	Coefficient	"CA"	"CA"	Tc	Frequency	"I"	Runoff	Q(cap)	Flow	In Sewer	Conduit	Slope Sf	Head Loss	Elevation	Elevation	V1^2/2g	V2^2/2g	Junction Type	Coefficient	HeadLoss	Design	Top of Curb	Pipe Cover	HGL Depth	Remarks
	Station	Station	Points		(in)		(ft^2)	(ft)	(ft)		Upstream	Downstream	(ft/ft)		(Acres)	"C"				(years)	(in/hr)	Q (cfs)	cfs	(YES/NO)	(fps)	(min)	(ft/ft)	(ft)	Upstream	Downstream				Kj	HL	HGL	Elevation	Upstream	Below T/C	
LINE G	1+46.70	1+00.00	46.70	1	18	RCP	1.77	4.71	0.375	0.013	553.70	552.24	0.0313	15 & 16	3.20	0.50	1.60	1.60	10.00	100	9.80	15.68	18.62	NO	8.87	0.09	0.02216	1.035	555.28	554.24	1.22	1.22	End	0.00	0.00	555.28	559.16	3.96	3.88	

System ID	Conduit Properties														Incremental Drainage Area																											
	Collection Point Station		Distance	# of Barrels	Selected	Conduit Material	Conduit	Wetted	Hydraulic	Manning's	Flowline	Flowline	Pipe	Inlet	Drainage	Run-off	Incremental	Accumulated	Upstream	Design Storm	Intensity	Storm Water	Pipe Capacity	Partial	Velocity	Time in	Friction	Friction	HGL		Headloss Calculations											
	Upstream	Downstream	Between		Pipe Size	Type	Area of Flow	Perimeter	Radius	n value	Elevation	Elevation	Slope S	ID	Area "A"	Coefficient	"CA"	"CA"	Tc	Frequency	"I"	Runoff	Q(cap)	Flow	In Sewer	Conduit	Slope Sf	Head Loss	Elevation	Elevation	V1^2/2g	V2^2/2g	Junction Type	Coefficient	HeadLoss	Design	Top of Curb	Pipe Cover	HGL Depth	Remarks
	Station	Station	Points		(in)		(ft^2)	(ft)	(ft)		Upstream	Downstream	(ft/ft)		(Acres)	"C"				(years)	(in/hr)	Q (cfs)	cfs	(YES/NO)	(fps)	(min)	(ft/ft)	(ft)	Upstream	Downstream				Kj	HL	HGL	Elevation	Upstream	Below T/C	
LINE J	1+76.88	1+00.00	76.88	1	24	RCP	3.14	6.28	0.500	0.013	543.14	542.04	0.0143		0.00	0.50	0.00	1.80	12.08	100	9.80	17.64	27.13	YES	6.01	0.21	0.00605	0.465	545.16	544.70	0.13	0.56	45 deg Wye	0.50	0.49	545.66	549.06	3.92	3.40	
LAT J-1	1+52.54	1+00.00	52.54	1	18	RCP	1.77	4.71	0.375	0.013	545.21	543.39	0.0346	18	1.81	0.50	0.91	0.91	10.00	100	9.80	8.87	19.60	YES	4.92	0.18	0.00709	0.373	546.03	545.66	0.00	0.38	Curb Inlet	1.25	0.47	546.50	549.21	2.50	2.71	
LINE J	1+92.46	1+76.88	15.58	1	24	RCP	3.14	6.28	0.500	0.013	543.42	543.14	0.0180		0.00	0.50	0.00	0.89	11.99	100	9.80	8.77	30.41	NO	2.79	0.09	0.00149	0.023	545.68	545.66	0.13	0.12	60 deg Wye	0.35	0.07	545.76	549.02	3.60	3.26	
LAT J-2	1+21.36	1+00.00	21.36	1	18	RCP	1.77	4.71	0.375	0.013	545.21	543.67	0.0721	19	0.67	0.50	0.33	0.33	10.00	100	9.80	3.28	28.28	YES	10.65	0.03	0.00097	0.021	545.78	545.76	0.00	1.76	Curb Inlet	1.25	0.00	545.78	549.21	2.50	3.43	
LINE J	5+41.12	1+92.46	348.66	1	18	RCP	1.77	4.71	0.375	0.013	550.05	543.92	0.0176	17	1.12	0.50	0.56	0.56	10.00	100	9.80	5.49	13.97	YES	2.92	1.99	0.00271	0.947	550.70	545.76	0.00	0.13	Curb Inlet	1.25	0.17	550.86	554.05	2.50	3.19	

Inlet ID	Location				Area Runoff						Upstream Bypass Q	Total Gutter Flow Q_a	Gutter Flow							Gutter Flow					Inlets Capacity						Inlets Capacity				Inlet By-pass		
	Alignment	Station	Offset	Design Freq	C	AREA ID	Time of Concentration Tc	Intensity I	Area A	Runoff Q			Thoroughfare Type	On-Grade/ Sag	Manning's n	Long Slope S	Crown Type	Cross Slope S_X	Depression		Ponding Width/ Spread		Depth of Gutter Flow		Max Allow Flow based on Ponding $Q_{max\ Gutter}$	Depressed Gutter Section		Section Beyond Depression		Conveyance		Ratio of Depression flow to Total Flow E_0	Equivelent Cross-slope, S_e	Inlet Length		Inlet Capacity Q_C	Flow $Q_{by\ pass}$	C*A	To Inlet ID
																			Depth a	Width W	(allow) T_{allow}	(actual) T_{actual}	(allow) y_{allow}	(actual) y_{actual}		Area A_W	Wetted Perimeter P_W	Area A_0	Wetted Perimeter P_0	Depression Kw	Section Beyond Depression K_0			Required $L_{Req'd}$	Actual L_{actual}				
				(yr)			(min)	(in/hr)	(acres)	(cfs)	(cfs)	(cfs)				(ft/ft)		(ft/ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)	(ft^2)	(ft)	(ft^2)	(ft)	(cfs)	(cfs)			(ft/ft)	(ft)	(ft)	(cfs)	(cfs)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	(36)	(37)	(38)	(39)	(40)
1	LAT A-1	1+20.61	0	100	0.50	1	10	9.80	1.77	8.67	0.00	8.67	LOCAL	ON GRADE	0.0175	0.007	6" Crown	0.0357	0.5	2	14.00	12.45	0.50	0.44	11.80	1.32	2.08	1.95	10.45	82.48	53.97	0.60	0.19	10.40	15	16.36	0.00	0.00	N/A
2	LAT A-2	1+16.72	0	100	0.50	2	10	9.80	2.30	11.27	0.00	11.27	LOCAL	ON GRADE	0.0175	0.007	6" Crown	0.0357	0.5	2	14.00	13.73	0.50	0.49	11.80	1.41	2.08	2.46	11.73	92.27	73.53	0.56	0.17	12.08	15	16.36	0.00	0.00	N/A
3	LAT A-3	1+17.67	0	100	0.50	3	10	9.80	1.79	8.77	0.00	8.77	LOCAL	ON GRADE	0.0175	0.015	6" Crown	0.0208	0.5	2	15.21	15.18	0.32	0.32	8.76	1.09	2.07	1.81	13.18	60.32	40.82	0.60	0.17	13.90	15	12.58	0.00	0.00	N/A
4	LINE A	12+02.16	0	100	0.50	4	10	9.80	1.49	7.30	0.00	7.30	LOCAL	ON GRADE	0.0175	0.007	6" Crown	0.0208	0.5	2	16.40	16.35	0.34

MATCH LINE - SHEET 24

INSTALL 8" PVC SEWER

5+99.29 SS LAT B-1
CONSTR. 4' DIA MH
RIM 548.44

10' U.E.

INSTALL 8" PVC WATER

INSTALL
1-8" VALVE
1-8"X6" TEE
1-6" VALVE
1-F.H.

CANYON LAKE RD.

Δ=20°01'28"
R=728.97'
L=254.771'
TAN=128.70

INSTALL
1-8" VALVE
1-8"X6" TEE
1-6" VALVE
1-F.H.

SS LAT B-1

INSTALL 8" PVC WATER

INSTALL
11.25° BEND

INSTALL 8" PVC SEWER

EROSION HAZARD
SETBACK

FUTURE PHASE

1+51.08 SS LAT B-1
CONSTR. 4' DIA MH
RIM 546.23

INSTALL
1-11.25° BEND
1-22.5° BEND
1-8" VALVE
1-8"X6" TEE
1-6" VALVE
1-F.H.

Δ=9°17'24"
R=145.50'
L=23.592'
TAN=11.82

20' D.E.

INSTALL
1-8" TEE
3-8" VALVES

INSTALL
1-8" TEE
3-8" VALVES
1-22.5° BEND

3+35.84 SS LINE B
1+00.00 SS LAT B-1
CONSTR. 4' DIA MH
RIM 547.15

INSTALL
1-11.25° BEND

3+00

4+00

5+00

5+83.43

20' S.E.

Δ=45°29'12"
R=145.50'
L=115.511'
TAN=60.99

1+00.00 SS LINE B
INSTALL
1-8" PLUG FOR FUTURE
CONNECTION

107 LF 4" IRRIGATION SLEEVE

5+83.43 SS LINE B
CONSTR. CLEANOUT
RIM 552.57

2" IRRIGATION SERVICE

SS LINE B

4+90.52 SS LINE B
CONSTR. 4' DIA MH
RIM 550.30

INSTALL 8" PVC SEWER

100 YR FLOODPLAIN

INSTALL
1-8"X6" TEE
1-6" VALVE
1-F.H.

10' U.E.

TWIN LAKES BLVD.

INSTALL 8" PVC WATER

20' W.E.

INSTALL
1-22.50° BEND

100 YR FLOODPLAIN

APPROX. LOCATION OF
EX. ABANDONED
12" CASH WATER LINE

25' LANDSCAPE BUFFER

INSTALL
1-8" VALVE
1-16"x8" TEE
1-16" BUTTERFLY VALVE

INSTALL
1-8" VALVE
1-16"x8" TEE

INSTALL
1-16"X6" TEE
1-6" VALVE
1-FIRE HYDRANT
1-16" BUTTERFLY VALVE

EROSION HAZARD SETBACK

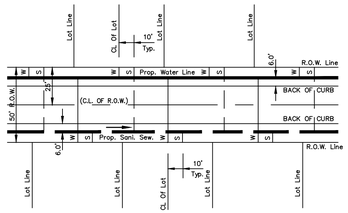
STATE HIGHWAY 276

INSTALL 16" WATER
(SEE OFFSITE WATER PLANS
IN THIS PLAN SET)

1 2 3 4 5 6 7 8

LEGEND

- PROP. 8" WATER LINE
- PROP. WATER SERVICE LINE
- PROP. FIRE HYDRANT ASSEMBLY
- PROP. VALVE
- PROP. PLUG
- PROP. 8" SANITARY SEWER LINE
- PROP. SANITARY SEWER SERVICE LINE
- PROP. SANITARY SEWER MANHOLE
- PROP. CLEANOUT
- PROP. PLUG



TYPICAL WATER & SEWER DETAIL
N.T.S.

tnp

60 30 0 60

SCALE IN FEET
1" = 60'

NOTE:
LOTS SHALL BE STUBBED FOR FUTURE CONNECTION TO SEWER MAIN IN STREET, LOTS SHALL BE ON SEPTIC UNTIL FUTURE CONNECTION TO REGIONAL SYSTEM CAN OCCUR.

RECORD DRAWINGS

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GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER

4/5/2023

scale	
when bar is 1 inch long	
horiz	1"=60'
vert	N/A
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
WATER AND SANITARY SEWER PLAN SHEET 1 OF 2

tnp project SBD20370
sheet 23 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-WSS.dwg at Apr 05, 2023-8:35am by cslown

FALCON LAKE DR.
FUTURE PHASE
SALT LAKE DR.
RAINY LAKE RD.
ROCK LAKE RD.
TWIN LAKES BLVD.
BEAR LAKE DR.
CANYON LAKE RD.
FUTURE PHASE
SALT LAKE DR.

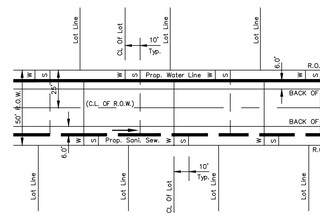
INSTALL 1–8" PLUG
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
INSTALL 1–8" PLUG
2+24.76 SS LINE E INSTALL 1–8" PLUG
SS LINE E
INSTALL 8" PVC SEWER
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
1+00.00 SS LINE D INSTALL 1–8" PLUG FOR FUTURE CONNECTION
SS LINE D
INSTALL 8" PVC SEWER
INSTALL VERTICAL BENDS. RE: VERTICAL BEND NOTE ON THIS SHEET.
INSTALL 8" PVC WATER
INSTALL VERTICAL BENDS. RE: VERTICAL BEND NOTE ON THIS SHEET.
INSTALL 1–8" TEE 1–8" VALVE 1–8" PLUG
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
INSTALL 1–8"x8" CROSS 2–8" VALVE
4+23.17 SS LINE D 1+00.00 SS LINE E CONSTR. 5' DIA MH RIM 553.01
1+73.21 SS LINE F INSTALL 1–8" PLUG
SS LINE F
INSTALL 8" PVC SEWER
INSTALL VERTICAL BENDS. RE: VERTICAL BEND NOTE ON THIS SHEET.
INSTALL 1–8" TEE 1–8" VALVE 1–8" PLUG
Δ=2°02'17" R=4971.14 L=176.829' TAN=88.42
SS LINE D
Δ=0°53'42" R=5024.89 L=78.483' TAN=39.24
11+70.86 SS LINE C CONSTR. SEWER CLEANOUT RIM 552.62
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
INSTALL VERTICAL BENDS. RE: VERTICAL BEND NOTE ON THIS SHEET.
6+78.48 SS LINE D 1+00.00 SS LINE F CONSTR. 5' DIA MH RIM 558.54
INSTALL 8" PVC SEWER
INSTALL 8" PVC WATER
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
8+92.03 SS LINE D INSTALL 1–8" PLUG
Δ=17°06'00" R=479.50 L=143.107' TAN=72.09
9+35.90 SS LINE C CONSTR. 4' DIA MH RIM 551.02
Δ=46°39'07" R=820.50 L=668.076' TAN=353.80
INSTALL 1–45° BEND
Δ=33°42'50" R=530.99 L=312.446' TAN=160.89
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
8+21.59 SS LINE D CONSTR. 5' DIA MH RIM 565.92
SS LINE C
INSTALL 8" PVC SEWER
4+91.19 SS LINE C CONSTR. 4' DIA MH RIM 546.79
Δ=46°39'07" R=820.50 L=668.076' TAN=353.80
INSTALL VERTICAL BENDS. RE: VERTICAL BEND NOTE ON THIS SHEET.
Δ=47°09'33" R=145.50 L=119.759' TAN=63.51
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
INSTALL 1–45° BEND
3+71.43 SS LINE C CONSTR. 4' DIA MH RIM 546.85
INSTALL 8" PVC WATER
SS LINE C
INSTALL 8" PVC SEWER
INSTALL 1–8" CROSS 3–8" VALVES
INSTALL VERTICAL BENDS. RE: VERTICAL BEND NOTE ON THIS SHEET.
3+23.54 SS LINE A 1+00.00 SS LINE C CONSTR. 5' DIA MH RIM 547.91
INSTALL 1–8"X6" TEE 1–6" VALVE 1–F.H.
INSTALL 1–8" PLUG
1+00.00 SS LINE A INSTALL 1–10" PLUG
44 LF 4" IRRIGATION SLEEVE
2" IRRIGATION SERVICE
12+58.55 SS LINE A CONSTR. 4' DIA MH RIM 567.22
Δ=26°08'32" R=738.00 L=336.724' TAN=171.34
SS LINE A
INSTALL 8" PVC SEWER
INSTALL VERTICAL BENDS. RE: VERTICAL BEND NOTE ON THIS SHEET.
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
INSTALL 1–8" VALVE 1–8"X6" TEE 1–6" VALVE 1–F.H.
Δ=21°11'04" R=1504.18 L=556.155' TAN=281.29
Δ=18°37'53" R=1545.44 L=502.546' TAN=253.51
Δ=30°34'00" R=682.00 L=353.169' TAN=180.90
Δ=10°50'08" R=1505.90 L=284.787' TAN=142.82
INSTALL VERTICAL BENDS. RE: VERTICAL BEND NOTE ON THIS SHEET.
9+05.38 SS LINE A CONSTR. 4' DIA MH INSTALL STUB AND PLUG TO R.O.W. AT 0.5% SLOPE FOR FUTURE CONNECTION RIM 562.68
8+25.37 SS LINE A CONSTR. 4' DIA MH RIM 562.22
5+50.00 SS LINE A CONSTR. 4' DIA MH RIM 553.20
SS LINE A
INSTALL 10" PVC SEWER

100 YR FLOODPLAIN
EROSION HAZARD SETBACK

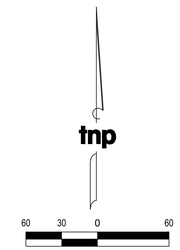
LEGEND

- PROP. 8" WATER LINE
- PROP. WATER SERVICE LINE
- PROP. FIRE HYDRANT ASSEMBLY
- PROP. VALVE
- PROP. PLUG
- PROP. 8" SANITARY SEWER LINE
- PROP. SANITARY SEWER SERVICE LINE
- PROP. SANITARY SEWER MANHOLE
- PROP. CLEANOUT
- PROP. PLUG

WATER MAIN VERTICAL BEND NOTE:
INSTALL 45° VERTICAL BENDS 10' ON EACH SIDE OF STORM SEWER CROSSING. CONTRACTOR TO INSTALL WATERLINE 2' BELOW STORM SEWER AND 2' ABOVE SANITARY SEWER AT CROSSING LOCATIONS.



TYPICAL WATER & SEWER DETAIL
NT.S.



NOTE:
LOTS SHALL BE STUBBED FOR FUTURE CONNECTION TO SEWER MAIN IN STREET, LOTS SHALL BE ON SEPTIC UNTIL FUTURE CONNECTION TO REGIONAL SYSTEM CAN OCCUR.

MATCH LINE - SHEET 23

RECORD DRAWINGS

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STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

scale when bar is 1 inch long
horiz 1"=60'
vert N/A
APR 2023

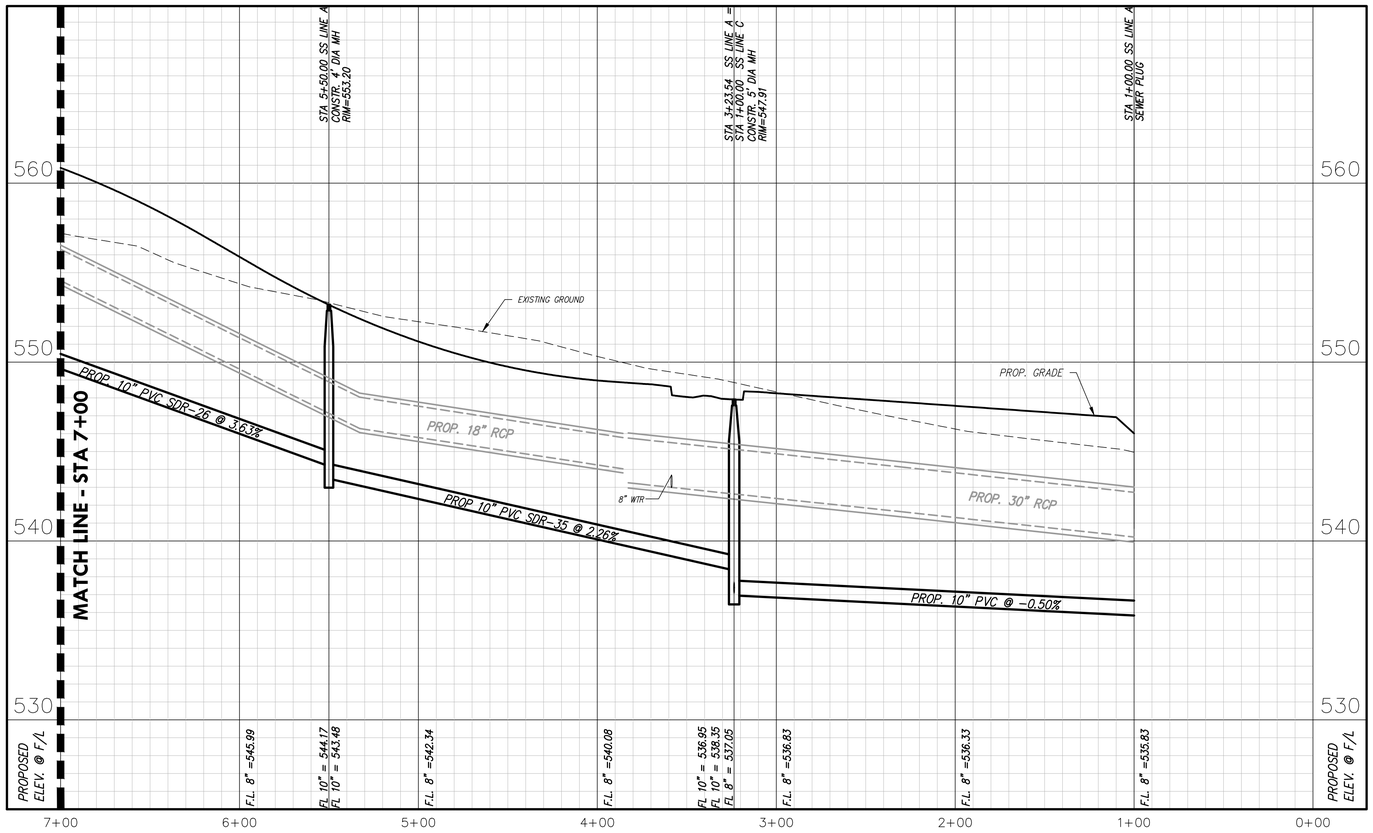
DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
WATER AND SANITARY SEWER PLAN SHEET 2 OF 2

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sheet 24 of 51

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SS LINE A



CAUTION !!! CAUTION !!! CAUTION !!!

EXISTING UTILITIES AND UNDERGROUND FACILITIES INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY VARIOUS OWNERS OF THE FACILITIES. THE ENGINEER DOES NOT ACCEPT THE RESPONSIBILITY FOR THE UTILITY LOCATIONS SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY BOTH HORIZONTALLY AND VERTICALLY THE LOCATION OF ALL EXISTING UTILITIES AND UNDERGROUND FACILITIES PRIOR TO CONSTRUCTION, TO TAKE NECESSARY PRECAUTIONS IN ORDER TO PROTECT ALL FACILITIES ENCOUNTERED, AND TO NOTIFY THE ENGINEER PROMPTLY OF ALL CONFLICTS OF THE WORK WITH EXISTING FACILITIES. THE CONTRACTOR SHALL PRESERVE AND PROTECT ALL EXISTING UTILITIES FROM DAMAGE DURING CONSTRUCTION. ANY DAMAGE BY THE CONTRACTOR TO EXISTING UTILITIES SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE.

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STATE OF TEXAS
CAMERON A. SLOWN
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LICENSED PROFESSIONAL ENGINEER

4/5/2023

scale
when bar is 1 inch long
horiz 1"=40'
vert 1"=4'
APR 2023

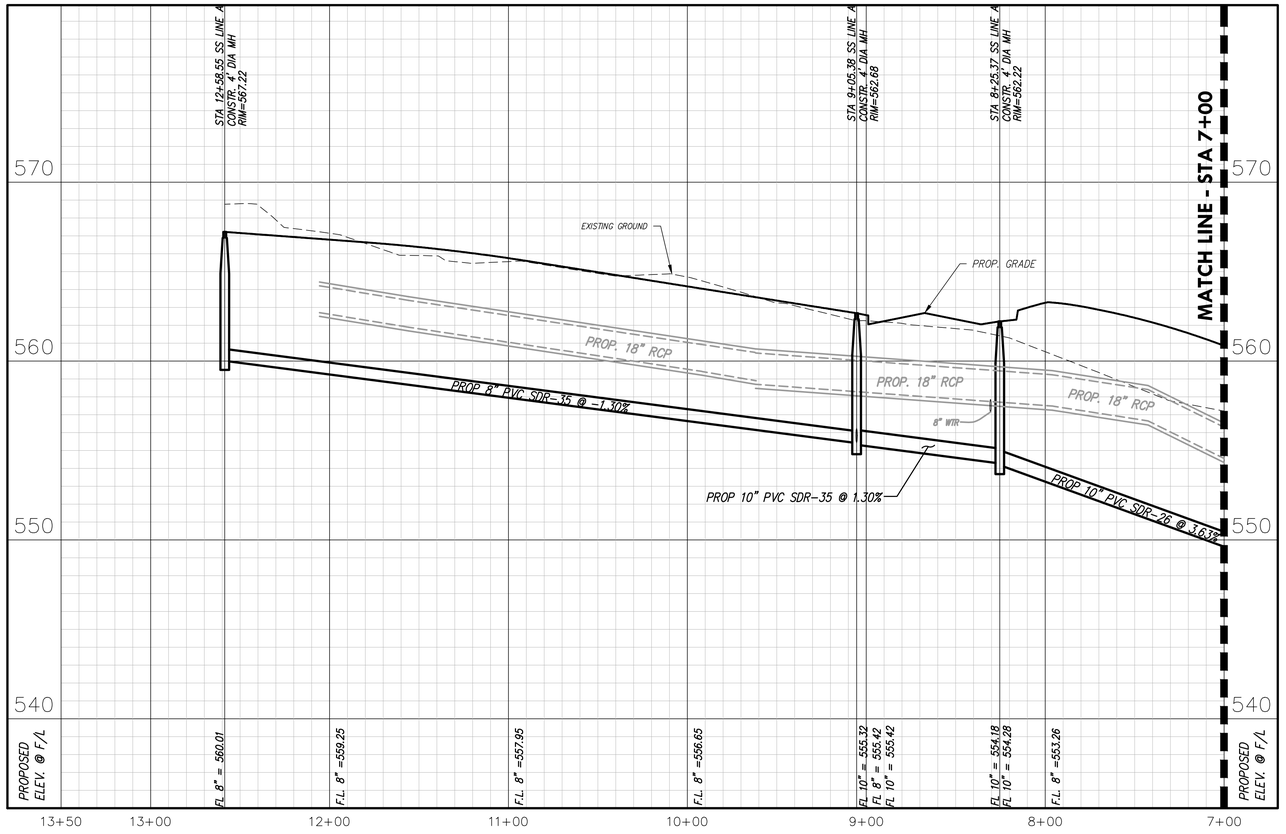
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Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
SANITARY SEWER PROFILE - LINE A SHEET 1 OF 2

tnp project SBD20370
sheet 25 of 51

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SS LINE A



CAUTION !!! CAUTION !!! CAUTION !!!

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STATE OF TEXAS — CAMERON A. SLOWN — 106317 — LICENSED PROFESSIONAL ENGINEER

4/5/2023

scale	
when bar is 1 inch long	
horiz	1"=40'
vert	1"=4'
APR 2023	

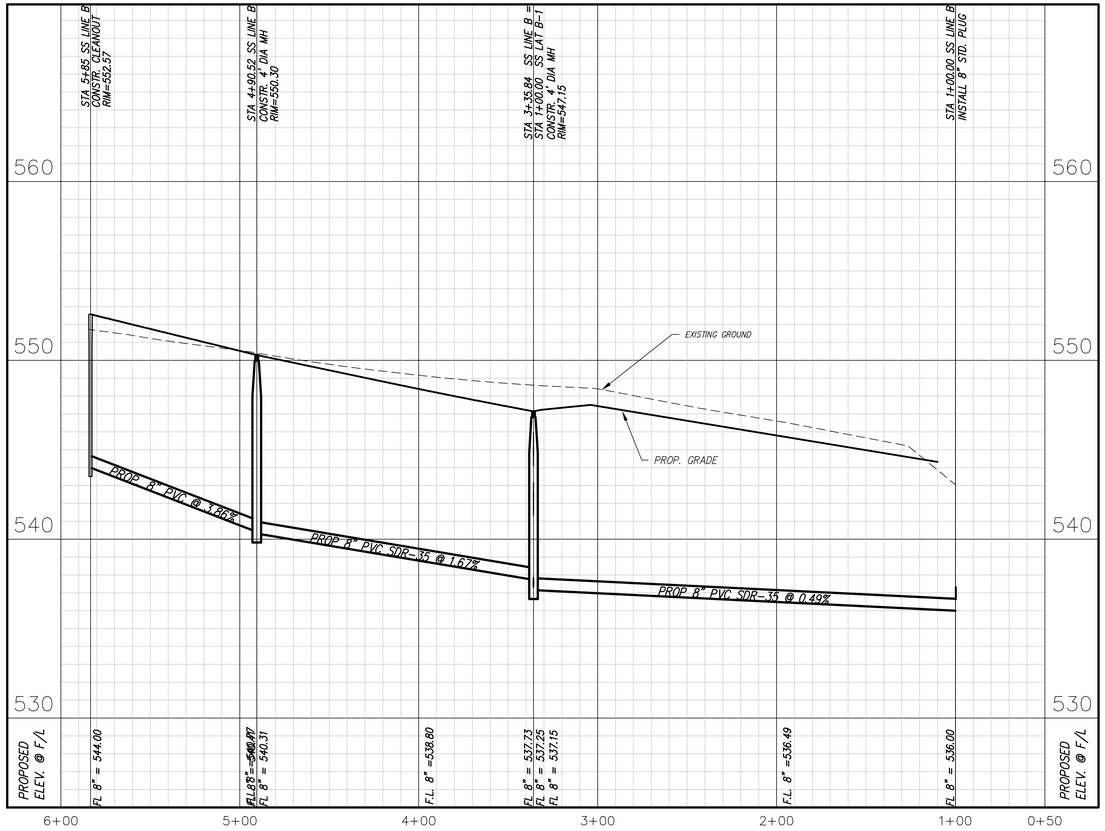
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15400 KNOLL TRAIL DRIVE, SUITE 230
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PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
SANITARY SEWER PROFILE - LINE A SHEET 2 OF 2

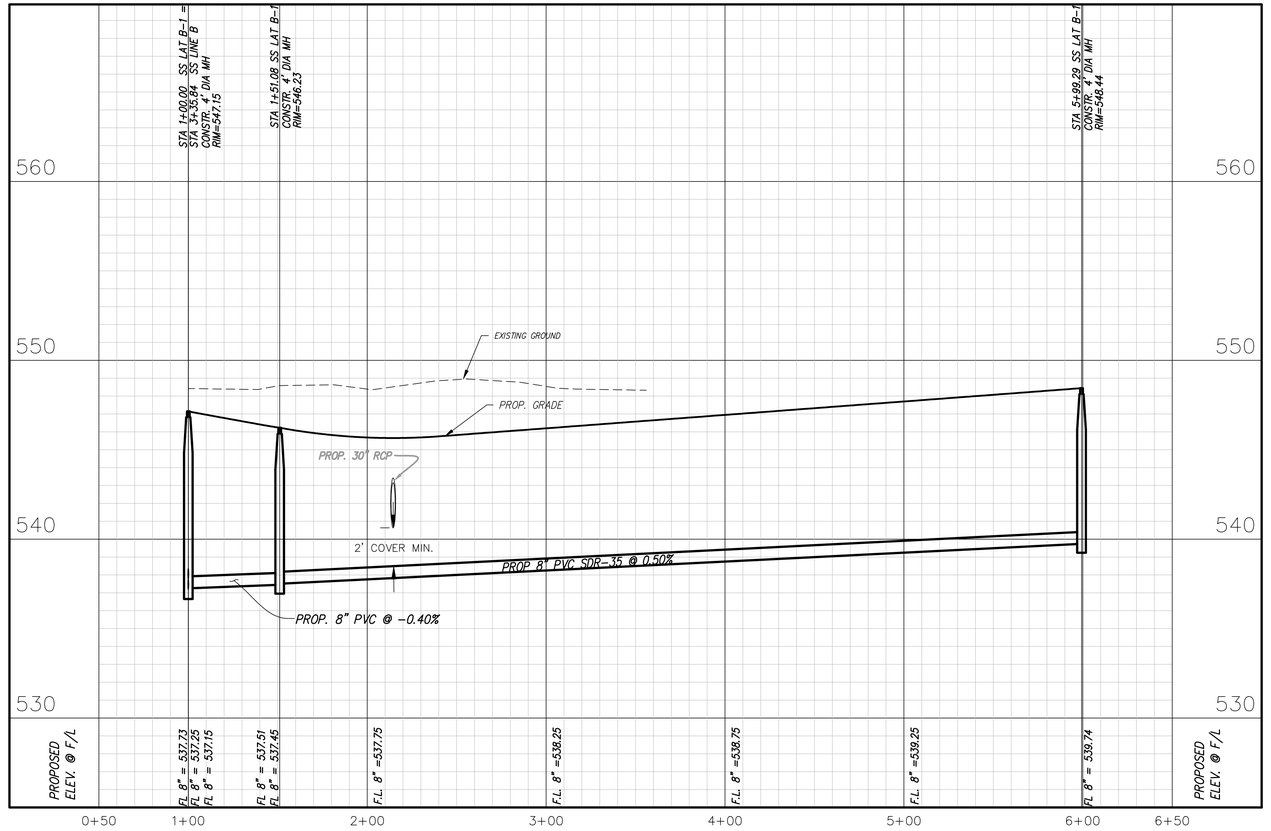
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sheet 26 of 51

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SS LINE B



SS LAT B-1



CAUTION !!! **CAUTION !!!** **CAUTION !!!**

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RECORD DRAWINGS

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www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

scale
when bar is 1 inch long
horiz 1"=40'
vert 1"=4'
APR 2023

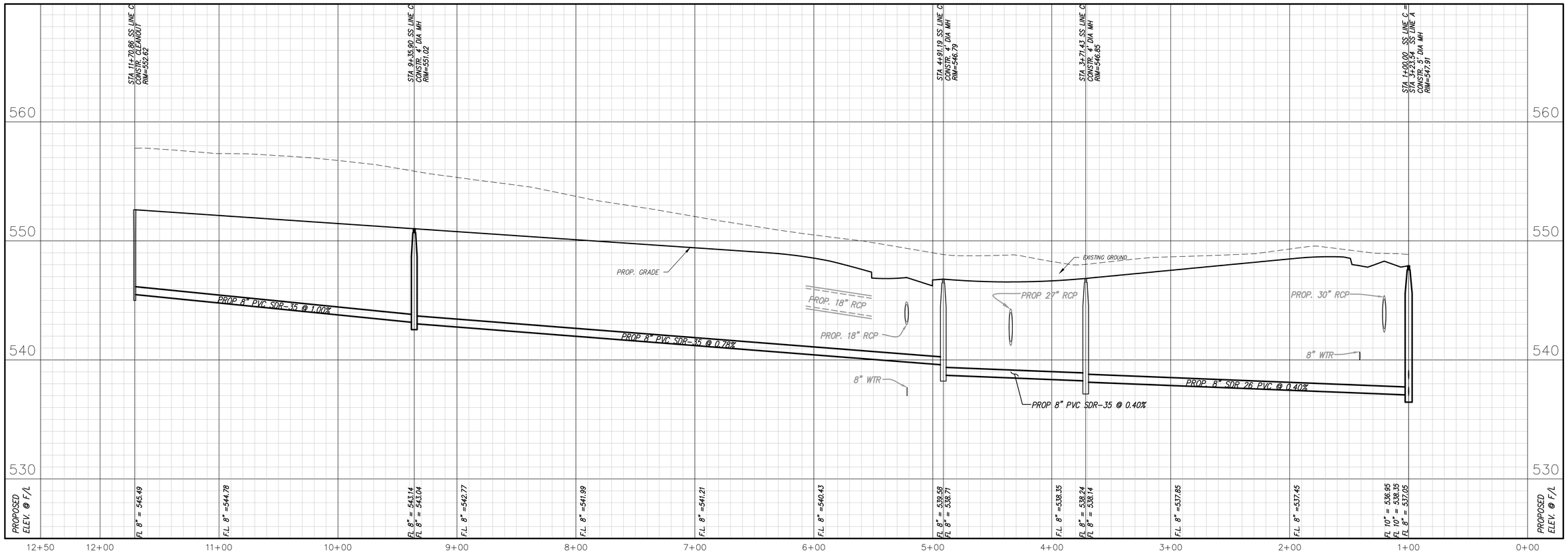
DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
SANITARY SEWER PROFILE - LINE B & B-1

tnp project SBD20370
sheet 27 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-SS-PROF.dwg at Apr 05, 2023-1:12am by cslown

SS LINE C



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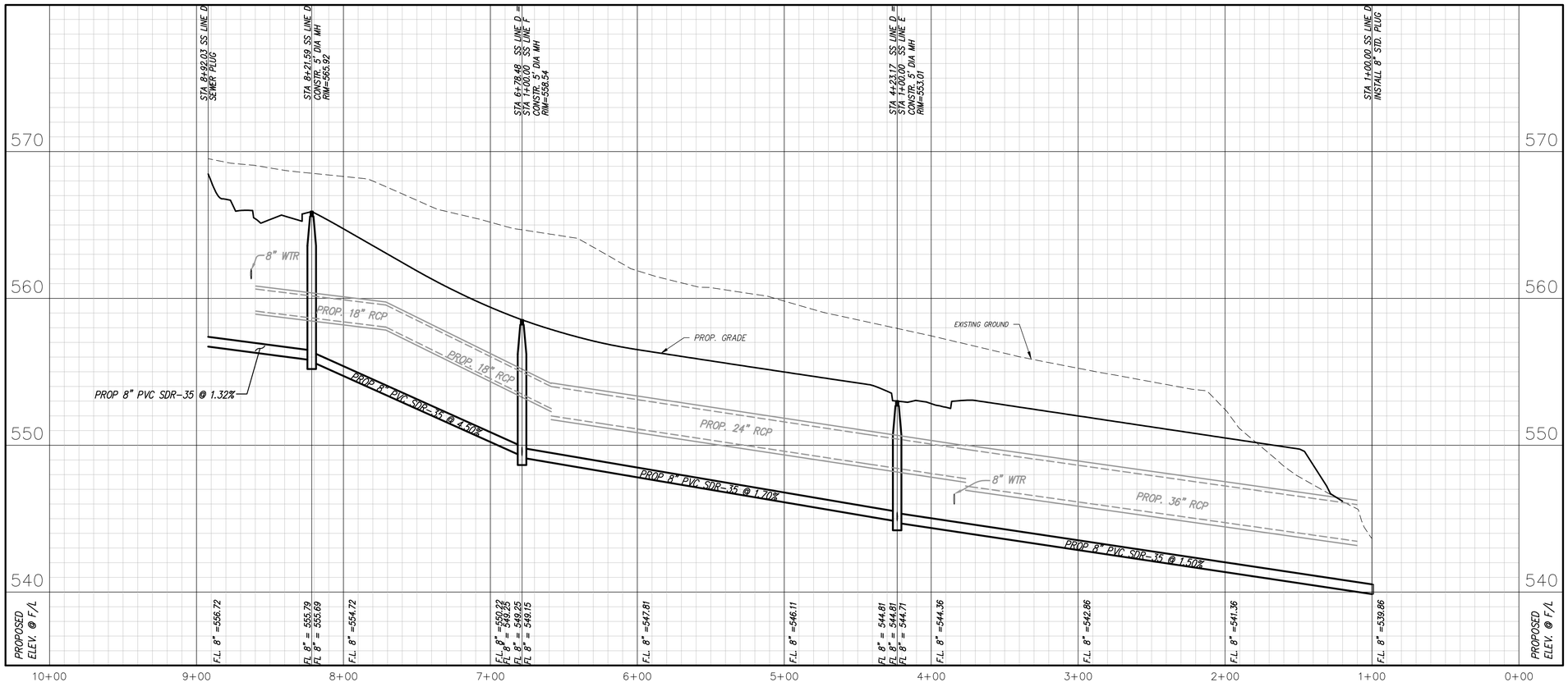
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Improvements for
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SANITARY SEWER PROFILE - LINE C

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sheet 28 of 51

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SS LINE D



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STATE OF TEXAS
CAMERON A. SLOWN
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LICENSED
PROFESSIONAL ENGINEER

4/5/2023

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APR 2023

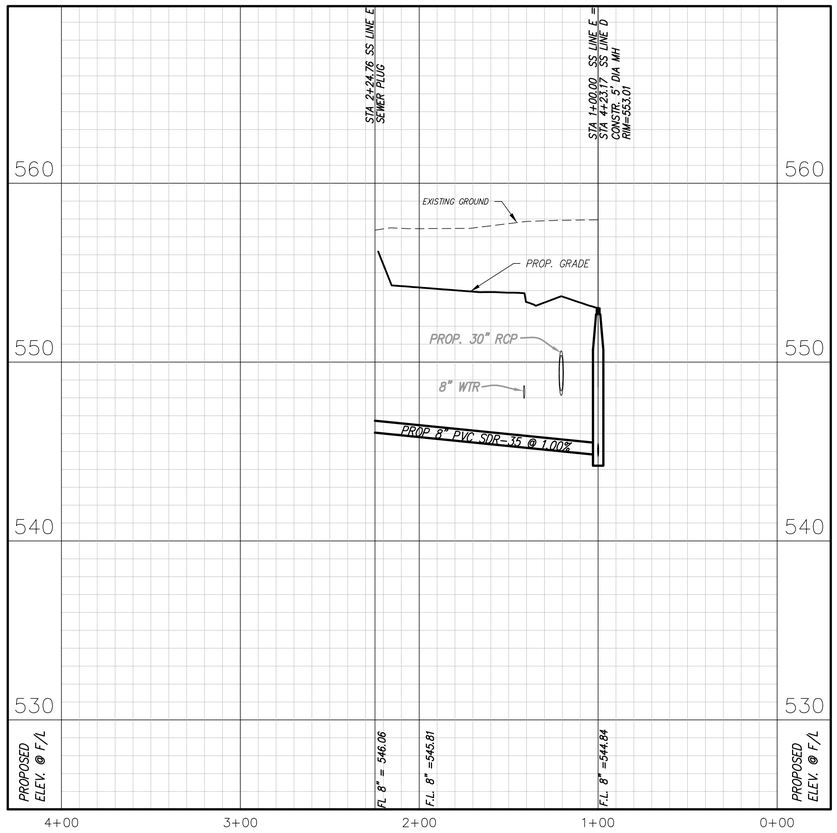
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SANITARY SEWER PROFILE - LINE D

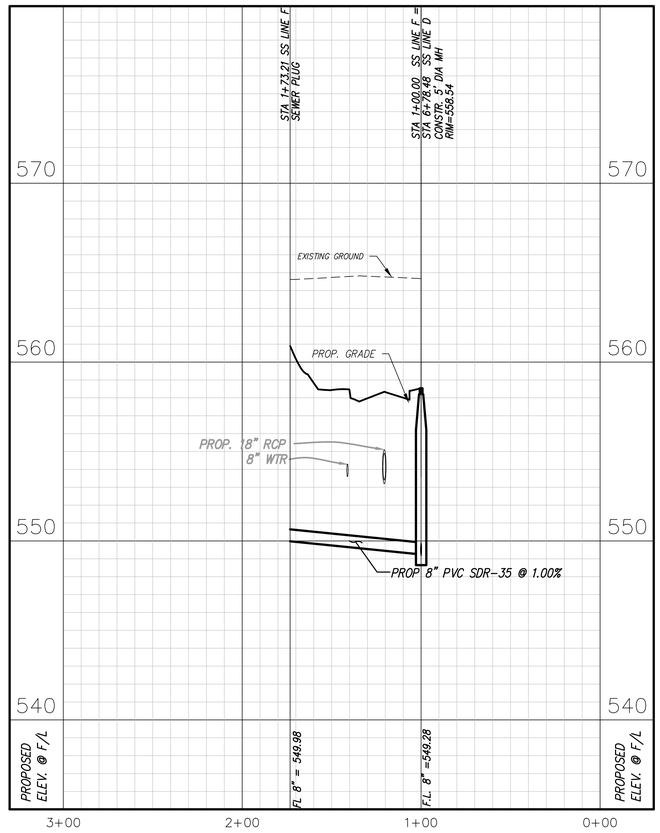
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sheet 29 of 51

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SS LINE E



SS LINE F



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STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED CIVIL ENGINEER
4/5/2023

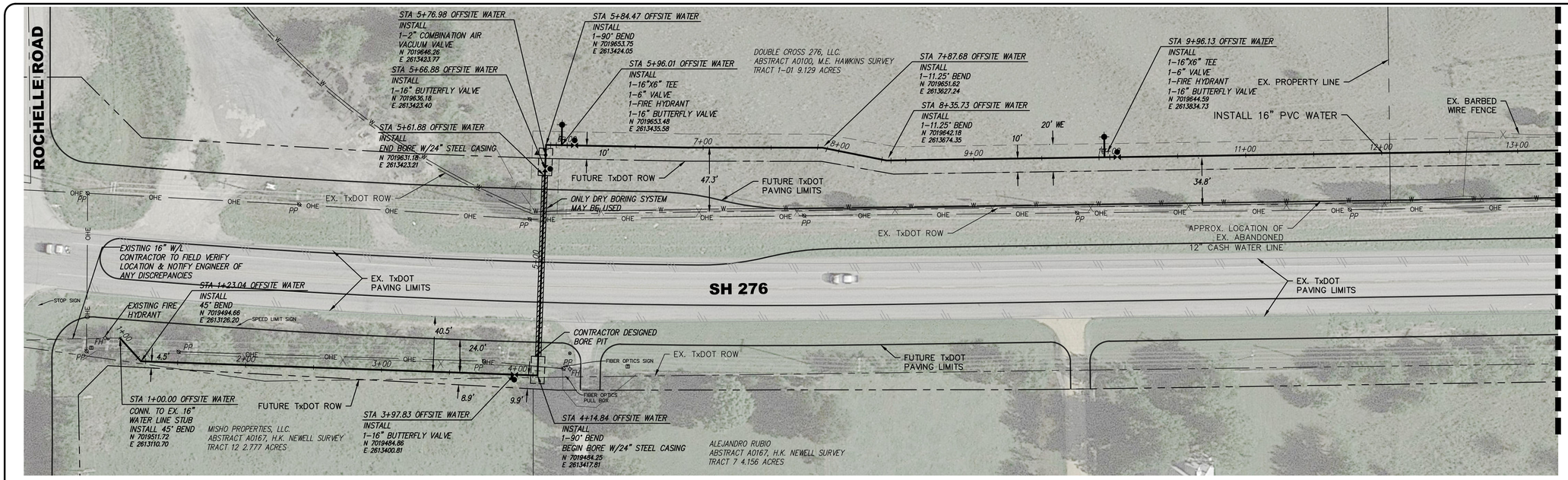
scale
when bar is 1 inch long
horiz 1"=40'
vert 1"=4'
APR 2023

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SANITARY SEWER PROFILE - LINES E & F

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sheet 30 of 51

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NOTE:
– DEVELOPER SHALL COORDINATE REMOVAL AND REPLACEMENT OF FENCE LINE DURING CONSTRUCTION.
– CONTRACTOR TO FIELD VERIFY LOCATION OF EX. BLACKLAND WATER LINE PRIOR TO CONSTRUCTION OF 16" WATER LINE ALONG SH 276

tnp

40 20 0 40
SCALE IN FEET
1" = 40'

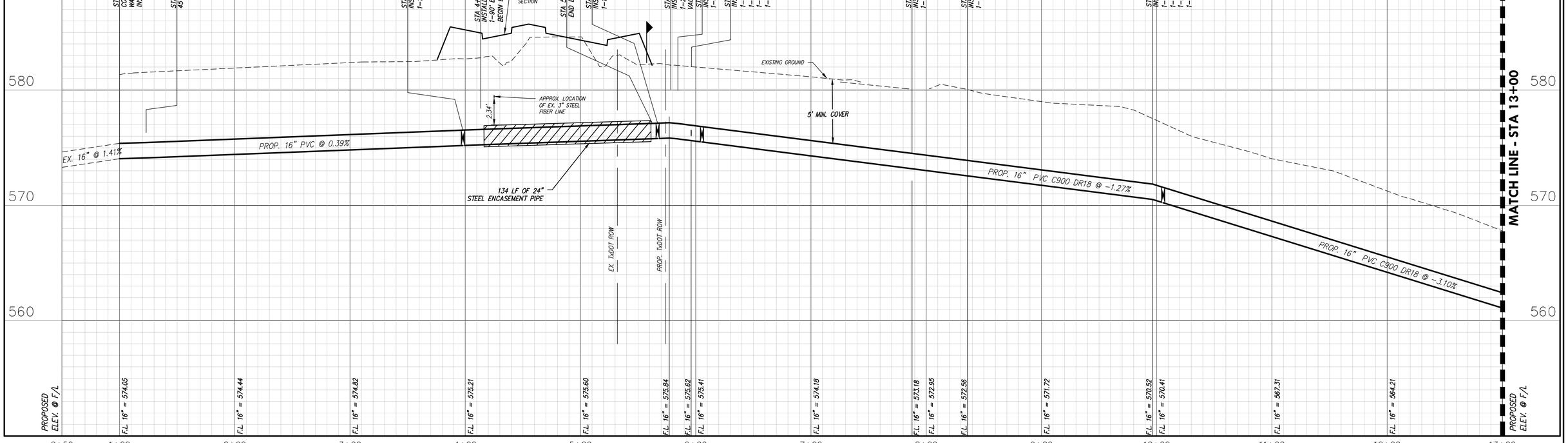
LEGEND

- PROP. 16" WATER LINE
- PROP. 8" WATER LINE
- PROP. FIRE HYDRANT ASSEMBLY
- PROP. VALVE

CAUTION !!! CAUTION !!! CAUTION !!!

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OFFSITE WATER



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STATE OF TEXAS · 106317 · CAMERON A. SLOWN · LICENSED PROFESSIONAL ENGINEER

4/5/2023

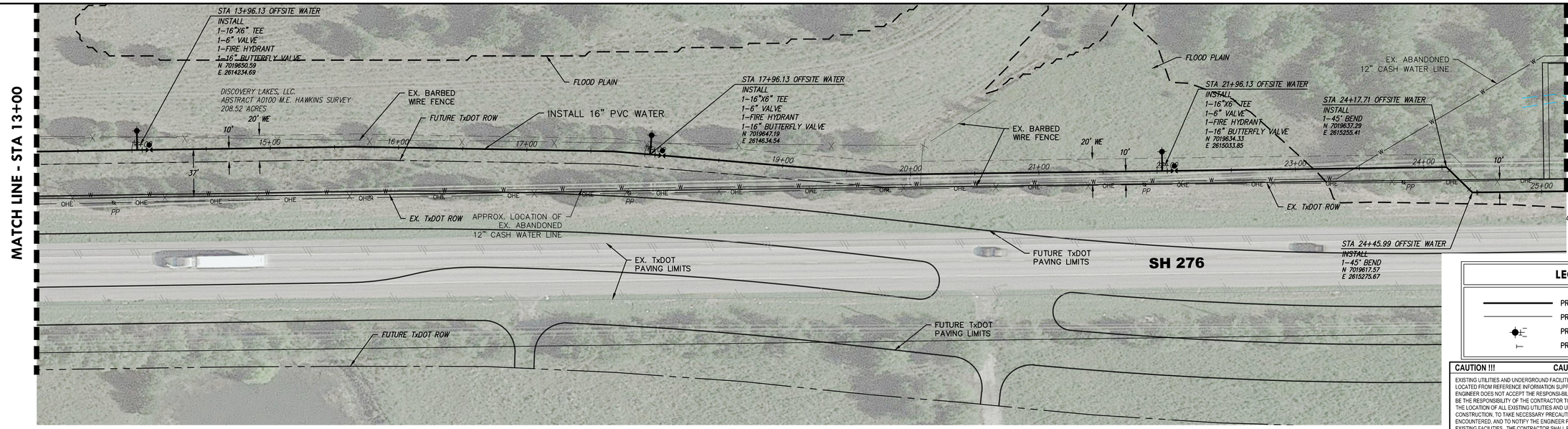
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when bar is 1 inch long	
horiz	1"=40'
vert	1"=4'
APR 2023	

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Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
OFFSITE WATER LINE BEGIN - STA. 13+00

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sheet 31 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-OFFSITE WTR.dwg at Apr 05, 2023-8:48am by cslown



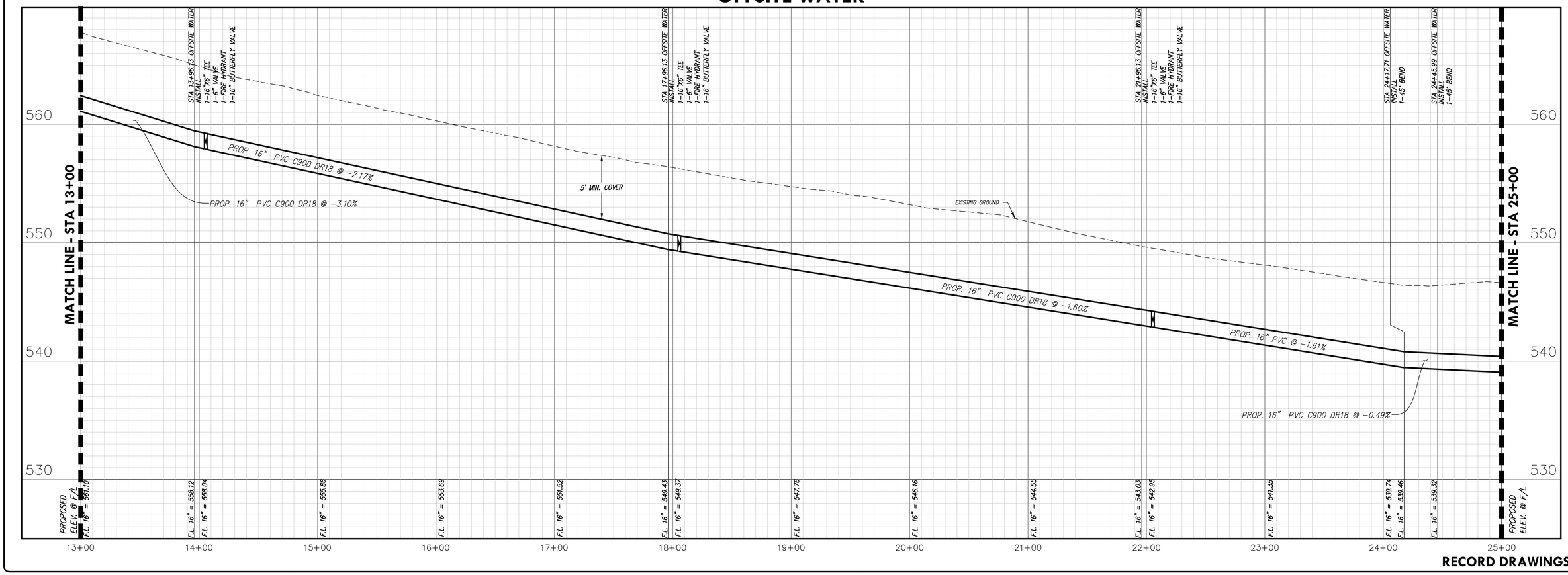
LEGEND

- PROP. 16" WATER LINE
- PROP. 8" WATER LINE
- PROP. FIRE HYDRANT ASSEMBLY
- PROP. VALVE

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OFFSITE WATER



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STATE OF TEXAS — CAMERON A. SLOWN — 106317 — LICENSED PROFESSIONAL ENGINEER

4/5/2023

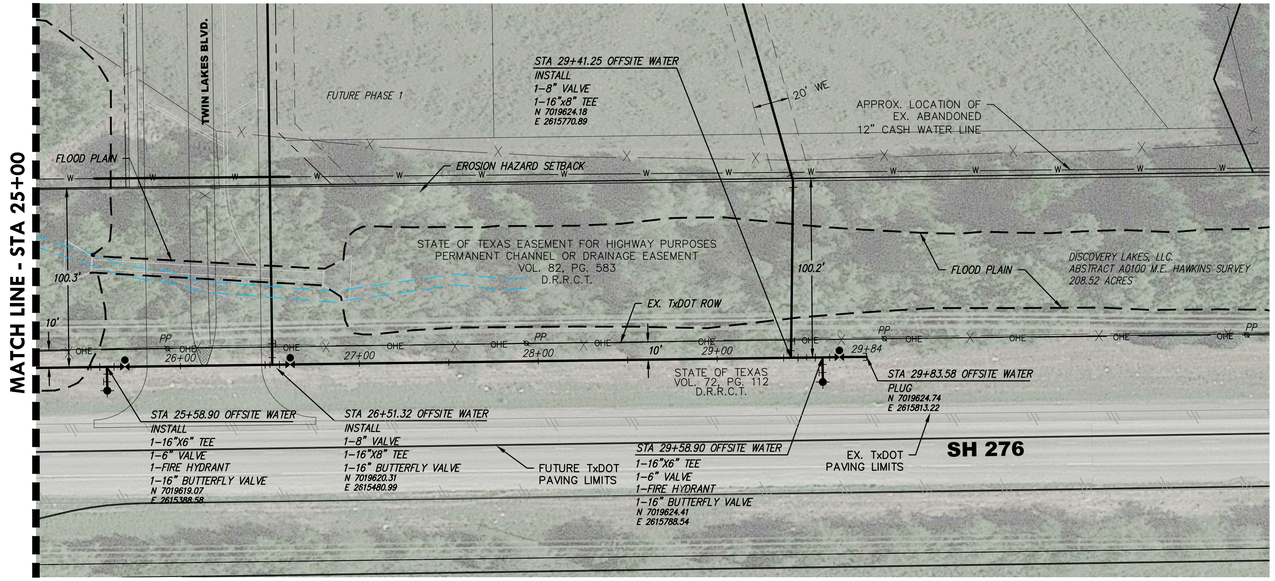
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when bar is 1 inch long	
horiz	1"=40'
vert	1"=4'
APR 2023	

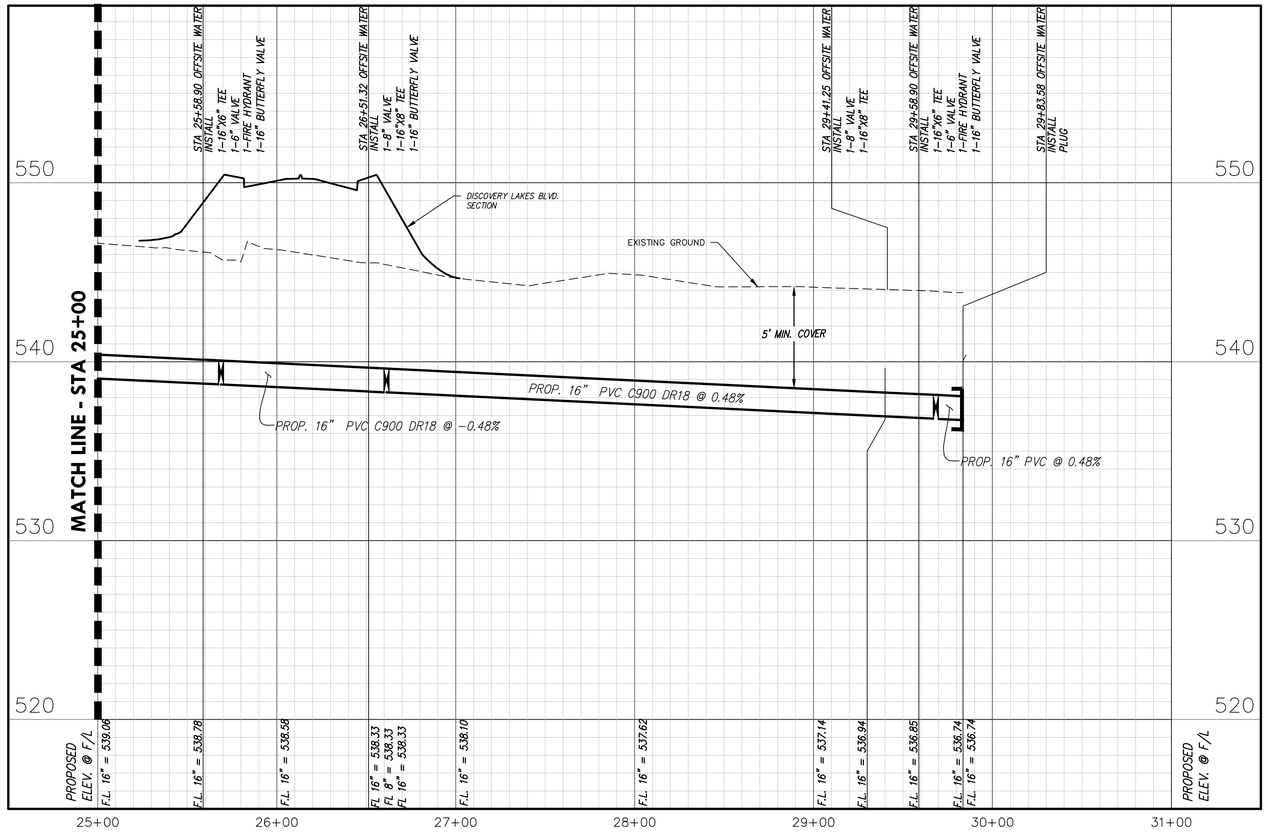
DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

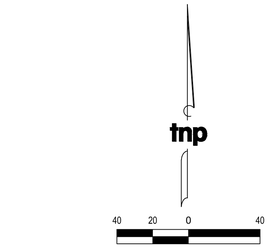
Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
OFFSITE WATER LINE STA. 13+00 - 25+00

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sheet 32 of 51

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LEGEND

- PROP. 16" WATER LINE
- PROP. 8" WATER LINE
- PROP. FIRE HYDRANT ASSEMBLY
- PROP. VALVE

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STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED
PROFESSIONAL ENGINEER
4/5/2023

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vert 1"=4'
APR 2023

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Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
OFFSITE WATER LINE STA. 25+00 - END

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sheet 33 of 51

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FUTURE PHASE

FLOOD PLAIN

EROSION HAZARD SET BACK

ROCK CHECK DAM

ROCK CHECK DAM

ROCK CHECK DAM

TREE LINE

FUTURE PHASE

SILT FENCE

CURLEX BLANKET

SALT LAKE DR.

APPROX. UTILITY SPOILS PLACEMENT AREA

RAINY LAKE RD.

SALT LAKE DR.

CANYON LAKE RD.

ROCK CHECK DAM

FUTURE PHASE

INLET PROTECTION

SILT FENCE

FALCON LAKE DR.

INLET PROTECTION

BEAR LAKE DR.

FLOOD PLAIN

ROCK LAKE RD.

CURLEX BLANKET

ROCK CHECK DAM

TREE TO BE REMOVE

TWIN LAKES BLVD.

INLET PROTECTION

SILT FENCE

SILT FENCE

EROSION HAZARD SET BACK

ALTERNATE CONSTRUCTION ENTRANCE ROUTE FROM ROCHELLE ROAD. RE: SHEET 10.1 OF THIS PLAN SET FOR FULL ROUTE TO ROCHELLE ROAD.

CANYON LAKE RD.

CURLEX BLANKET

TREE LINE

WATERS OF THE U.S. PER REPORT PREPARED BY IES ON 5/11/21

TWIN LAKES BLVD.

STATE HIGHWAY 276

ROCK CHECK DAM

TREE LINE

INSTALL CONSTRUCTION ENTRANCE UPON RECEIPT OF TxDOT PERMIT FOR DRIVE CONNECTION TO SH 276. ALTERNATE CONSTRUCTION ENTRANCE TO BE PROVIDED AT SECONDARY DRIVE ENTRANCE AT ROCHELLE ROAD. RE: SHEET 10.1 OF THIS PLAN SET FOR LOCATION.

tnp

100 50 0 100

SCALE IN FEET
1" = 100'

LEGEND

- PROP. ROCK RIP RAP
- PROP. ROCK CHECK DAM
- PROP. SILT FENCE
- PROP. INLET PROTECTION
- PROP. CURLEX BLANKET
- FLOW ARROWS
- EX. CONTOURS
- FLOOD PLAIN

POST-CONSTRUCTION EROSION CONTROL
1. SEED DENUDED AREAS
2. INSTALL SILT FENCE ON INLETS

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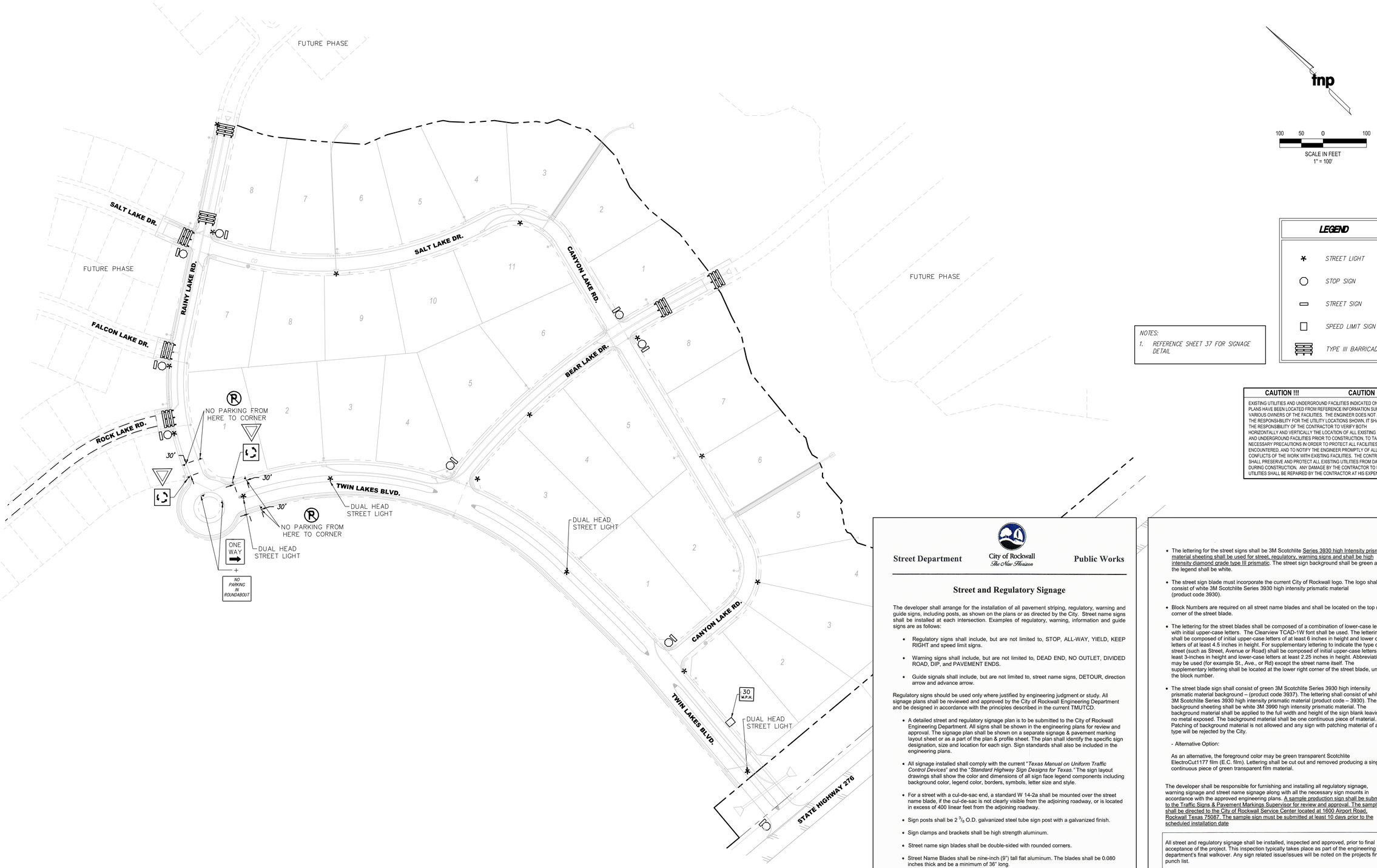
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when bar is 1 inch long	
horiz	1"=100'
vert	N/A
APR 2023	

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Improvements for
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EROSION CONTROL PLAN

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SBD20370	
sheet	34
of	51

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100 50 0 100

SCALE IN FEET
1" = 100'

LEGEND

- STREET LIGHT
- STOP SIGN
- STREET SIGN
- SPEED LIMIT SIGN
- TYPE III BARRICADE

NOTES:
1. REFERENCE SHEET 37 FOR SIGNAGE DETAIL

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Street Department — City of Rockwall, *The New Horizon* — **Public Works**

Street and Regulatory Signage

The developer shall arrange for the installation of all pavement striping, regulatory, warning and guide signs, including posts, as shown on the plans or as directed by the City. Street name signs shall be installed at each intersection. Examples of regulatory, warning, information and guide signs are as follows:

- Regulatory signs shall include, but are not limited to, STOP, ALL-WAY, YIELD, KEEP RIGHT and speed limit signs.
- Warning signs shall include, but are not limited to, DEAD END, NO OUTLET, DIVIDED ROAD, DIP, and PAVEMENT ENDS.
- Guide signals shall include, but are not limited to, street name signs, DETOUR, direction arrow and advance arrow.

Regulatory signs should be used only where justified by engineering judgment or study. All signage plans shall be reviewed and approved by the City of Rockwall Engineering Department and be designed in accordance with the principles described in the current TMUTCD.

- A detailed street and regulatory signage plan is to be submitted to the City of Rockwall Engineering Department. All signs shall be shown in the engineering plans for review and approval. The signage plan shall be shown on a separate signage & pavement marking layout sheet or as a part of the plan & profile sheet. The plan shall identify the specific sign designation, size and location for each sign. Sign standards shall also be included in the engineering plans.
- All signage installed shall comply with the current "*Texas Manual on Uniform Traffic Control Devices*" and the "*Standard Highway Sign Designs for Texas.*" The sign layout drawings shall show the color and dimensions of all sign face legend components including background color, legend color, borders, symbols, letter size and style.
- For a street with a cul-de-sac end, a standard W 14-2a shall be mounted over the street name blade, if the cul-de-sac is not clearly visible from the adjoining roadway, or is located in excess of 400 linear feet from the adjoining roadway.
- Sign posts shall be 2 3/8 O.D. galvanized steel tube sign post with a galvanized finish.
- Sign clamps and brackets shall be high strength aluminum.
- Street name sign blades shall be double-sided with rounded corners.
- Street Name Blades shall be nine-inch (9") tall flat aluminum. The blades shall be 0.080 inches thick and be a minimum of 36" long.

- The lettering for the street signs shall be 3M Scotchlite Series 3930 high Intensity prismatic material sheeting shall be used for street, regulatory, warning signs and shall be high intensity diamond grade type III prismatic. The street sign background shall be green and the legend shall be white.
- The street sign blade must incorporate the current City of Rockwall logo. The logo shall consist of white 3M Scotchlite Series 3930 high intensity prismatic material (product code 3930).
- Block Numbers are required on all street name blades and shall be located on the top right corner of the street blade.
- The lettering for the street blades shall be composed of a combination of lower-case letters with initial upper-case letters. The Clearview TCAD-1W font shall be used. The lettering shall be composed of initial upper-case letters of at least 6 inches in height and lower case letters of at least 4.5 inches in height. For supplementary lettering to indicate the type of street (such as Street, Avenue or Road) shall be composed of initial upper-case letters at least 3-inches in height and lower-case letters at least 2.25 inches in height. Abbreviations may be used (for example St., Ave., or Rd) except the street name itself. The supplementary lettering shall be located at the lower right corner of the street blade, under the block number.
- The street blade sign shall consist of green 3M Scotchlite Series 3930 high intensity prismatic material background – (product code 3937). The lettering shall consist of white 3M Scotchlite Series 3930 high intensity prismatic material (product code – 3930). The background sheeting shall be white 3M 3990 high intensity prismatic material. The background material shall be applied to the full width and height of the sign blank leaving no metal exposed. The background material shall be one continuous piece of material. Patching of background material is not allowed and any sign with patching material of any type will be rejected by the City.

- Alternative Option:

As an alternative, the foreground color may be green transparent Scotchlite ElectroCut1177 film (E.C. film). Lettering shall be cut out and removed producing a single continuous piece of green transparent film material.

The developer shall be responsible for furnishing and installing all regulatory signage, warning signage and street name signage along with all the necessary sign mounts in accordance with the approved engineering plans. A sample production sign shall be submitted to the Traffic Signs & Pavement Markings Supervisor for review and approval. The sample shall be directed to the City of Rockwall Service Center located at 1600 Airport Road, Rockwall Texas 75087. The sample sign must be submitted at least 10 days prior to the scheduled installation date

All street and regulatory signage shall be installed, inspected and approved, prior to final acceptance of the project. This inspection typically takes place as part of the engineering department's final walkover. Any sign related issue/issues will be noted on the projects final punch list.

RECORD DRAWINGS

no.	revision	by	date

tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS — CAMERON A. SLOWN — 106317 — LICENSED PROFESSIONAL ENGINEER

4/5/2023

scale
when bar is 1 inch long
horiz 1"=100'
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
SIGNAGE & LIGHTING PLAN

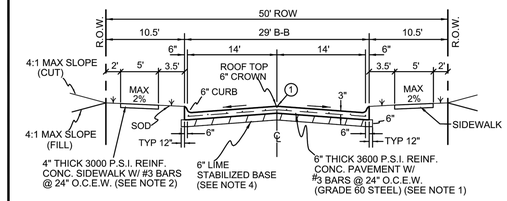
tnp project SBD20370
sheet 35 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-LIGHT&SIGNAGE.dwg at Apr 05, 2023-7:13am by cslown

GENERAL NOTES:

1. REINFORCED CONCRETE PAVEMENT:
   - A. ALL CURBS SHALL BE PLACED INTEGRAL WITH PAVEMENT UNLESS OTHERWISE APPROVED BY THE OWNER.
   - B. CURBS SHALL MEET THE SAME COMPRESSIVE STRENGTH AS SPECIFIED FOR THE PAVEMENT.
   - C. BAR LAPS SHALL BE 30 DIAMETERS.
   - D. REINFORCING BARS SHALL BE SUPPORTED BY CHAIRS OR OTHER DEVICES APPROVED BY THE OWNER.
2. SUBGRADE: (UNLESS OTHERWISE SPECIFIED BY OWNER)
   - A. SUBGRADE UNDER ALL PAVEMENTS SHALL BE STABILIZED TO A MINIMUM DEPTH OF SIX (6") INCHES WITH HYDRATEDLIME CEMENT. LABORATORY TESTS WILL BE PERFORMED TO DETERMINE THE AMOUNT OF LIME OR CEMENT TO USE.

PAVEMENT SYSTEMS	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 302,303
GENERAL NOTES		DATE: Mar. 2018 / STANDARD DRAWING NO.: R-2190



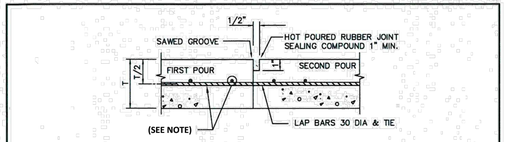
1 SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT

50' R.O.W. Residential Street
(Not to Scale)

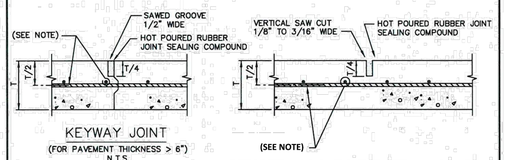
NOTES:

1. Street pavement cement content to be no less than 6 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.
4. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compacted to 95% standard density.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
LOCAL RESIDENTIAL STREET		DATE: AUG. '19 / DRAWING NO.: R-2033



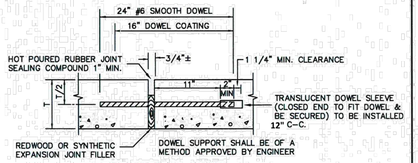
CONSTRUCTION JOINT
N.T.S.



KEYWAY JOINT
(FOR PAVEMENT THICKNESS > 6")
N.T.S.

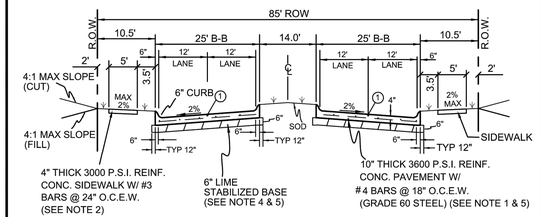
SAWED CONTRACTION JOINT
N.T.S.

NOTE:
REINFORCING SHALL BE - #3 BARS AT 24" FOR 6" THICK PAVEMENT AND LESS. #4 BARS AT 18" FOR 8" THICK PAVEMENT AND GREATER.



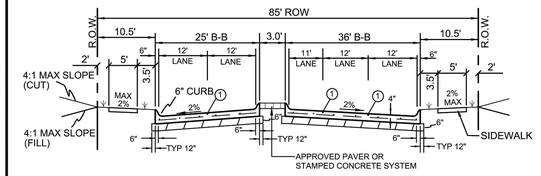
EXPANSION JOINT
(SPACED 600 FT. MAXIMUM; LOCATE AT STRUCTURES AND AT INTERSECTION P.C.'S & P.T.'S)
N.T.S.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 303.5.4.
JOINTS		DATE: Mar. 2018 / STANDARD DRAWING NO.: R-2050



1 SAWED LONGITUDINAL CONTRACTION, OR CONSTRUCTION JOINT

85' ROW – Minor 4 Lane Divided Arterial Regular Section
(Not to Scale)

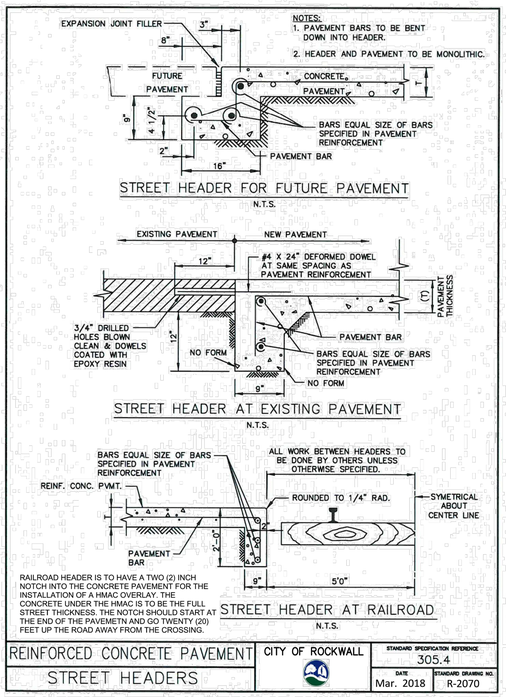


Left Turn Section
(Not to Scale)

NOTES:

1. Street pavement cement content to be no less than 6 sacks per cubic yard for machine placed and not less than 6.5 sacks per cubic yard for hand placed.
2. Sidewalk Cement content of not less than 5.5 sack per cubic yard.
3. No sand allowed under pavement or sidewalks.
4. Minimum lime content shall be 6% of dry weight of material (at least 27 lbs/SY) compacted to 95% standard density.
5. Paving Section design shall be based off the 30 year projected traffic volumes and geotechnical analysis/report.

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
(M4D) MINOR ARTERIAL DIVIDED 4–LANE		DATE: AUG. '15 / DRAWING NO.: R-2020

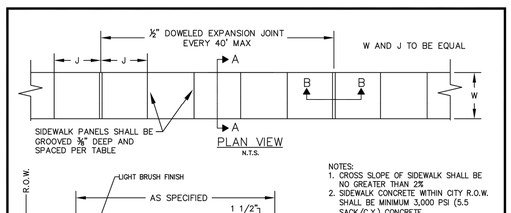


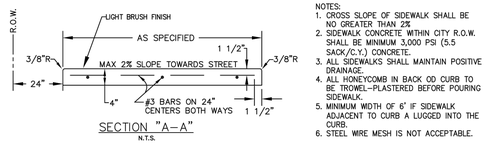
STREET HEADER FOR FUTURE PAVEMENT
N.T.S.

STREET HEADER AT EXISTING PAVEMENT
N.T.S.

STREET HEADER AT RAILROAD
N.T.S.

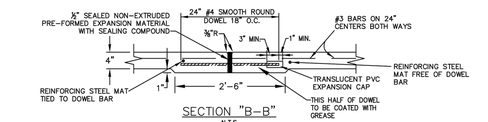
REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 305.4
STREET HEADERS		DATE: Mar. 2018 / STANDARD DRAWING NO.: R-2070



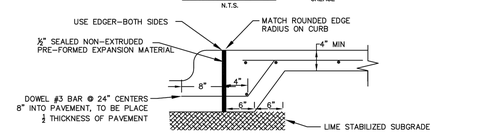


SECTION "A–A"
N.T.S.

NOTES:
1. CROSS SLOPE OF SIDEWALK SHALL BE NO GREATER THAN 2%
2. SIDEWALK CONCRETE WITHIN CITY R.O.W. SHALL BE MINIMUM 3,000 PSI (5.5 SACK/C.Y.) CONCRETE.
3. ALL SIDEWALKS SHALL MAINTAIN POSITIVE DRAINAGE.
4. ALL HONEYCOMB IN BACK OD CURB TO BE TROWEL–PLASTERED BEFORE POURING SIDEWALK.
5. MINIMUM WIDTH OF 6' IF SIDEWALK ADJACENT TO CURB A LUGGED INTO THE CURB.
6. STEEL WIRE MESH IS NOT ACCEPTABLE.

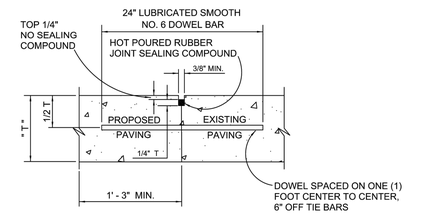


SECTION "B–B"
N.T.S.



JOINT LUG DETAIL FOR MEDIAN PAVEMENT
LEAD WALK CONNECTIONS OR SIDEWALK ADJACENT TO CURB
N.T.S.

REINFORCED CONCRETE SIDEWALKS	CITY OF ROCKWALL	
JOINTS AND SPACING		DATE: AUG '19 / DRAWING NO.: R–2170

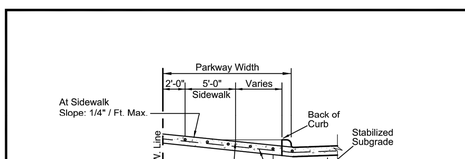


NOTES: T = PAVEMENT

1. LONGITUDINAL BUTT CONSTRUCTION MAY BE UTILIZED IN PLACE OF LONGITUDINAL HINGED (KEYWAY) JOINT AT CONTRACTORS OPTION.
2. DOWEL BARS SHALL BE DRILLED INTO PAVEMENT HORIZONTALLY BY USE OF A MECHANICAL RIG.
3. DRILLING BY HAND IS NOT ACCEPTABLE, PUSHING DOWEL BARS INTO GREEN CONCRETE NOT ACCEPTABLE.

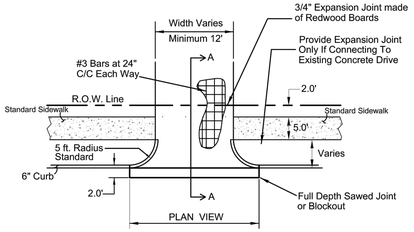
LONGITUDINAL BUTT JOINT
NOT TO SCALE

REINFORCED CONCRETE PAVEMENT	CITY OF ROCKWALL	
LONGITUDINAL BUTT JOINT		DATE: OCT. '17 / DRAWING NO.: R–2051



SECTION A-A

NOTE:
Sidewalk section thru driveway to be poured same thickness as driveway - 6" Thick 3,600 P.S.I. Reinf. Conc. Pvmt. w/ #3 Bars @ 24" O.C.E.W. (Grade 60 Steel)



DRIVEWAY DETAILS
(Not to Scale)

DRIVEWAY DETAIL	CITY OF ROCKWALL	
RESIDENTIAL DRIVEWAY		DATE: AUG '19 / DRAWING NO.: R–2150

RECORD DRAWINGS

no.	revision	by	date

tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS — CAMERON A. SLOWN — 106317 — LICENSED PROFESSIONAL ENGINEER

4/5/2023

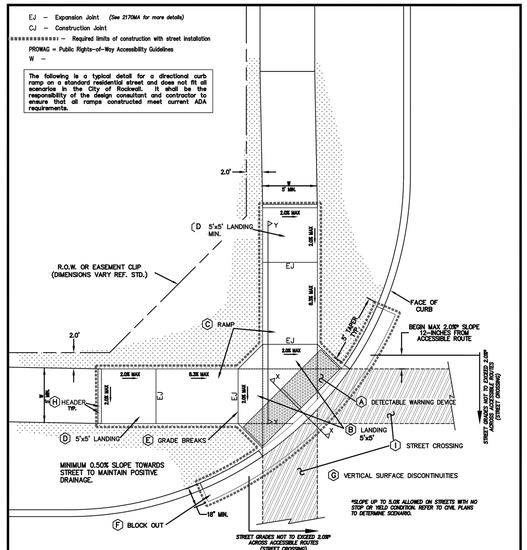
scale	
when bar is 1 inch long	
horiz	N/A
vert	N/A
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING DETAILS SHEET 1 OF 2

tnp project: SBD20370
sheet: 36 of 51

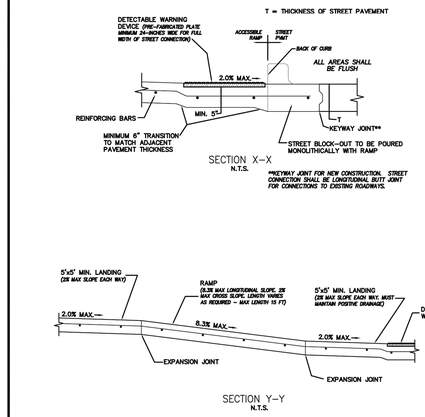
Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-PVMT DETAILS.dwg at Apr 05, 2023-7:14am by cslown



NOTES: All newly constructed sidewalks, curb ramps and crosswalks installed within City of Rockwall public rights-of-way shall be considered a pedestrian access route and shall conform to the most current "Draft" Guidelines for Public Rights-of-Way created by the United States Access Board.

1. SEE DETAIL R-2125B FOR RAMP FEATURE DESCRIPTIONS
2. SEE DETAIL R-2125C FOR SECTIONS X-X AND Y-Y
3. SEE DETAIL R-2125D FOR ADDITIONAL NOTES

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	DATE	DRAWING NO.
		MAR. '17	R-2125A



NOTE: ALL SIDEWALK CURB RAMPS WILL BE 3,600 PSI (6.5 SACK/CY) CONCRETE.

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	DATE	DRAWING NO.
		MAR. '17	R-2125C

PEDESTRIAN ACCESSIBILITY (WITHIN PUBLIC R.O.W.)

All newly constructed sidewalks, curb ramps and crosswalks installed within City of Rockwall public rights-of-way shall be considered a pedestrian access route and shall conform to the most current Guidelines for Public Rights-of-Way created by the United States Access Board.

CURB RAMPS

1. All slopes shown are MAXIMUM ALLOWABLE. Lesser slopes that will still drain properly should be used. Adjust curb ramp length or grade of approach sidewalks as directed.
2. Landings shall be 5'x 5' minimum with a maximum 2% slope in the transverse and longitudinal directions..
3. Clear space at the bottom of curb ramps shall be a minimum of 5'x 5' wholly contained within the crosswalk and wholly outside the parallel vehicular travel path.
4. Maximum allowable cross slope on sidewalk and curb ramp surfaces is 2%
5. Additional information on curb ramp location, design, light reflective value and texture may be found in the most current edition of the Texas Accessibility Standards (TAS) and 16 TAC 68.102. Federal guidelines shall supersede any conflicts.
6. Crosswalk dimensions, crosswalk markings and stop bar locations shall be as shown elsewhere in the plans. At intersections where crosswalk markings are not required, curb ramps and accessible routes shall align with theoretical crosswalks unless otherwise directed.
7. Handrails are not required on curb ramps.
8. Provide a flush transition where the curb ramps connect to the street.
9. Accessible routes are considered "ramps" when longitudinal slopes are between 5% and 8.3% (maximum allowable). Sidewalks under 5% longitudinal slope are deemed accessible routes and must follow all applicable guidelines.

DETECTABLE WARNING DEVICE

10. Curb ramps must contain a detectable warning surface that consists of raised truncated domes complying with Section 705 of the TAS. The surface must contrast visually with adjoining surfaces. Furnish and install an approved cast-in-place dark red detectable warning surface material adjacent to uncolored concrete, unless specified elsewhere in the plans.
11. Detectable Warning Materials shall be truncated dome plates in the color approved by the City. Install products in accordance with manufacturer's specifications.
12. Detectable warning surfaces must be slip resistant and not allow water to accumulate.
13. Detectable warning surfaces shall be a minimum of 24" in depth in the direction of pedestrian travel, and extend the full width of the curb ramp or landing where the pedestrian access route enters the street.
14. Detectable warning surfaces shall be located so that the edge nearest the curb line is at the back of curb. When placed on the ramp, align the rows of domes to be perpendicular to the grade break between the ramp run and the street. Where detectable warning surfaces are provided on a surface with a slope that is less than 5 percent, dome orientation is less critical. Detectable warning surfaces may be curved along the corner radius.

SIDEWALKS

15. Provide clear ground space at operable parts, including pedestrian push buttons. Operable parts shall be placed within one or more reach ranges specified in TAS 308.
16. Place traffic signal or illumination poles, ground boxes, controller boxes, signs, drainage facilities and other items so as not to obstruct the pedestrian access route or clear ground space.
17. Street grades and cross slopes shall be as shown elsewhere in the plans.
18. Changes in level greater than 1/4 inch are not permitted (1/2 inch with bevel).
19. The least possible grade should be used to maximize accessibility. The running slope of sidewalks and crosswalks within the public right of way may follow the grade of the parallel roadway. Where a continuous grade greater than 5% must be provided, handrails may be desirable to improve accessibility. Handrails may also be needed to protect pedestrians from potentially hazardous conditions. If provided, handrails shall comply with TAS 505.
20. Handrail extensions shall not protrude into the usable landing area or into intersecting pedestrian routes.

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	DATE	DRAWING NO.
		MAR. '17	R-2125D

(A) Detectable Warning Devices (DWD) shall be pre-manufactured cast-in-place truncated dome plates installed to the manufacturer's specifications, and shall meet all ADA requirements. No Brick Pavers allowed. Color to be approved by the City. DWD shall be 24 inches in length for the full width of the street connection starting at the back of curb. A maximum 2-inch border shall be allowed on the sides of the DWD for proper installation.

(B) Also known as "Clear Space" per ADA PROWAG, the City requires a minimum landing space of 5-foot by 5-foot at the bottom of every ramp. This landing space shall have a cross slope in both directions that does not exceed 2.0% and shall be wholly outside the parallel vehicular travel path.

(C) The ramp component of the directional curb ramp shall have a continuous longitudinal slope more than 5% and less than 8.3%. The ramp shall also have a cross slope of no more than 2.0% Length of ramp can vary, but shall not exceed 15 feet to achieve desired elevation change.

(D) Also known as "Turning Space" per ADA PROWAG, a minimum landing space of 5-foot by 5-foot shall be at the top of every ramp. This landing (turning) space shall have a cross slope in both directions that does not exceed 2.0%. Landing must match width of sidewalk and length shall be the same distance ("Squared" Landing).

(E) All curb ramps shall have grade breaks at the top and bottom that are perpendicular to the direction of the ramp run. Where the ends of the bottom grade break are less than or equal to 5 feet, the DWD shall be placed within the ramp at the bottom grade break. Where either end of the bottom grade break is greater than 5 feet, the DWD shall be placed behind the back of the curb.

(F) Paving contractor shall leave block out with a keyway joint installed, minimum of 18 inches measured from back of curb. Block out shall be poured monolithically with Curb Ramp. Concrete shall tie to street paving with a keyway joint per NCTCOG detail 2050. No curb shall be constructed where a DWD is provided. The curb on either side shall have a typical 5 foot taper to transition from the standard 6-inch curb height to be flush with ramp.

(G) All work associated with accessible routes shall be installed flush with all features to minimize vertical surface discontinuities. Each segment along accessible route shall be flush with no more (zero tolerance) than a ¼-inch grade separation (elevation difference), or ½-inch grade separation if beveled (bevel slope shall not be steeper than 50%).

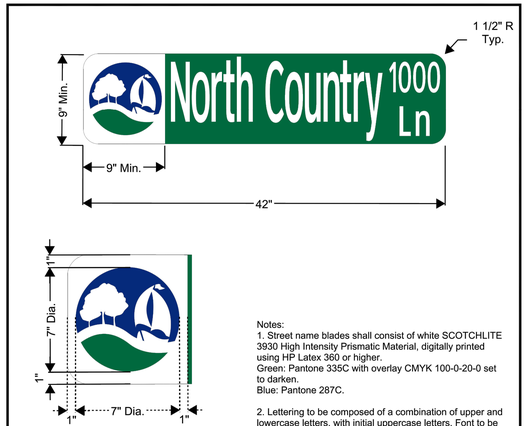
(H) A sidewalk header shall be constructed at ends of all work performed.

(I) Street crossings shall adhere to same guidelines as other accessible routes within public right-of-way, and shall be for the full width of the in-line accessible route. Cross slope shall not exceed 2%. New street construction shall incorporate all ADA design requirements. It shall be the responsibility of the Design Professional and Contractor to ensure all street crossings meet the requirements of PROWAG. Street alterations on existing streets to bring to compliance shall be at the City Engineer's discretion.

(J) All curbs constructed as part of an ADA Ramp shall match City curb standards.

** See PROWAG special design considerations when street crossing has no stop or yield condition.*

DIRECTIONAL CURB RAMP	CITY OF ROCKWALL	DATE	DRAWING NO.
		MAR. '17	R-2125B



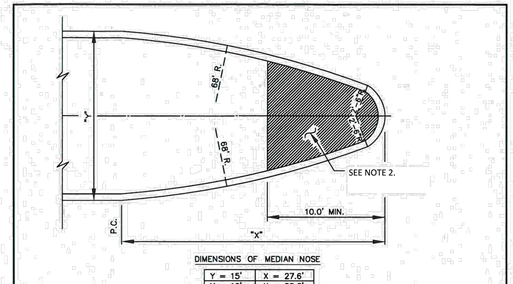
Notes:
1. Street name blades shall consist of white SCOTCHLITE 3930 High Intensity Prismatic Material, digitally printed using HP Latex 360 or higher.
Green: Pantone 335C with overlay CMYK 100-0-20-0 set to darken.
Blue: Pantone 287C.

2. Lettering to be composed of a combination of upper and lowercase letters, with initial uppercase letters. Font to be Clearview TCAD-1w with uppercase to be 6" Min. height and lowercase to be 4.5" Min. height. No more than 65% compression on font width.

3. Lettering for street designations and block numbers to be composed of initial uppercase letters at least 3" Min. height and lower-case letters at least 2.25" Min. height.

STREET SIGN DETAIL
NOT TO SCALE

STREET REGULATORY SIGNAGE TYPICAL STREET SIGN DETAIL	CITY OF ROCKWALL	DATE	DRAWING NO.
		May 2018	R-2300

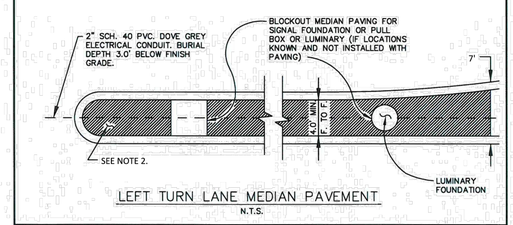


DIMENSIONS OF MEDIAN NOSE

Y = 15'	X = 27.6'
Y = 16'	X = 28.8'
Y = 17'	X = 29.9'
Y = 18'	X = 30.9'

CONCRETE NOSE FOR MEDIAN ISLAND
N.T.S.

NOTES
1. LEFT TURN LANE SHALL HAVE A MOWER ACCESS RAMP.
2. MEDIAN PAVING TO BE CONSTRUCTED OF INEGRAL STAMPED & STAINED REINFORCED CONCRETE, COLOR AND PATTERN TO BE APPROVED BY THE CITY. CONCRETE TO BE MINIMUM SIX (6") INCH 3600PSI (6.5 SACK/CY) WITH #4 BARS ON 18" CENTERS.
3. STREET LIGHT POLE BASES IN MEDIAN ARE TO HAVE THIRTY-SIX (36") INCH BY THIRTY-SIX (36") INCH, FOUR (4") INCH THICK, 3000PSI REINFORCED CONCRETE MOW STRIP.



LEFT TURN LANE MEDIAN PAVEMENT
N.T.S.

MEDIAN ISLAND PAVEMENT NOSE & LEFT TURN LANE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE	
		305.3	
		DATE	STANDARD DRAWING NO.
		AUG. '19	R-2130

RECORD DRAWINGS

no.	revision	by	date

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TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

scale when bar is 1 inch long	
horiz	N/A
vert	N/A
	APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING DETAILS SHEET 2 OF 3

tnp project	sheet	of
SBD20370	37	51

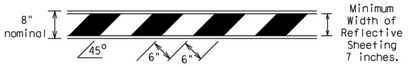
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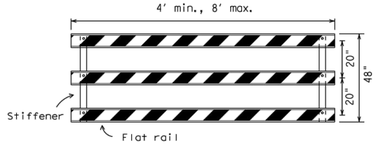
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



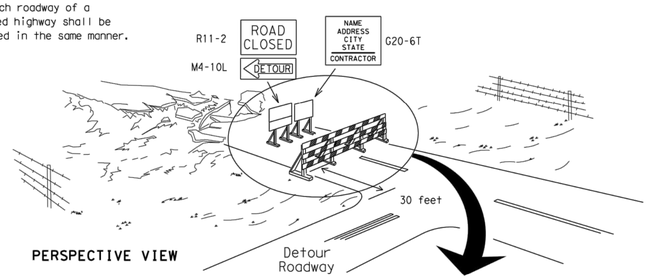
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

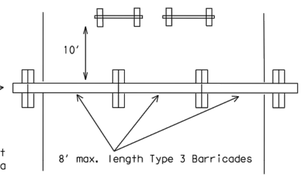
TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

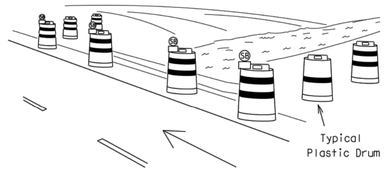
The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

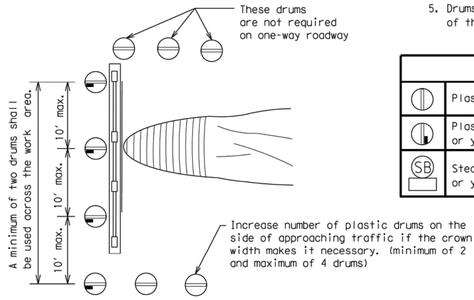
1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



PERSPECTIVE VIEW

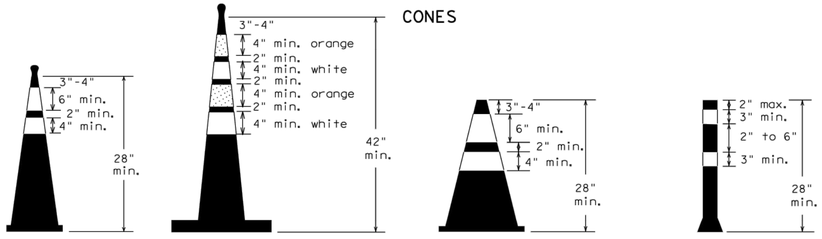
1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.



LEGEND	
	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
SB	Steady burn warning light or yellow warning reflector

PLAN VIEW

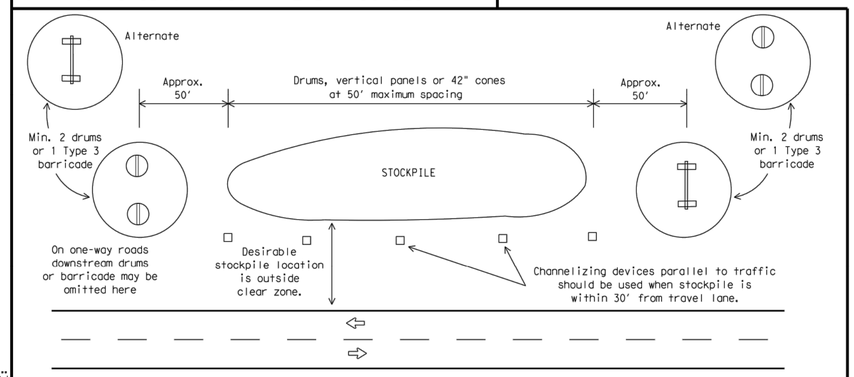
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS



28" Cones shall have a minimum weight of 9 1/2 lbs.

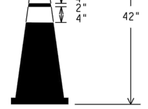
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS 9-07 8-14 7-13	DIST	COUNTY		SHEET NO.

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STATE OF TEXAS — CAMERON A. SLOWN — 106317 — LICENSED PROFESSIONAL ENGINEER
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scale
when bar is 1 inch long
horiz N/A
vert N/A
APR 2023

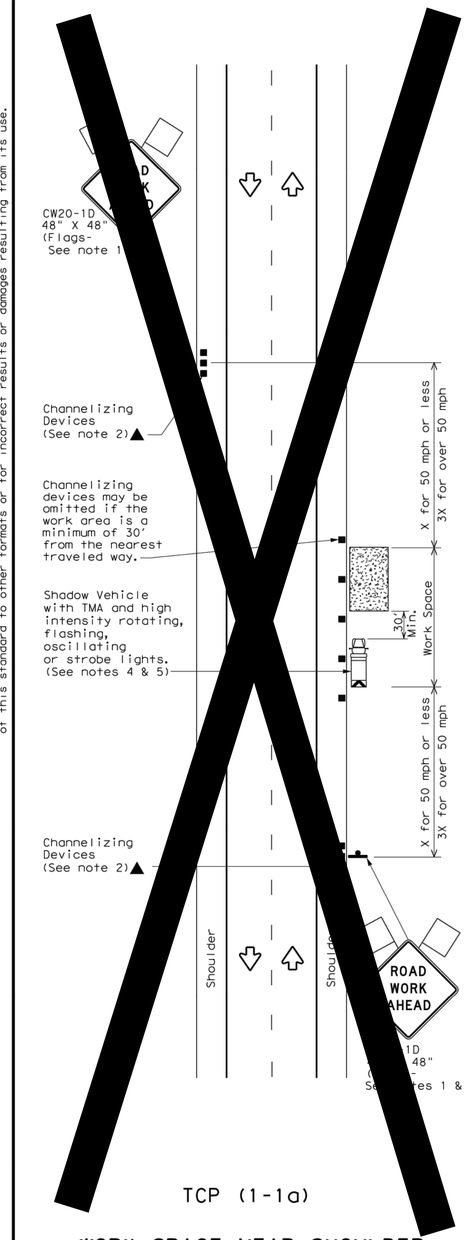
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Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PAVING DETAILS SHEET 3 OF 3

tnp project SBD20370
sheet 38 of 51

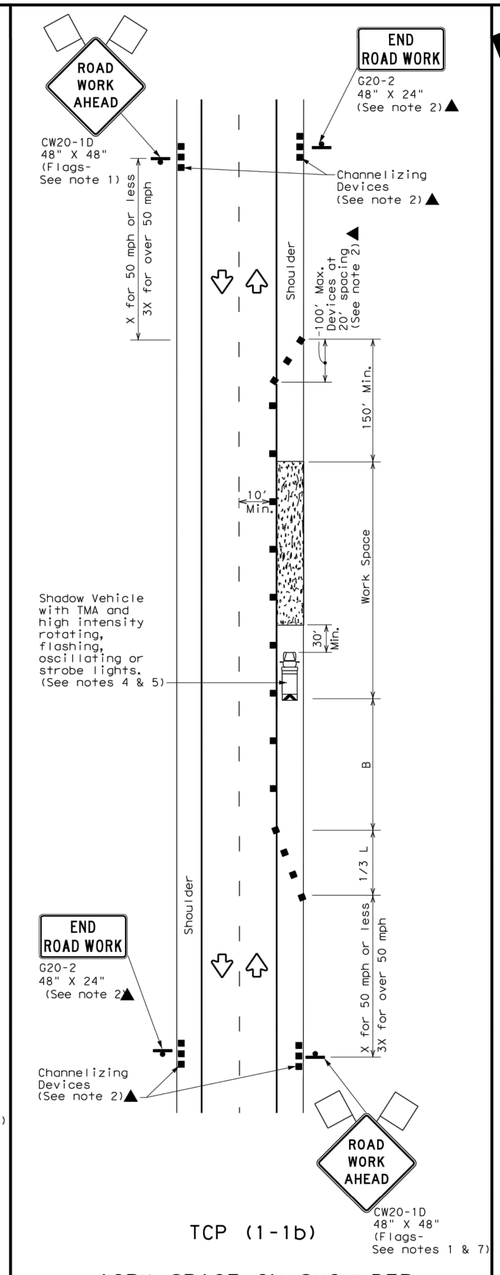
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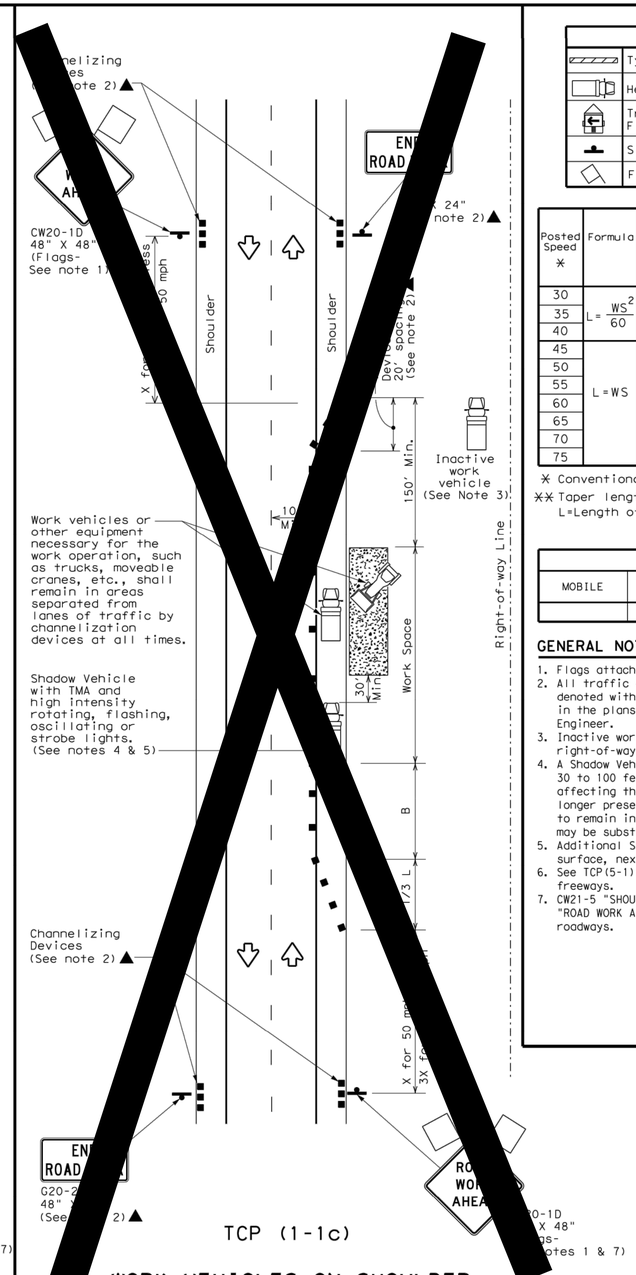
TCP (1-1a)

WORK SPACE NEAR SHOULDER
Conventional Roads



TCP (1-1b)

WORK SPACE ON SHOULDER
Conventional Roads



TCP (1-1c)

WORK VEHICLES ON SHOULDER
Conventional Roads

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Heavy Work Vehicle		Truck Mounted Attenuator (TMA)
	Trailer Mounted Flashing Arrow Board	M	Portable Changeable Message Sign (PCMS)
	Sign		Traffic Flow
	Flag		Flagger

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"
30	$L=\frac{WS^2}{60}$	150'	165'	180'	30'	60'	120'	90'
35		205'	225'	245'	35'	70'	160'	120'
40		265'	295'	320'	40'	80'	240'	155'
45	L=WS	450'	495'	540'	45'	90'	320'	195'
50		500'	550'	600'	50'	100'	400'	240'
55		550'	605'	660'	55'	110'	500'	295'
60		600'	660'	720'	60'	120'	600'	350'
65		650'	715'	780'	65'	130'	700'	410'
70		700'	770'	840'	70'	140'	800'	475'
75		750'	825'	900'	75'	150'	900'	540'

* Conventional Roads Only

** Taper lengths have been rounded off.
L=Length of Taper(FT) W=Width of Offset(FT) S=Posted Speed(MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
	✓	✓		

GENERAL NOTES

1. Flags attached to signs where shown are REQUIRED.
2. All traffic control devices illustrated are REQUIRED, except those denoted with the triangle symbol may be omitted when stated elsewhere in the plans, or for routine maintenance work, when approved by the Engineer.
3. Inactive work vehicles or other equipment should be parked near the right-of-way line and not parked on the paved shoulder.
4. A Shadow Vehicle with a TMA should be used anytime it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the performance or quality of the work. If workers are no longer present but road or work conditions require the traffic control to remain in place, Type 3 Barricades or other channelizing devices may be substituted for the Shadow Vehicle and TMA.
5. Additional Shadow Vehicles with TMAs may be positioned off the paved surface, next to those shown in order to protect wider work spaces.
6. See TCP(5-1)for shoulder work on divided highways, expressways and freeways.
7. CW21-5 "SHOULDER WORK" signs may be used in place of CW20-1D "ROAD WORK AHEAD" signs for shoulder work on conventional roadways.

Texas Department of Transportation — Traffic Operations Division Standard

TRAFFIC CONTROL PLAN CONVENTIONAL ROAD SHOULDER WORK

TCP(1-1)-18

FILE: tcp1-1-18.dgn	DN:	CK:	DW:	CK:
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REVISIONS				
2-94 4-98	DIST	COUNTY		SHEET NO.
8-95 2-12				
1-97 2-18				

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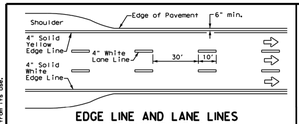
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Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
TCP (1-1) - 18

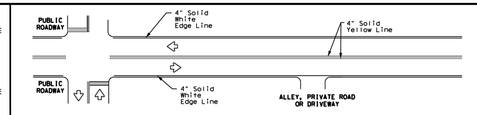
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sheet 39 of 51

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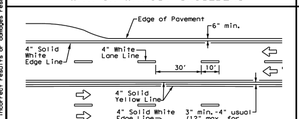
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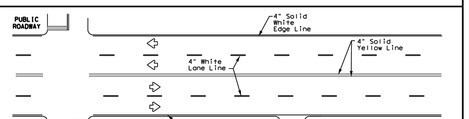
EDGE LINE AND LANE LINES
ONE-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



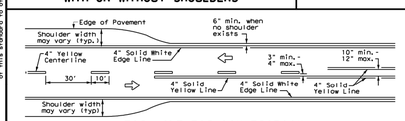
TYPICAL TWO-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



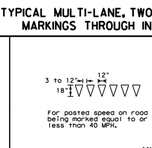
CENTERLINE AND LANE LINES
FOUR LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



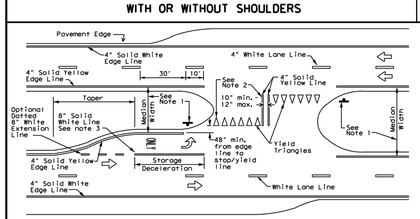
TYPICAL MULTI-LANE, TWO-WAY PAVEMENT
MARKINGS THROUGH INTERSECTIONS



TWO LANE TWO-WAY ROADWAY
WITH OR WITHOUT SHOULDERS



YIELD LINES



FOUR LANE DIVIDED ROADWAY CROSSOVERS

NOTES

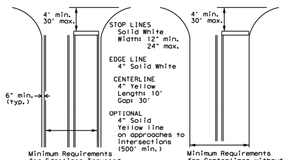
1. Where divided highways are separated by median widths at the median opening itself of 30 feet or more, median openings shall be signed as two separate intersections. Each median opening has two width measurements, with one measurement for each approach. The narrow median width will be the controlling width to determine if signs are required. Yield signs are the typical intersection control. Stop signs are optional as determined by the Engineer.
2. Install median striping (double yellow centerlines and stop bars/yield triangles) when a 50' or greater median centerline can be placed. Stop bars shall only be used with stop signs. Yield traingles shall only be used with yield signs.
3. Length of turn bays, including taper, deceleration, and storage lengths shall be as shown on the plans or as directed by the Engineer.

GENERAL NOTES

1. Edgeline striping shall be as shown in the plans or as directed by the Engineer. The edgeline should not be placed less less than 6 inches from the edge of pavement. This distance may vary due to pavement raveling or other conditions. Edgelines are not required in curb and gutter sections of roadways.
2. The traveled way includes only that portion of the roadway used for vehicular travel. It does not include the parking lanes, sidewalks, berms and shoulders. The traveled ways shall be measured from the inside of edgeline to the inside of edgeline of a two lane roadway.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



GUIDE FOR PLACEMENT OF STOP LINES,
EDGE LINE & CENTERLINE
Based on Traveled Way and Pavement Widths
for Undivided Highways

Texas Department of Transportation — Traffic Safety Division Standard

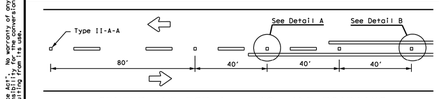
TYPICAL STANDARD
PAVEMENT MARKINGS

PM(1)-20

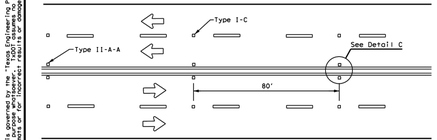
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©TxDOT	November 1978	CONT	SECT	JOB	HIGHWAY
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8-95	3-03	DIST	COUNTY		SHEET NO.
5-00	2-12				
8-00	6-20				

PM1-20

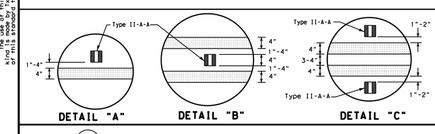
REFLECTIVE RAISED PAVEMENT MARKERS
FOR VEHICLE POSITIONING GUIDANCE



CENTERLINE FOR ALL TWO LANE ROADWAYS



CENTERLINE & LANE LINES
FOR FOUR LANE TWO-WAY HIGHWAYS



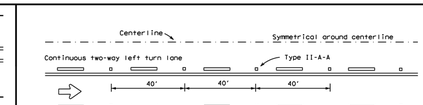
REFLECTORIZED PROFILE
PATTERN DETAIL
USING REFLECTIVE PROFILE PAVEMENT MARKINGS

4" EDGE LINE, CENTER LINE OR LANE LINE

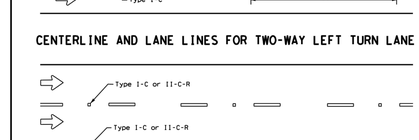
OPTIONAL 6" EDGE LINE, CENTER LINE OR LANE LINE

A quick field check for the thickness of base line and profile marking is approximately equal to a stack of 5 quarters to a maximum height of 7 quarters.

NOTE
Profile markings shall not be placed on roadways with a posted speed limit of 45 MPH or less.



CENTERLINE AND LANE LINES FOR TWO-WAY LEFT TURN LANE



LANE LINES FOR ONE-WAY ROADWAY (NON-FREEWAY FACILITIES)

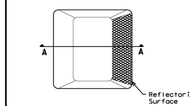
Raised pavement markers Type II-C-R shall have clear face toward normal traffic and red face toward wrong-way traffic.

GENERAL NOTES

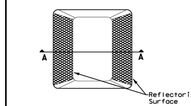
1. All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.
2. On concrete pavements the raised pavement markers should be placed to one side of the longitudinal joints.

MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
TRAFFIC PAINT	DMS-8200
HOT APPLIED THERMOPLASTIC	DMS-8220
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240

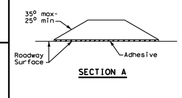
All pavement marking materials shall meet the required Departmental Material Specifications as specified by the plans.



Type I (Top View)



Type II (Top View)



SECTION A

RAISED PAVEMENT MARKERS

Texas Department of Transportation — Traffic Safety Division Standard

POSITION GUIDANCE USING
RAISED MARKERS
RELECTORIZED PROFILE
MARKINGS
PM(2)-20

FILE:	pm2-20.dgn	DN:	CK:	DW:	CK:
©TxDOT	April 1977	CONT	SECT	JOB	HIGHWAY
REVISIONS					
6-92	2-12	DIST	COUNTY		SHEET NO.
5-00	2-12				
8-00	6-20				

PM2-20

RECORD DRAWINGS

no.	revision	by	date

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED
PROFESSIONAL ENGINEER
4/5/2023

scale	
when bar is 1 inch long	
horiz	N/A
vert	N/A
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
PM (1-2) - 20

tnp project SBD20370
sheet 40 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-SIGNAGE.dwg at Apr 05, 2023-7:14am by cslown

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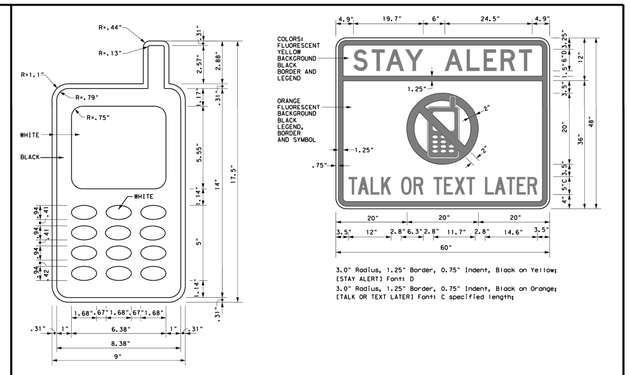
BARRICADE AND CONSTRUCTION (BC) STANDARD SHEETS GENERAL NOTES:

1. The Barricade and Construction Standard Sheets (BC sheets) are intended to show typical examples for placement of temporary traffic control devices, construction pavement markings, and typical work zone signs. The information contained in these sheets meet or exceed the requirements shown in the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. The development and design of the Traffic Control Plan (TCP)is the responsibility of the Engineer.
3. The Contractor may propose changes to the TCP that are signed and sealed by a licensed professional engineer for approval. The Engineer may develop, sign and seal Contractor proposed changes.
4. The Contractor is responsible for installing and maintaining the traffic control devices as shown in the plans. The Contractor may not move or change the approximate location of any device without the approval of the Engineer.
5. Geometric design of lane shifts and detours should, when possible, meet the applicable design criteria contained in manuals such as the American Association of State Highway and Transportation Officials (AASHTO), "A Policy on Geometric Design of Highways and Streets," the TxDOT "Roadway Design Manual" or engineering judgment.
6. When projects abut, the Engineer(s) may omit the END ROAD WORK, TRAFFIC FINES DOUBLE, and other advance warning signs if the signing would be redundant and the work areas appear continuous to the motorists. If the adjacent project is completed first, the Contractor shall erect the necessary warning signs as shown on these sheets, the TCP sheets or as directed by the Engineer. The BEGIN ROAD WORK NEXT X MILES sign shall be revised to show appropriate work zone distance.
7. The Engineer may require duplicate warning signs on the median side of divided highways where median width will permit and traffic volumes justify the signing.
8. All signs shall be constructed in accordance with the details found in the "Standard Highway Sign Designs for Texas," latest edition. Sign details not shown in this manual shall be shown in the plans or the Engineer shall provide a detail to the Contractor before the sign is manufactured.
9. The temporary traffic control devices shown in the illustrations of the BC sheets are examples. As necessary, the Engineer will determine the most appropriate traffic control devices to be used.
10. As shown on BC(2), the OBEY WARNING SIGNS STATE LAW sign, STAY ALERT TALK OR TEXT LATER (see Sign Detail G20-10T) and the WORK ZONE TRAFFIC FINES DOUBLE sign with plaque shall be erected in advance of the CSJ limits. However, the TRAFFIC FINES DOUBLE sign will not be required on projects consisting solely of mobile operation work, such as striping or milling edgeline rumble strips. The BEGIN ROAD WORK NEXT X MILES, CONTRACTOR and END ROAD WORK signs shall be erected at or near the CSJ limits.
11. Except for devices required by Note 10, traffic control devices should be in place only while work is actually in progress or a definite need exists.
12. The Engineer has the final decision on the location of all traffic control devices.
13. Inactive equipment and work vehicles, including workers' private vehicles must be parked away from travel lanes. They should be as close to the right-of-way line as possible, or located behind a barrier or guardrail, or as approved by the Engineer.

WORKER SAFETY APPAREL NOTES:

1. Workers on foot who are exposed to traffic or to construction equipment within the right-of-way shall wear high-visibility safety apparel meeting the requirements of ISEA "American National Standard for High-Visibility Apparel," or equivalent revisions, and labeled as ANSI 107-2004 standard performance for Class 2 or 3 risk exposure. Class 3 garments should be considered for high traffic volume work areas or night time work.

DATES:
FILES:



SIGN DETAIL (G20-10T)

COLORS:
FLUORESCENT YELLOW BACKGROUND
BLACK BORDER AND LEGEND

ORANGE FLUORESCENT BACKGROUND
BLACK LEGEND, BORDER AND SYMBOL

3.0" Radius, 1.25" Border, 0.75" Indent, Black on Yellow (STAY ALERT) Font D

3.0" Radius, 1.25" Border, 0.75" Indent, Black on Orange (TALK OR TEXT LATER) Font C specified length;

Only pre-qualified products shall be used. The "Compliant Work Zone Traffic Control Devices List" (CWZTCD) describes pre-qualified products and their sources and may be found on-line at the web address given below or by contacting:

Texas Department of Transportation
Traffic Operations Division - TE
Phone (512) 416-3118

THE DOCUMENTS BELOW CAN BE FOUND ON-LINE AT http://www.txdot.gov
COMPLIANT WORK ZONE TRAFFIC CONTROL DEVICES LIST (CWZTCD)
DEPARTMENTAL MATERIAL SPECIFICATIONS (DMS)
MATERIAL PRODUCER LIST (MPL)
ROADWAY DESIGN MANUAL - SEE "MANUALS (ONLINE MANUALS)"
STANDARD HIGHWAY SIGN DESIGNS FOR TEXAS (SHSD)
TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (TMUTCD)
TRAFFIC ENGINEERING STANDARD SHEETS

Texas Department of Transportation | Traffic Operations Division Standard

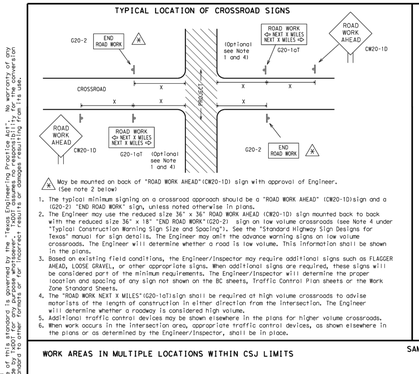
BARRICADE AND CONSTRUCTION GENERAL NOTES AND REQUIREMENTS

BC(1)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT November 2002	CONT	SECT	JOB	HIGHWAY
REVISIONS				
4-03 5-10 8-14	DIST	COUNTY		SHEET NO.
9-07 7-13				

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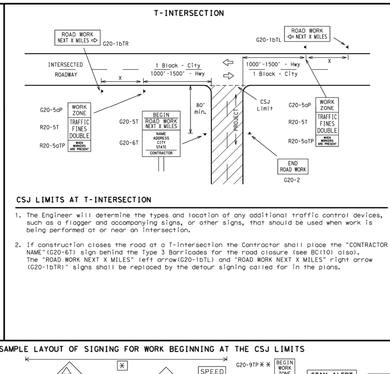
TYPICAL LOCATION OF CROSSROAD SIGNS



⚠ May be mounted on back of "ROAD WORK AHEAD"(CW20-1D) sign with approval of Engineer. (See note 2 below)

1. The typical minimum signing on a crossroad approach should be a "ROAD WORK AHEAD" (CW20-1D)sign and a (G20-2) "END ROAD WORK" sign, unless noted otherwise in plans.
2. The Engineer may use the reduced size 36" x 36" ROAD WORK AHEAD (CW20-1D) sign mounted back to back with the reduced size 36" x 18" "END ROAD WORK"(G20-2) sign on low volume crossroads See Note 4 under "Typical Construction Warning Sign Size and Spacing"). See the "Standard Highway Sign Designs for Texas" manual for sign details. The Engineer may omit the advance warning signs on low volume crossroads. The Engineer will determine whether a road is low volume. This information shall be shown in the plans.
3. Based on existing field conditions, the Engineer/Inspector may require additional signs such as FLAGGER AHEAD, LOOSE GRAVEL, or other appropriate signs. When additional signs are required, these signs will be considered part of the minimum requirements. The Engineer/Inspector will determine the proper location and spacing of any sign not shown on the BC sheets, Traffic Control Plan sheets or the Work Zone Standard Sheets.
4. The "ROAD WORK NEXT X MILES"(G20-1a)sign shall be required at high volume crossroads to advise motorists of the length of construction in either direction from the intersection. The Engineer will determine whether a roadway is considered high volume.
5. Additional traffic control devices may be shown elsewhere in the plans for higher volume crossroads.
6. When work occurs in the intersection area, appropriate traffic control devices, as shown elsewhere in the plans or as determined by the Engineer/Inspector, shall be in place.

T-INTERSECTION



CSJ LIMITS AT T-INTERSECTION

1. The Engineer will determine the types and location of any additional traffic control devices, such as a flagger and accompanying signs, or other signs, that should be used when work is being performed at or near an intersection.
2. If construction closes the road at a T-intersection the Contractor shall place the "CONTRACTOR NAME"(G20-6T) sign behind the Type 3 Barricades for the road closure (see BC(10) also). The "ROAD WORK NEXT X MILES" left arrow(G20-1aTL) and "ROAD WORK NEXT X MILES" right arrow (G20-1aTR)" signs shall be replaced by the detour signing called for in the plans.

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING[a,b,c]

SIZE

Sign Number or Series	Conventional Road	Expressway/ Freeway
CW20[4] CW21 CW22 CW23 CW25	48" x 48"	48" x 48"
CW1, CW2, CW7, CW8, CW9, CW11, CW14	36" x 36"	48" x 48"
CW3, CW4, CW5, CW6, CW8-3, CW10, CW12	48" x 48"	48" x 48"

SPACING

Posted Speed	Sign Spacing "X"[d]
MPH	Feet (Approx.)
30	120
35	160
40	240
45	320
50	400
55	500[2]
60	600[2]
65	700[2]
70	800[2]
75	900[2]
80	1000[2]
*	*[3]

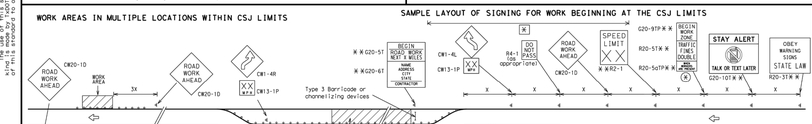
* For typical sign spacings on divided highways, expressways and freeways, see Part 6 of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) typical application diagrams or TCP Standard Sheets.

a Minimum distance from work area to First Advance Warning sign nearest the work area and/or distance between each additional sign.

GENERAL NOTES

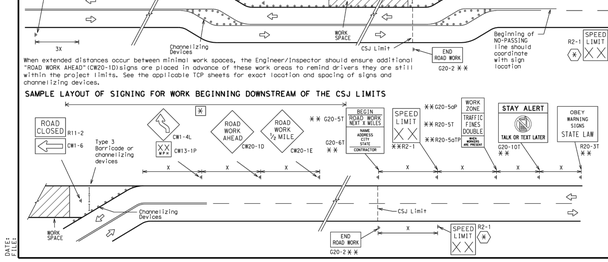
1. Special or larger size signs may be used as necessary.
2. Distance between signs should be increased as required to have 1500 feet advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. 36" x 36" "ROAD WORK AHEAD" (CW20-1D)signs may be used on low volume crossroads at the discretion of the Engineer. See Note 2 under "Typical Location of Crossroad Signs".
5. Only diamond shaped warning sign sizes are indicated.
6. See sign size listing in "TMUTCD", Sign Appendix or the "Standard Highway Sign Designs for Texas" manual for complete list of available sign design sizes.

WORK AREAS IN MULTIPLE LOCATIONS WITHIN CSJ LIMITS



SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING AT THE CSJ LIMITS

SAMPLE LAYOUT OF SIGNING FOR WORK BEGINNING DOWNSTREAM OF THE CSJ LIMITS



NOTES

The Contractor shall determine the appropriate distance to be placed on the G20-1 series signs and "BEGIN ROAD WORK NEXT X MILES"(G20-5T)sign for each specific project. This distance shall replace the "X" and shall be rounded to the nearest whole mile with the approval of the Engineer. No decimals shall be used.

(K) The "BEGIN WORK ZONE"(G20-9TP) and "END WORK ZONE" (G20-2bT) shall be used as shown on the sample layout when advance signs are required outside the CSJ limits. They inform the motorist of entering or leaving a part of the work zone lying outside the CSJ limits where traffic fines may double if workers are present.

W K Required CSJ Limit signing. See Note 10 on BC(1). TRAFFIC FINES DOUBLE signs will not be required on projects consisting solely of mobile operations work.

(X) Area for placement of "ROAD WORK AHEAD" (CW20-1D)sign and other signs or devices as called for on the Traffic Control Plan.

(X) Contractor will install a regulatory speed limit sign at the end of the work zone.

LEGEND

⟷	Type 3 Barricade
○○○	Channelizing Devices
▲	Sign
X	See Typical Construction Warning Sign Size and Spacing chart or the TMUTCD for sign spacing requirements.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PROJECT LIMIT

BC(2)-14

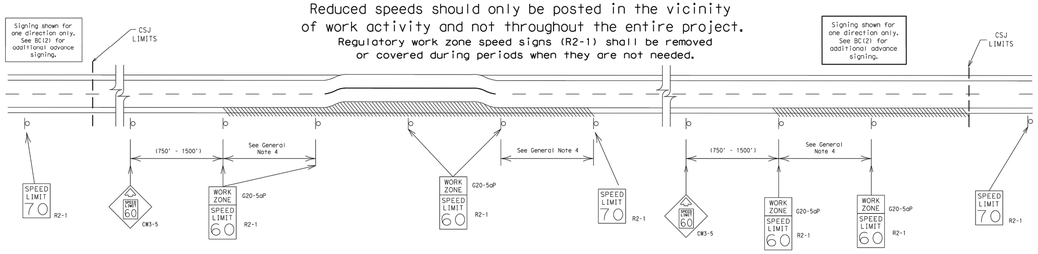
FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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TYPICAL APPLICATION OF WORK ZONE SPEED LIMIT SIGNS

Work zone speed limits shall be regulatory, established in accordance with the "Procedures for Establishing Speed Zones," and approved by the Texas Transportation Commission, or by City Ordinance when within incorporated City Limits.

Reduced speeds should only be posted in the vicinity of work activity and not throughout the entire project.
Regulatory work zone speed signs (R2-1) shall be removed or covered during periods when they are not needed.



GUIDANCE FOR USE:

LONG/INTERMEDIATE TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit should be included on the design of the traffic control plans when restricted geometrics with a lower design speed are present in the work zone and modification of the geometrics to a higher design speed is not feasible.

Long/Intermediate Term Work Zone Speed Limit signs, when approved as described above, should be posted and visible to the motorist when work activity is present. Work activity may also be defined as a change in the roadway that requires a reduced speed for motorists to safely negotiate the work area, including:
a) rough road or damaged pavement surface
b) substantial alteration of roadway geometrics (diversions)
c) construction detours
d) grade
e) width
f) other conditions readily apparent to the driver
As long as any of these conditions exist, the work zone speed limit signs should remain in place.

SHORT TERM WORK ZONE SPEED LIMITS

This type of work zone speed limit may be included on the design of the traffic control plans when workers or equipment are not behind concrete barrier, when work activity is within 10 feet of the traveled way or actually within the traveled way.

Short Term Work Zone Speed Limit signs should be posted and visible to the motorist when work activity is present. When work activity is not present, signs shall be removed or covered.
(See Removing or Covering on BC(4)).

GENERAL NOTES

1. Regulatory work zone speed limits should be used only for sections of construction projects where speed control is of major importance.
2. Regulatory work zone speed limit signs shall be placed on supports at a 7 foot minimum mounting height.
3. Speed zone signs are illustrated for one direction of travel and are normally posted for each direction of travel.
4. Frequency of work zone speed limit signs should be:
   40 mph and greater 0.2 to 2 miles
   35 mph and less 0.2 to 1 mile
5. Regulatory speed limit signs shall have black legend and border on a white reflective background (See "Reflective Sheeting" on BC(4)).
6. Fabrication, erection and maintenance of the"ADVANCE SPEED LIMIT"(CW13-5)sign, "WORK ZONE"(G20-5aP) plaque and the "SPEED LIMIT"(R2-1)signs shall not be paid for directly, but shall be considered subsidiary to Item 502.
7. Turning signs from view, laying signs over or down will not be allowed, unless as otherwise noted under "REMOVING OR COVERING" on BC(4).
8. Techniques that may help reduce traffic speeds include but are not limited to:
   A. Law enforcement.
   B. Flagger stationed next to sign.
   C. Portable changeable message sign (PCMS).
   D. Low-power (radar) radar transmitter.
   E. Speed monitor trailers or signs.
9. Speeds shown on details above are for illustration only. Work Zone Speed Limits should only be posted as approved for each project.
10. For more specific guidance concerning the type of work, work zone conditions and factors impacting allowable regulatory construction speed zone reduction see TxDOT form #1204 in the TxDOT e-form system.

DATES:
FILES:

Texas Department of Transportation | Traffic Operations Division Standard

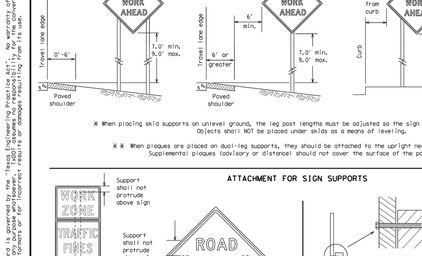
BARRICADE AND CONSTRUCTION WORK ZONE SPEED LIMIT

BC(3)-14

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TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



✻ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

✻✻ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



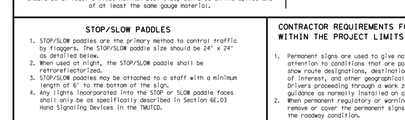
Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

STOP/SLOW PADDLES

1. STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
2. When used at night, the STOP/SLOW paddle shall be retroreflectorized.
3. STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
4. Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

1. Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
2. When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
3. When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times. If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
4. If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
5. Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

1. Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
2. Wooden sign posts shall be painted white.
3. Barricades shall NOT be used as sign supports.
4. All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zones.
5. The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
6. The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
7. The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
8. Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
9. The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

1. The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
   a. Long-term stationary - work that occupies a location more than 3 days.
   b. Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
   c. Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
   d. Short, duration - work that occupies a location up to 1 hour.
   e. Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

1. The bottom of Long-Term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
2. The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
3. Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
4. Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
5. Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

1. The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

1. The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWTCD lists each substrate that can be used on the different types and models of sign supports.
2. "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
3. All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

1. All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
2. White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
3. Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

1. All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

1. When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
2. Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
3. Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
4. When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
5. Burlap shall NOT be used to cover signs.
6. Duct tape or other adhesive material shall NOT be affixed to a sign face.
7. Signs and anchor studs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

1. Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, coarse, cohesive sand may be used.
2. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
3. Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weight.
4. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
5. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire liner tubes) shall NOT be used.
6. Rubber ballasts designed for traffic control devices may not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWTCD list.
7. Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
8. Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

1. Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC(4)-14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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REVISIONS				
9-07 8-14 7-13	DIST	COUNTY		SHEET NO.

RECORD DRAWINGS

no.	revision	by	date

tnp
teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 100116600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

scale when bar is 1 inch long	
horiz	N/A
vert	N/A
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

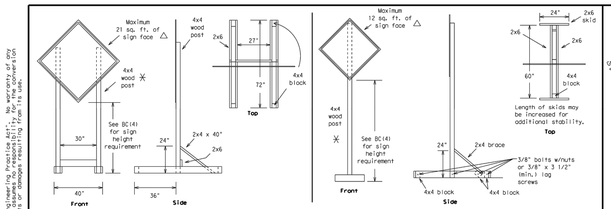
Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
BC (1-4) -14

tnp project SBD20370
sheet 41 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-SIGNAGE.dwg 11 Apr 05, 2025-7:14am by cslown

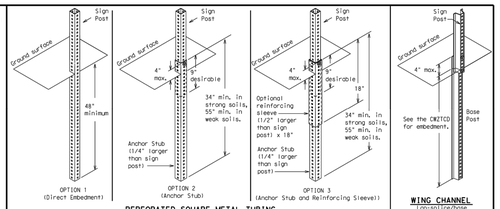
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SKID MOUNTED WOOD SIGN SUPPORTS

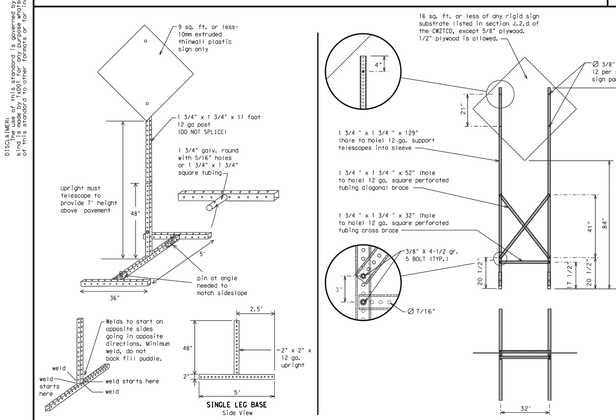
LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS □



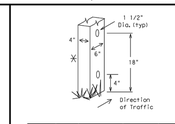
GROUND MOUNTED SIGN SUPPORTS

PERFORATED SQUARE METAL TUBING

Refer to the CMTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.



SKID MOUNTED PERFORATED SQUARE STEEL TUBING SIGN SUPPORTS



Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 4	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS

WEDGE ANCHORS

Both steel and plastic wedge anchor systems as shown on the SMD (Sign) Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CMTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

1. Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
2. No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CMTCD List.
3. When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

□ See BC(4) for definition of "Work Duration."

※ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Stakes may be spliced as shown.

△ See the CMTCD for the type of sign substrate that can be used for each approved sign support.

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Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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7-13					

Roadway designation * IH-number, US-number, SH-number, FM-number

99

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WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," "THE."
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway. I.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) associated with the number when referring to a roadway.
6. When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the messages.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION	WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD	Major	MAJ
Alternate	ALT	Miles	MI
Avenue	AVE	Miles Per Hour	MPH
Best Route	BEST RTE	Minor	MNR
Boulevard	BLVD	Monday	MON
Bridge	BRDG	Normal	NORM
Cannot	CANT	North	N
Center	CTR	Northbound	(route) N
Construction Ahead	CONST AHD	Parking	PKING
		Road	RD
CROSSING	XING	Right Lane	RT LN
Detour Route	DETOUR RTE	Saturday	SAT
Do Not	DONT	Service Road	SERV RD
East	E	Shoulder	SHLDR
Eastbound	(route) E	Slippery	SLIP
Emergency	EMER	South	S
Emergency Vehicle	EMER VEH	Southbound	(route) S
Entrance, Enter	ENT	Speed	SPD
Express Lane	EXP LN	Street	ST
Expressway	EXPWY	Sunday	SUN
XXXX Feet	XXXX FT	Telephone	PHONE
Fog Ahead	FOG AHD	Temporary	TEMP
Freeway	FRWY, FWY	Thursday	THURS
Freeway Blocked	FWY BLKD	To Downtown	TO DWNTN
Friday	FRI	Traffic	TRAF
Hazardous Driving	HAZ DRIVING	Travelers	TRVLRS
Hazardous Material	HAZMAT	Tuesday	TUES
High-Occupancy Vehicle	HOV	Time Minutes	TIME MIN
Highway	HWY	Upper Level	UPR LEVEL
Hour(s)	HR, HRS	Vehicles (s)	VEH, VEHS
Information	INFO	Warning	WARN
In (s)	I(S)	Wednesday	WED
Junction	JCT	Weight Limit	WT LIMIT
Left	LFT	West	W
Left Lane	LFT LN	Westbound	(route) W
Long Closed	LN CLOSED	Wet Pavement	WET PVMT
Lower Level	LWR LEVEL	Will Not	WONT
Maintenance	MAINT		

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List		Other Condition List	
FREEWAY CLOSED X MILE	FRONTAGE ROAD CLOSED	ROADWORK XXX FT	ROAD REPAIRS XXXX FT
ROAD CLOSED AT SH XXX	SHOULDER CLOSED XXX FT	FLAGGER XXX FT	LANE NARROWS XXXX FT
ROAD CLSD AT FM XXXX	RIGHT LN CLOSED XXX FT	RIGHT LN NARROWS XXX FT	TWO-WAY TRAFFIC XX MILE
RIGHT X LANES CLOSED	RIGHT X LANES OPEN	MERGING TRAFFIC XXXX FT	CONST TRAFFIC XXX FT
CENTER LANE CLOSED	DAYTIME LANE CLOSURES	LOOSE GRAVEL XXXX FT	UNEVEN LANES XXXX FT
NIGHT LANE CLOSURES	I-XX SOUTH EXIT CLOSED	DETOUR X MILE	ROUGH ROAD XXXX FT
VARIOUS LANES CLOSED	EXIT XXX CLOSED X MILE	ROADWORK PAST SH XXXX	ROADWORK NEXT FRI-SUN
EXIT CLOSED	RIGHT LN TO BE CLOSED	BUMP XXXX FT	US XXX EXIT X MILES
MALL DRIVEWAY CLOSED	X LANES CLOSED TUE - FRI	TRAFFIC SIGNAL XXXX FT	LANES SHIFT *
XXXXXXXX BLVD CLOSED			

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List		Location List	Warning List	** Advance Notice List
MERGE RIGHT	FORM X LINES RIGHT	AT FM XXXX	SPEED LIMIT XX MPH	TUE-FRI XX AM- X PM
DETOUR NEXT X EXITS	USE XXXXX RD EXIT	BEFORE RAILROAD CROSSING	MAXIMUM SPEED XX MPH	APR XX-XX X PM-X AM
USE EXIT XXX	USE EXIT I-XX NORTH	NEXT X MILES	MINIMUM SPEED XX MPH	BEGINS MONDAY
STAY ON US XXX SOUTH	USE I-XX E TO I-XX N	PAST US XXX EXIT	ADVISORY SPEED XX MPH	BEGINS MAY XX
TRUCKS USE US XXX N	WATCH FOR TRUCKS	XXXXXXX TO XXXXXXX	RIGHT LANE EXIT	MAY X-X XX PM - XX AM
WATCH FOR TRUCKS	EXPECT DELAYS	US XXX TO FM XXXX	USE CAUTION	NEXT FRI-SUN
EXPECT DELAYS	PREPARE TO STOP		DRIVE SAFELY	XX AM TO XX PM
REDUCE SPEED XXX FT	END SHOULDER USE		DRIVE WITH CARE	NEXT TUE AUG XX
USE OTHER ROUTES	WATCH FOR WORKERS			TONIGHT XX PM- XX AM
STAY IN LANE *				

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH for abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol"(W20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

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Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

BC(6)-14

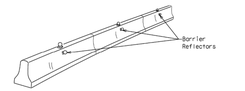
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1. Barrier Reflectors shall be pre-qualified, and conform to the color and retroreflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
2. Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

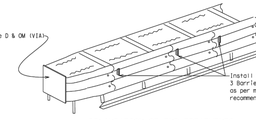


CONCRETE TRAFFIC BARRIER (CTB)

3. Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
4. Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional)while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
5. When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
6. Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
7. Maximum spacing of Barrier Reflectors is forty (40) feet.
8. Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
9. Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
10. Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
11. Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB)

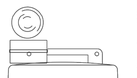


DELINEATION OF END TREATMENTS

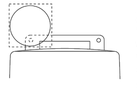
END TREATMENTS FOR CTB'S USED IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CMTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

1. Warning lights shall meet the requirements of the TMUTCD.
2. Warning lights shall NOT be installed on barricades.
3. Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_G or C_G Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
4. Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
5. The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
6. When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
7. When used in limited quantity, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
8. The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

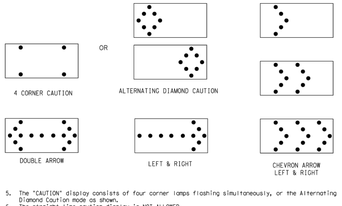
1. Type A Flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
2. Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
3. A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
4. Type C and D Steady burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
5. Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
6. Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
7. The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

1. A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
2. The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CMTCD.
3. The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
4. Round reflectors shall be fully reflectorized, including the area where attached to the drum.
5. Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
6. The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
7. When used along two-way traffic, both sides of the warning reflector shall be reflectorized.
8. The warning reflector should be mounted on the side of the handle nearest approaching traffic.
9. The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

1. The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
2. Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
3. The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
4. The Flashing Arrow Board should be able to display the following symbols:



5. The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
6. The straight line caution display is NOT ALLOWED.
7. The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage.
8. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
9. Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
10. The sequential arrow display is NOT ALLOWED.
11. The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
12. The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
13. A Flashing Arrow Board SHALL NOT BE USED to intensify shift traffic.
14. A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
15. Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION

Flashing Arrow Boards shall be installed with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

TRUCK-MOUNTED ATTENUATORS

1. Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
2. Refer to the CMTCD for the requirements of Level 2 or Level 3 TMAs.
3. Refer to the CMTCD for a list of approved TMAs.
4. TMAs are required on freeways unless otherwise noted in the plans.
5. A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of one exposure without adversely affecting the work performance.
6. The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.

SHEET 7 OF 12

Texas Department of Transportation — Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION ARROW PANEL, REFLECTORS, WARNING LIGHTS & ATTENUATOR

BC(7)-14

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GENERAL NOTES

1. For long-term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate-term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

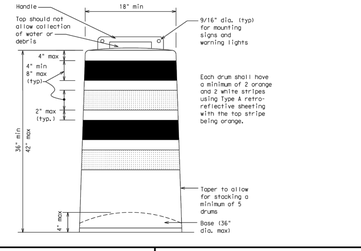
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width on the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectorized space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be hot dawn while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or approved equal.
9. Drum body shall have a maximum unpolished weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

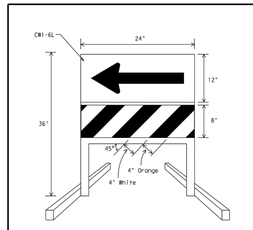
RETROREFLECTIVE SHEETING

1. The stripes used on drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface both hot, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

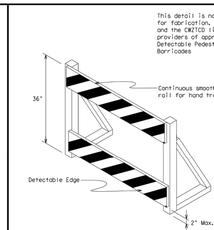
1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The bottom of the sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CMTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in locations susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.





DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_G or Type C_G Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CMTCD List. Ballast shall be as approved by the manufacturers instructions.



DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by pedestrians with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous edge may also be satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



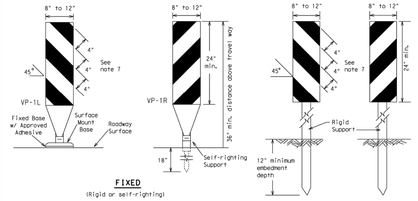
Plywood, Aluminum or Metal sign substrates shall NOT be used on plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CMTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_G or Type C_G Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Materials", unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A (Diagonal stripes on vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in

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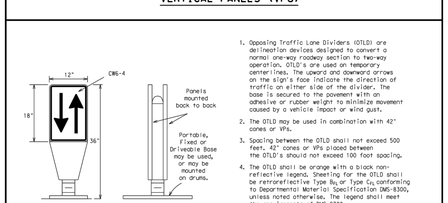
FIXED

DRIVEABLE

PORTABLE

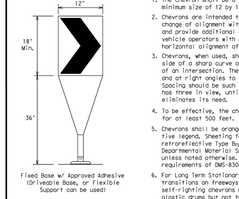
VERTICAL PANELS (VPs)

1. Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
2. VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs In Work Zones" for additional guidelines on the use of VP's for drop-offs.
3. VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
4. VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
5. Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
6. Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
7. Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.



OPPOSING TRAFFIC LANE DIVIDERS (OTLD)

1. Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to channel a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by vehicle impact or wind gust.
2. The OTLD may be used in combination with 42" cones or VPs.
3. Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
4. The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_R or Type C_R conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

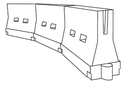


CHEVRONS

1. The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
2. Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
3. Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the chevron always has three in view, until the change in alignment eliminates its need.
4. To be effective, the chevron should be visible for at least 500 feet.
5. Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_R or Type C_R conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
6. For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

GENERAL NOTES

1. Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
2. Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
3. Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
4. The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
5. Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
6. Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
7. The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.



LONGITUDINAL CHANNELIZING DEVICES (LCD)

1. LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
2. LCDs may be used instead of a line of cones or drums.
3. LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
5. LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
6. LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

1. Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
2. Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
3. Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
4. Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
5. When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

Posted Speed *	Formula	Minimum Desirable Taper Lengths ** 10:1 Offset	11:1 Offset	12:1 Offset	Suggested Maximum Spacing of Channelizing Devices On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45		450'	495'	540'	45'	90'
50	L=WS	500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

** Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

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Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

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TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left, for the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.



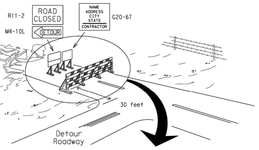
TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES

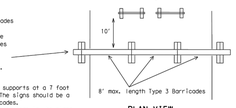
Each roadway of a divided highway shall be barricaded in the same manner.



PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

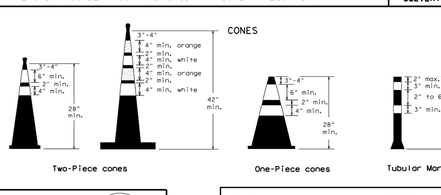
Barricade striping should slant downward in the direction of detour.



PLAN VIEW

1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.

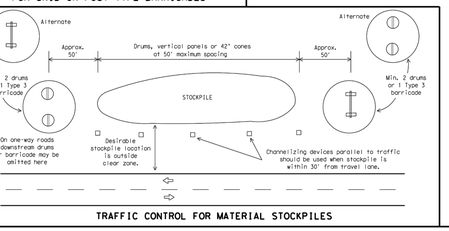
TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



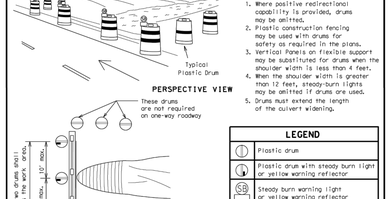
28" Cones shall have a minimum weight of 9 1/2 lbs.

42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



TRAFFIC CONTROL FOR MATERIAL STOCKPILES



1. Where positive redirectional capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

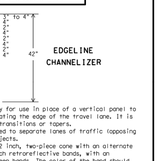
LEGEND

- Plastic drum
- Plastic drum with steady burn light or yellow warning reflector
- Steady burn warning light or yellow warning reflector

Increase number of plastic drums on the side of approaching traffic if the crown width makes it necessary. Minimum of 2 and maximum of 4 drums)

CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping patterns four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is supplemental or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

SHEET 10 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC(10)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	November 2002	CONT	SECT	JOB	HIGHWAY
9-07	8-14	DIST	COUNTY		SHEET NO.
7-13					

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DATE:
FILE:

WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet RZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

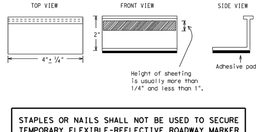
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
10. Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
   - A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
   - B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet RZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(T-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - two amber reflective surfaces with yellow body.
WHITE - lone silver reflective surface with white body.

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(11).

SHEET 11 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

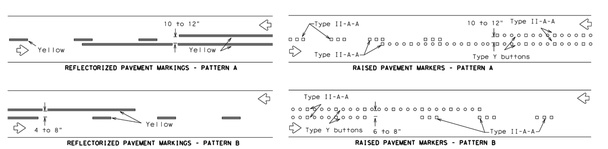
BC(11)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY
2-98	9-07	DIST	COUNTY		SHEET NO.
1-02	7-13				
7-02	8-14				

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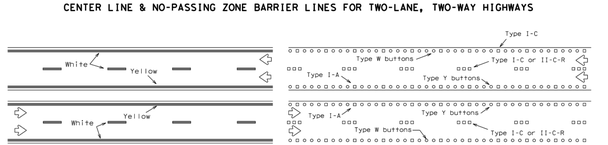
DATE:
FILE:

PAVEMENT MARKING PATTERNS



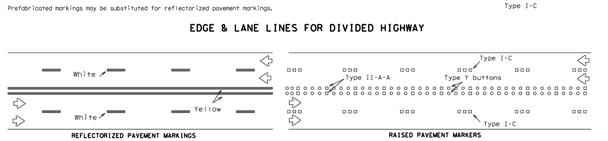
Pattern A is the TXDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectorized pavement markings.

CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



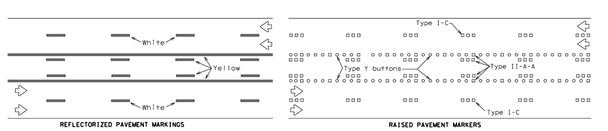
Prefabricated markings may be substituted for reflectorized pavement markings.

EDGE & LANE LINES FOR DIVIDED HIGHWAY



Prefabricated markings may be substituted for reflectorized pavement markings.

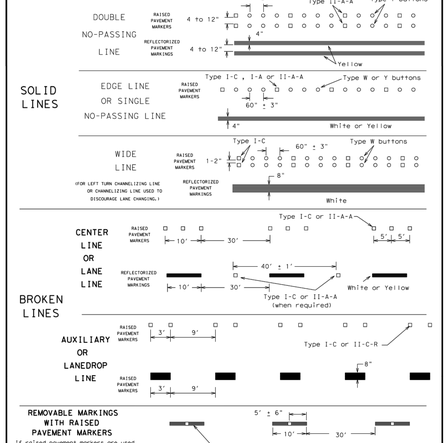
LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



Prefabricated markings may be substituted for reflectorized pavement markings.

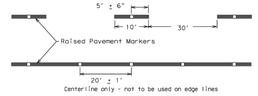
TWO-WAY LEFT TURN LANE

STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



Raised pavement markers used as standard pavement markings shall be from the approved products list and meet the requirements of Item 672 "RAISED PAVEMENT MARKERS."

SHEET 12 OF 12

Texas Department of Transportation | Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

BC(12)-14

FILE:	bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
©TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY
1-97	9-07	DIST	COUNTY		SHEET NO.
2-98	7-13				
11-02	8-14				

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RECORD DRAWINGS

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GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS — 106317 — LICENSED PROFESSIONAL ENGINEER — CAMERON A. SLOWN

4/5/2023

scale	
when bar is 1 inch long	
horiz	N/A
vert	N/A
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
BC (9-12) - 14

tnp project SBD20370
sheet 43 of 51

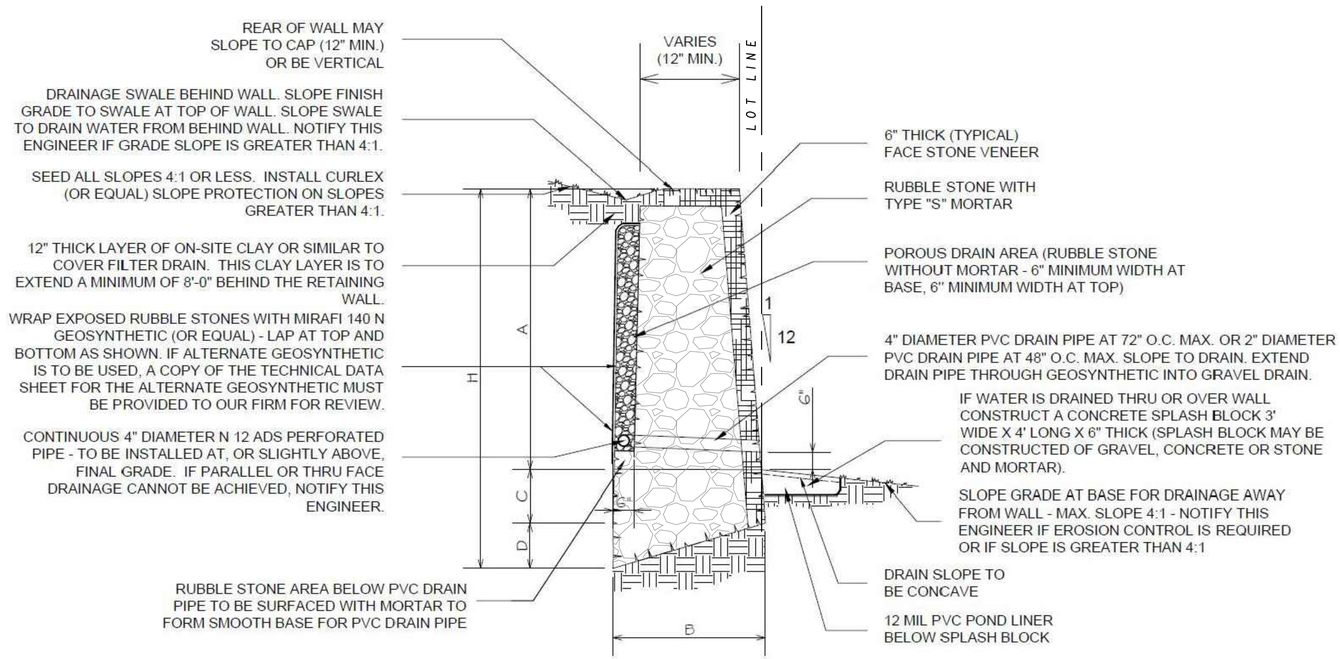
Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-SIGNAGE.dwg at Apr 05, 2023-7:15am by cslown

N O T E :
1) RETAINING WALLS 3' IN HEIGHT AND GREATER TO BE DESIGNED BY OTHERS. TOP OF WALL (TW) & BOTTOM OF WALL (BW) ARE INDICATED ON THE PLAN FOR FUTURE DESIGNER. WALL IS TO BE DESIGNED BY A PROFESSIONAL ENGINEER SELECTED BY THE CONTRACTOR WITH SAID DESIGN AND REQUEST FOR PERMIT TO BE SUBMITTED TO THE CITY FOR APPROVAL PRIOR TO RETAINING WALL CONSTRUCTION.

2) ALL WALLS TO BE ROCK OR STONE FACED.

3) NO WALL TO BE CONSTRUCTED WITHIN EASEMENTS.

4) RETAINING WALLS ARE TO BE INSTALLED ON THE HIGH SIDE OF LOT LINES, UNLESS OTHERWISE NOTED.



FOR REFERENCE ONLY

WALL DIMENSIONS TABLE FOR WALLS BEARING ON NATURAL SOILS

HEIGHT ABOVE GRADE		1'-0"	2'-0"	3'-0"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"	9'-0"	10'-0"
WIDTH OF BASE	B	0'-9"	1'-3"	2'-3"	2'-8"	3'-3"	3'-9"	4'-3"	4'-9"	5'-3"	6'-0"
DEPTH BELOW GRADE*	C	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	2'-0"	4'-6"	4'-6"	5'-0"
DEPTH SLOPED TOE*	D	1'-0"	1'-3"	1'-3"	1'-6"	1'-9"	2'-0"	2'-3"	2'-6"	3'-0"	3'-3"
TOTAL HEIGHT OF WALL**	H	3'-6"	4'-9"	5'-9"	7'-6"	8'-3"	9'-6"	11'-3"	12'-9"	16'-6"	19'-3"

RECORD DRAWINGS

no.	revision	by	date

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TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS — CAMERON A. SLOWIK — 106317 — LICENSED PROFESSIONAL ENGINEER

4/5/2023

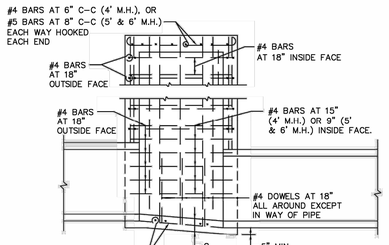
scale
when bar is 1 inch long
horiz N/A
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

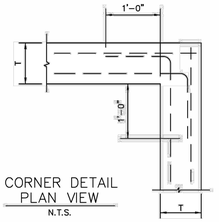
Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
RETAINING WALL DETAIL

tnp project SBD20370
sheet 44 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-RETAINING WALL DETAILS.dwg, dwg at Apr 05, 2023-7:15am by cslown



SECTION A–A
N.T.S.



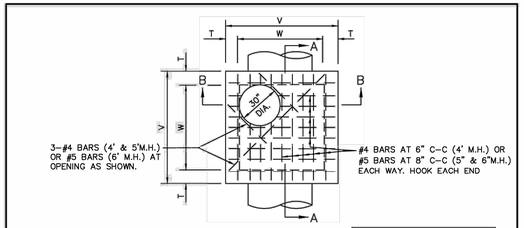
CORNER DETAIL
PLAN VIEW
N.T.S.

NOTES:

1. SLOPE INVERT OF MANHOLE AS INDICATED ON PLAN–PROFILE SHEET.
2. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACE SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT).
4. NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

STORM WATER MANHOLE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.1.4.1*	
4', 5', OR 6' SQUARE		DATE Mar. 2018	STANDARD DRAWING NO. R-6010B

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

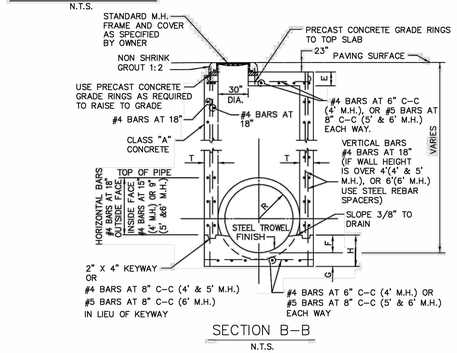


PLAN
N.T.S.

M.H. SIZE(W)	V	T	E	F	G	H
4'	5'–4"	8"	6"	9"	6"	1'–3"
5'	6'–4"	8"	6"	12"	8"	1'–8"
6'	7'–6"	9"	9"	16"	10"	2'–2"

TABLE OF DIMENSIONS
N.T.S.

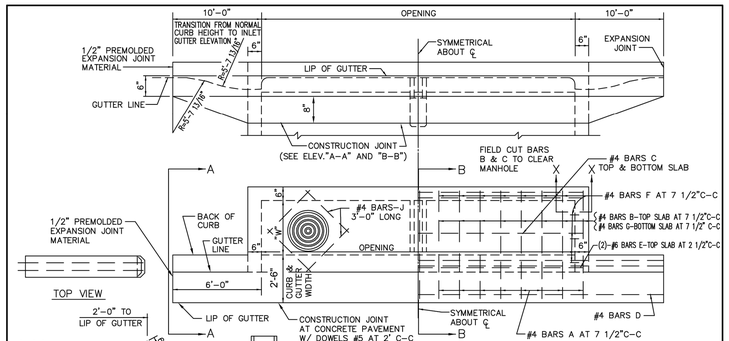
ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.



SECTION B–B
N.T.S.

STORM WATER MANHOLE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.1.4.1*	
4', 5', OR 6' SQUARE		DATE Mar. 2018	STANDARD DRAWING NO. R-6010A

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



PLAN
N.T.S.

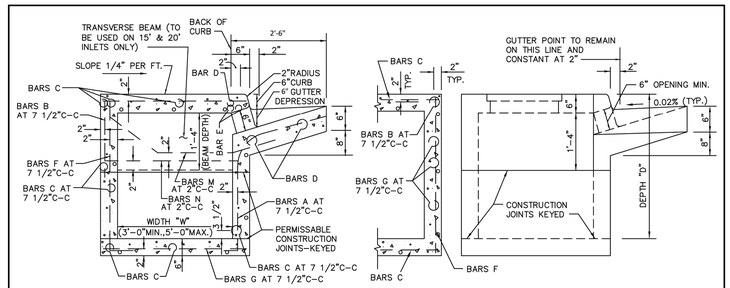
ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES. NO EARTH WALL FORMS, DOUBLE WALL FORMS TO BE USED.

NOTES:

1. LOCATION OF MANHOLE OPENING TO BE AT OUTFALL END, UNLESS OTHERWISE DIRECTED BY THE OWNER.
2. INLETS OVER 10' IN WIDTH SHALL HAVE A MANHOLE OPENING AT EACH END.

CURB INLET	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702	
5', 10', 15' OR 20' OPENING		DATE AUG. 2019	STANDARD DRAWING NO. R-6020A

R-6020A STANDARD DRAWING NO.



GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS "A" CONCRETE.
2. REINFORCING BARS SHALL BE STANDARD GRADE STEEL, DEFORMED REINFORCING BARS OF A DIAMETER AND LENGTH AS SHOWN.
3. CHAMFER ALL EXPOSED CORNERS 3/4" EXCEPT WHERE OTHERWISE NOTED.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMODATE STORM SEWER PIPE.
6. RING AND COVER SHALL BE APPROVED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES. NO EARTH WALL FORMS, DOUBLE WALL FORMS TO BE USED.

CURB INLET	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702	
CROSS SECTION & INLET THROAT		DATE AUG. 2019	STANDARD DRAWING NO. R-6020B

R-6020B STANDARD DRAWING NO.

RECORD DRAWINGS

no.	revision	by	date

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TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS — CAMERON A. SLOWIK — 106317 — LICENSED PROFESSIONAL ENGINEER

4/5/2023

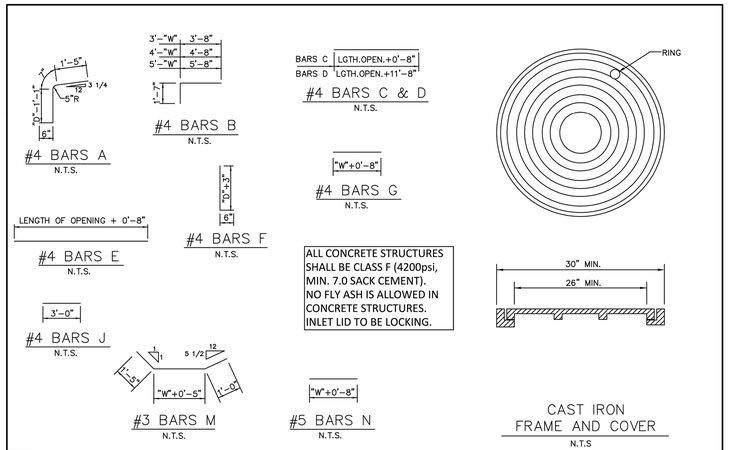
scale
when bar is 1 inch long
horiz N/A
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
STORM DRAIN DETAILS SHEET 1 OF 2

tnp project SBD20370
sheet 45 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-SD DETAILS.dwg at Apr 05, 2023-7:15am by cslown



CURB INLET	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702
REBAR & M.H. FRAME & COVER		DATE Mar. 2018 · STANDARD DRAWING NO. R-6020C

STANDARD DRAWING NO. 6020C

BILL OF REINFORCING STEEL

DEPTH "D"	ALL WIDTHS AND LENGTHS	OPENING LENGTH "L" = 5ft Widths "W" 3ft	4ft	5ft								OPENING LENGTH "L" = 10ft Widths "W" 3ft	4ft	5ft								OPENING LENGTH "L" = 15 ft Widths "W" 3ft	4ft	5ft								OPENING LENGTH "L" = 20 ft Widths "W" 3ft	4ft	5ft							
	BARS C	BARS D	BARS E	BARS J	BARS F	BARS F	BARS F	BARS A	BARS B	BARS G	BARS G	BARS C	BARS D	BARS E	BARS J	BARS F	BARS F	BARS F	BARS A	BARS B	BARS G	BARS G	BARS C	BARS D	BARS E	BARS J	BARS F	BARS F	BARS F	BARS A	BARS B	BARS G	BARS G	BARS C	BARS D	BARS E	BARS J	BARS F	BARS F	BARS F	BARS A	BARS B	BARS G	BARS G
	C	D	E	J	F	F	F	A	B	G	G	F	F	F	A	B	G	G	F	F	F	A	B	G	G	M	N	F	F	F	A	B	G	G	F	F	F	A	B	G	G	M	N
3'-6"	17	3	2	4	20	24	28	10	10	20	28	32	36	18	18	28	36	40	44	26	26	36	2	2	44	48	52	34	34	44	2	2											
3'-9"	18	"	"	"	"	"	"	"	"	20	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	"	"	44	"	"													
4'-0"	19	"	"	"	"	"	"	"	"	24	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	"	"	48	"	"													
4'-3"	19	"	"	"	"	"	"	"	"	24	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	"	"	48	"	"													
4'-6"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	50	"	"													
4'-9"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	50	"	"													
5'-0"	21	"	"	"	"	"	"	"	"	26	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	"	"	50	"	"													
5'-3"	23	"	"	"	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	"	"	52	"	"													
5'-6"	23	"	"	"	"	"	"	"	"	28	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	"	"	52	"	"													
5'-9"	25	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	54	"	"													
6'-0"	25	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	54	"	"													
6'-3"	26	"	"	"	"	"	"	"	"	30	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	"	"	54	"	"													
6'-6"	27	"	"	"	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	"	"	56	"	"													
6'-9"	27	"	"	"	"	"	"	"	"	32	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	"	"	56	"	"													
7'-0"	29	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	58	"	"													
7'-3"	29	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	58	"	"													
7'-6"	30	"	"	"	"	"	"	"	"	34	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	"	"	58	"	"													
7'-9"	31	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	60	"	"													
8'-0"	31	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	60	"	"													
8'-3"	32	"	"	"	"	"	"	"	"	36	"	"	"	"	"	44	"	"	"	"	"	52	"	"	"	"	"	"	"	60	"	"													
8'-6"	33	"	"	"	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	54	"	"	"	"	"	"	"	62	"	"													
8'-9"	34	"	"	"	"	"	"	"	"	38	"	"	"	"	"	46	"	"	"	"	"	54	"	"	"	"	"	"	"	62	"	"													
9'-0"	35	"	"	"	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	56	"	"	"	"	"	"	"	64	"	"													
9'-3"	36	"	"	"	"	"	"	"	"	40	"	"	"	"	"	48	"	"	"	"	"	56	"	"	"	"	"	"	"	64	"	"													
9'-6"	37	"	"	"	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	58	"	"	"	"	"	"	"	66	"	"													
10'-0"	38	"	"	"	"	"	"	"	"	42	"	"	"	"	"	50	"	"	"	"	"	58	"	"	"	"	"	"	"	66	"	"													

NOTE:
FOR CONVENIENCE, DEPTHS OF INLETS SHOWN IN ABOVE TABLES ARE IN INCREMENTS OF 3 INCHES BUT ANY DEPTHS OTHER THAN THOSE SHOWN ABOVE MAY BE USED WHEREVER DEEMED NECESSARY. QUANTITIES FOR OTHER DEPTHS FALLING WITHIN THE LIMITS OF THE TABLE MAY BE FOUND BY INTERPOLATION.

ALL CONCRETE STRUCTURES SHALL BE CLASS F (4200psi, MIN. 7.0 SACK CEMENT). NO FLY ASH IS ALLOWED IN CONCRETE STRUCTURES.

CURB INLET	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702
BILL OF REINFORCING STEEL		DATE Mar. 2018 · STANDARD DRAWING NO. R-6020D

STANDARD DRAWING NO. R-6020D

SUMMARY OF QUANTITIES FOR CURB INLETS

DEPTH "D"	5'-0" OPENING						10'-0" OPENING						15'-0" OPENING						20'-0" OPENING					
	WIDTH 3'-0"		WIDTH 4'-0"		WIDTH 5'-0"		WIDTH 3'-0"		WIDTH 4'-0"		WIDTH 5'-0"		WIDTH 3'-0"		WIDTH 4'-0"		WIDTH 5'-0"		WIDTH 3'-0"		WIDTH 4'-0"		WIDTH 5'-0"	
	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.	CONC C.Y.	STEEL LBS.
3'-6"	2.62	306	2.95	332	3.28	373	4.12	479	4.64	521	5.20	564	5.69	667	6.40	721	7.10	775	7.20	846	8.11	909	9.03	976
3'-9"	2.70	309	3.04	341	3.39	373	4.25	494	4.78	536	5.34	579	5.87	687	6.58	741	7.30	796	7.42	874	8.34	937	9.27	1010
4'-0"	2.78	328	3.14	364	3.49	399	4.38	518	4.92	565	5.49	610	6.05	718	6.77	776	7.49	835	7.64	909	8.58	976	9.51	1046
4'-3"	2.87	334	3.23	370	3.59	406	4.51	526	5.06	573	5.64	619	6.22	729	6.95	787	7.69	847	7.87	922	8.81	990	9.75	1061
4'-6"	2.95	356	3.32	394	3.69	431	4.64	558	5.20	607	5.79	656	6.40	770	7.14	830	7.88	891	8.09	973	9.04	1043	9.99	1115
4'-9"	3.03	361	3.41	410	3.79	438	4.77	566	5.34	616	5.94	665	6.57	780	7.32	841	8.07	903	8.31	986	9.27	1056	10.23	1129
5'-0"	3.12	367	3.51	416	3.90	445	4.90	574	5.47	624	6.09	674	6.75	791	7.51	853	8.27	915	8.53	999	9.50	1070	10.47	1144
5'-3"	3.20	383	3.60	424	4.00	465	5.03	600	5.61	652	6.23	704	6.93	827	7.69	890	8.46	955	8.76	1044	9.73	1118	10.71	1194
5'-6"	3.28	389	3.69	430	4.10	472	5.16	608	5.75	661	6.38	713	7.11	837	7.88	901	8.66	967	8.98	1057	9.97	1131	10.95	1208
5'-9"	3.37	405	3.78	451	4.20	495	5.29	635	5.89	690	6.53	744	7.28	874	8.07	940	8.85	1007	9.20	1102	10.20	1178	11.19	1258
6'-0"	3.45	415	3.88	460	4.30	504	5.42	646	6.03	702	6.68	757	7.45	888	8.25	954	9.05	1022	9.42	1119	10.43	1196	11.43	1276
6'-3"	3.53	425	3.97	470	4.41	515	5.55	661	6.17	718	6.83	773	7.63	908	8.44	975	9.24	1044	9.64	1147	10.66	1223	11.67	1305
6'-6"	3.62	437	4.06	486	4.51	532	5.68	681	6.31	739	6.97	797	7.81	935	8.62	1005	9.43	1057	9.87	1178	10.89	1258	11.92	1340
6'-9"	3.70	441	4.15	490	4.61	537	5.81	688	6.45	747	7.12	806	7.98	945	8.81	1015	9.63	1066	10.09	1191	11.12	1272	12.15	1355
7'-0"	3.78	460	4.25	510	4.71	560	5.94	716	6.59	777	7.27	837	8.16	981	8.99	1053	9.82	1126	10.31	1237	11.35	1319	12.40	1404
7'-3"	3.86	465	4.34	516	4.81	567	6.07	724	6.72	785	7.42	846	8.33	992	9.18	1065	10.02	1138	10.53	1249	11.59	1333	12.64	1418
7'-6"	3.95	477	4.43	529	4.91	570	6.20	742	6.86	804	7.57	866	8.51	1016	9.36	1089	10.21	1163	10.75	1290	11.82	1365	12.88	1451
7'-9"	4.03	491	4.53	544	5.02	597	6.33	762	7.00	826	7.71	890	8.67	1040	9.55	1116	10.41	1193	10.98	1313	12.05	1399	13.12	1498
8'-0"	4.12	496	4.62	550	5.12	604	6.46	770	7.14	834	7.86	899	8.86	1051	9.73	1129	10.60	1205	11.20	1325	12.28	1412	13.36	1510
8'-3"	4.20	504	4.71	559	5.22	613	6.59	784	7.28	849	8.01	915	9.04	1069	9.92	1149	10.80	1228	11.42	1353	12.51	1440	13.60	1529
8'-6"	4.28	519	4.80	576	5.32	632	6.71	804	7.42	871	8.16	938	9.21	1107	10.10	1176	10.99	1257	11.64	1385	12.74	1474	13.84	1565
8'-9"	4.37	528	4.90	586	5.42	643	6.84	819	7.56	886	8.31	954	9.39	1119	10.29	1199	11.18	1280	11.87	1410	12.97	1500	14.08	1592
9'-0"	4.45	545	4.99	605	5.53	664	6.97	842	7.70	912	8.46	982	9.56	1148	10.47	1231	11.38	1313	12.09	1447	13.21	1539	14.32	1631
9'-3"	4.53	554	5.08	614	5.63	674	7.10	858	7.84	929	8.60	999	9.74	1169	10.66	1252	11.57	1335	12.31	1474	13.44	1563	14.56	1660
9'-6"	4.62	568	5.17	630	5.73	692	7.23	878	7.97	950	8.75	1022	9.92	1195	10.84	1280	11.77	1365	12.53	1505	13.67	1600	14.80	1696
10'-0"	4.78	582	5.36	645	5.93	708	7.49	900	8.11	974	9.05	1048	10.27	1227	11.21	1312	12.16	1399	12.98	1546	14.13	1642	15.29	1739

NOTE:
FOR CONVENIENCE, DEPTHS OF INLETS SHOWN IN ABOVE TABLES ARE IN INCREMENTS OF 3 INCHES BUT ANY DEPTHS OTHER THAN THOSE SHOWN ABOVE MAY BE USED WHEREVER DEEMED NECESSARY. QUANTITIES FOR OTHER DEPTHS FALLING WITHIN THE LIMITS OF THE TABLE MAY BE FOUND BY INTERPOLATION.

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CURB INLET	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 702
SUMMARY OF QUANTITIES		DATE Mar. 2018 · STANDARD DRAWING NO. R-6020E

STANDARD DRAWING NO. R-6020E

RECORD DRAWINGS

no.	revision	by	date

tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 1019438
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS · CAMERON A. SLOWN · 106317 · LICENSED PROFESSIONAL ENGINEER
4/5/2023

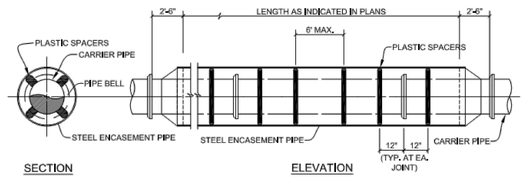
scale
when bar is 1 inch long
horiz N/A
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
STORM DRAIN DETAILS SHEET 2 OF 2

tnp project SBD20370
sheet 46 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-SD DETAILS.dwg, dwg at Apr 06, 2023-7:15am by cslown



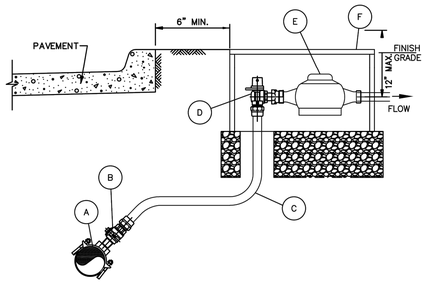
ENCASED ROAD BORE

NO SCALE

NOTES:

1) ALL BORES BY CONTRACTOR SHALL BE DRY BORES.
2) PREFABRICATED PLASTIC SPACERS SHALL BE RACI NORTH AMERICA OR APPROVED EQUAL, FOR THE SPECIFIC APPLICATION AS RECOMMENDED BY THE MANUFACTURER.
3) CONTRACTOR SHALL PROVIDE SUPPORT UNDER CARRIER PIPE TO HAVE A MIN. 1" CLEARANCE BETWEEN PIPE BELL AND ENCASEMENT PIPE.
4) ENDS OF ENCASEMENT PIPE SHALL HAVE END SEALS INSTALLED PER MANUFACTURER'S REQUIREMENTS. END SEALS SHALL BE CCI MODEL ESW WRAP-AROUND BY CCI PIPELINE SYSTEMS OR APPROVED EQUAL.
5) THE DESIGN ENGINEER SHALL DESIGN THE MINIMUM THICKNESS OF THE ENCASEMENT PIPE. DESIGN WILL NEED TO INCLUDE DEAD LOADING BASED ON THE HEIGHT OF COVER AND HS-20 LOADINGS FOR ROADWAY CROSSINGS AND E-80 LOADINGS FOR RAILROAD CROSSINGS.
6) STEEL ENCASEMENT PIPE SHALL CONFORM TO AWWA C-200. PIPE SHALL BE FABRICATED IN ACCORDANCE WITH ASTM A-570 FROM STEEL PLATES HAVING MINIMUM YIELD STRENGTH 36,000 PSI.
7) STEEL ENCASEMENT PIPE SHALL BE PAINTED INSIDE AND OUTSIDE WITH TWO COATS OF TNEMEC, H9 TNEMECOL, SERIES 46-465 COAL TAR, OR CITY APPROVED EQUIVALENT PRIOR TO DELIVERY TO THE JOB SITE. MINIMUM COATING INSIDE AND OUTSIDE SHALL BE 12+MILS DRY FILM THICKNESS (DFT) PER EACH COAT.
8) ENCASEMENT PIPE SHALL BE FEILD WELDED IN ACCORDANCE WITH AWWA C-206. WELDED JOINTS SHALL BE WIRE BRUSHED AND PAINTED WITH ONE COAT OF TNEMEC, OMNITHANE SERIES 530, 2.5-MILS DRY FILM THICKNESS 9DFT) OR CITY APPROVED EQUIVALENT.

UNDERGROUND CONDUIT	CITY OF ROCKWALL	
STEEL ENCASED BORE		DATE: OCT. '17 | DRAWING NO.: R-3090



NOTES:

1. SERVICE PIPE SHALL BE 1" OR 2" SEAMLESS 250 PSI BLUE COLORED POLYETHYLENE ASTM D2737, SDR 9, CTS WATER SERVICE PIPE, NSF61 APPROVED.
2. TOP OF METER BOXES SHALL BE 1" ABOVE FINISHED GRADE.
3. METER BOX SHALL HAVE A MINIMUM OF 6" OF GRAVEL BENEATH METER BOX AS ILLUSTRATED.
4. LOCATION OF THE METER BOX SHALL BE LOCATED TO ALLOW 6" CLEARANCE FROM CURB.

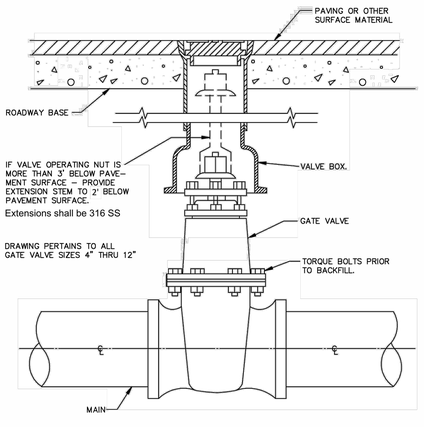
MATERIAL LIST:

A. SERVICE SADDLE SHALL BE BRASS WITH DOUBLE BRONZE FLATTENED STRAPS OR STAINLESS STEEL DOUBLE BOLT WIDE STRAPS. NO BANDED OR HINGED STRAPS SHALL BE ALLOWED. SERVICE SADDLES SHALL MEET AWWA/CC TAPPING OUTLET (TAPERED THREADS) REQUIREMENTS. ALL SERVICE SADDLES SHALL BE PER APPROVED WATER MATERIALS LIST.
B. 1" OR 2" CORPORATION STOP PER APPROVED WATER MATERIALS LIST.
C. 1" OR 2" SERVICE PIPE SHALL BE SEAMLESS 250 PSI BLUE COLORED POLYETHYLENE ASTM D2737, SDR9, CTS WATER SERVICE PIPE, NSF61 APPROVED.
D. 1" OR 2" LOCKING ANGLE METER VALVE (STOP) PER APPROVED WATER MATERIALS LIST.
E. WATER METERS CENTERED IN BOX AS ILLUSTRATED.
F. ROUND METER BOX PER APPROVED WATER MATERIALS LIST.

WATER SERVICE INSTALLATION	CITY OF ROCKWALL	
1" OR 2" LINE		DATE: AUG '19 | DRAWING NO.: R-4130

NOTE:

IN UNPAVED AREAS, INSTALL 2' x 2' x 6" CONCRETE VALVE PAD FLUSH WITH THE TOP OF VALVE BOX. REINFORCE WITH #3 BARS ON 6" CENTERS BOTH WAYS.

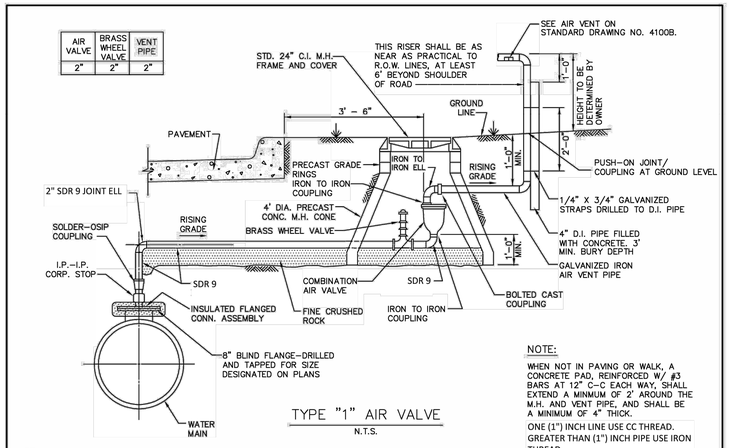


GATE VALVE BOX AND EXTENSION STEM

N.T.S.

GATE VALVE 4" TO 12" BOX & EXTENSION STEM	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 502.6.6* | DATE: AUG. '19 | STANDARD DRAWING NO.: R-4050

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



TYPE "1" AIR VALVE

N.T.S.

NOTE:

WHEN NOT IN PAVING OR WALK, A CONCRETE PAD, REINFORCED W/ #3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINIMUM OF 2' AROUND THE M.H. AND VENT PIPE, AND SHALL BE A MINIMUM OF 4" THICK.

ONE (1") INCH LINE USE CC THREAD. GREATER THAN (1") INCH PIPE USE IRON THREAD.

COMBINATION AIR VACUUM VALVE TYPE "1"	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 502.6.6* | DATE: Mar. 2018 | STANDARD DRAWING NO.: R-4090

STANDARD DRAWING NO. R-4090

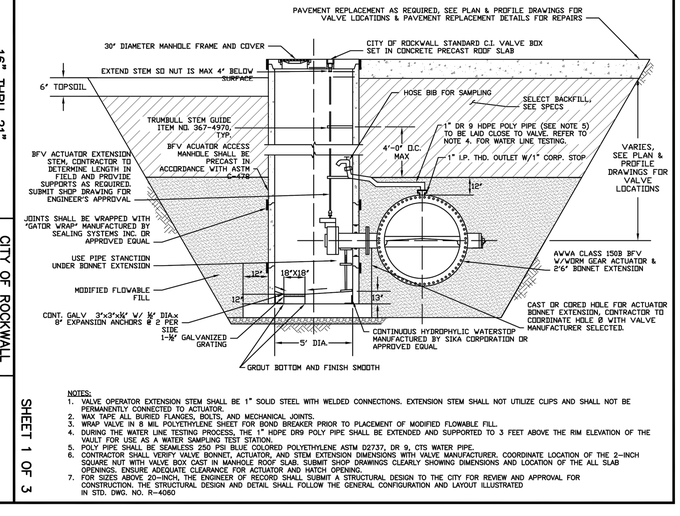
*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

HORIZONTAL BUTTERFLY VALVES 16" THRU 21"

CITY OF ROCKWALL

DATE: AUG '19 \| DRAWING NO.: R-4060

SHEET 1 OF 3

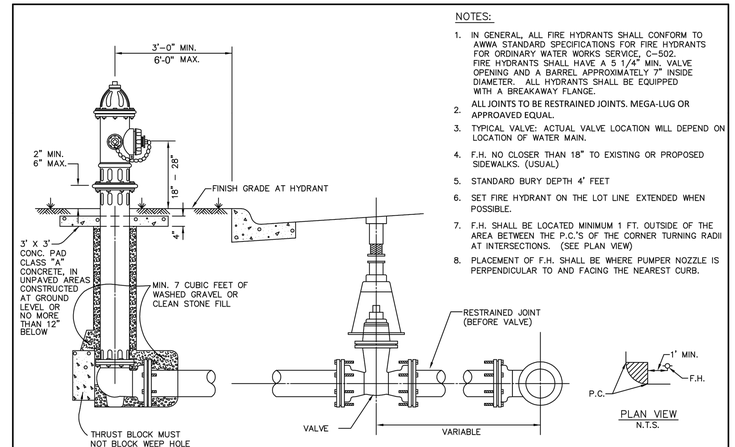


NOTES:

1. VALVE OPERATOR EXTENSION STEM SHALL BE 1" SOLID STEEL WITH WELDED CONNECTIONS. EXTENSION STEM SHALL NOT UTILIZE CLIPS AND SHALL NOT BE PERMANENTLY CONNECTED TO ACTUATOR.
2. WAX TAPE ALL BURIED FLANGES, BOLTS, AND MECHANICAL JOINTS.
3. WRAP VALVE IN 8 MIL POLYETHYLENE SHEET FOR BOND BREAKER PRIOR TO PLACEMENT OF MODIFIED FLOWABLE FILL.
4. DURING THE WATER LINE TESTING PROCESS, THE 1" HDPE DR9 POLY PIPE SHALL BE EXTENDED AND SUPPORTED TO 3 FEET ABOVE THE RIM ELEVATION OF THE VAULT FOR USE AS A WATER SAMPLING TEST STATION.
5. POLY PIPE SHALL BE SEAMLESS 250 PSI BLUE COLORED POLYETHYLENE ASTM D2737, DR 9, CTS WATER PIPE.
6. CONTRACTOR SHALL VERIFY VALVE BONNET, ACTUATOR, AND STEM EXTENSION DIMENSIONS WITH VALVE MANUFACTURER. COORDINATE LOCATION OF THE 2-INCH SQUARE NUT WITH VALVE BOX CAST IN MANHOLE ROOF SLAB. SUBMIT SHOP DRAWINGS CLEARLY SHOWING DIMENSIONS AND LOCATION OF THE ALL SLAB OPENINGS. ENSURE ADEQUATE CLEARANCE FOR ACTUATOR AND HATCH OPENING.
7. FOR SIZES ABOVE 20-INCH, THE ENGINEER OF RECORD SHALL SUBMIT A STRUCTURAL DESIGN TO THE CITY FOR REVIEW AND APPROVAL FOR CONSTRUCTION. THE STRUCTURAL DESIGN AND DETAIL SHALL FOLLOW THE GENERAL CONFIGURATION AND LAYOUT ILLUSTRATED IN STD. DWG. NO. R-4060

NOTES:

1. IN GENERAL, ALL FIRE HYDRANTS SHALL CONFORM TO AWWA STANDARD SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE, C-502. FIRE HYDRANTS SHALL HAVE A 5 1/4" MIN. VALVE OPENING AND A BARREL APPROXIMATELY 7" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE.
2. ALL JOINTS TO BE RESTRAINED JOINTS. MEGA-LUG OR APPROVED EQUAL.
3. TYPICAL VALVE: ACTUAL VALVE LOCATION WILL DEPEND ON LOCATION OF WATER MAIN.
4. F.H. NO CLOSER THAN 18" TO EXISTING OR PROPOSED SIDEWALKS. (USUAL)
5. STANDARD BURY DEPTH 4' FEET
6. SET FIRE HYDRANT ON THE LOT LINE EXTENDED WHEN POSSIBLE.
7. F.H. SHALL BE LOCATED MINIMUM 1 FT. OUTSIDE OF THE AREA BETWEEN THE P.C.'S OF THE CORNER TURNING RADII AT INTERSECTIONS. (SEE PLAN VIEW)
8. PLACEMENT OF F.H. SHALL BE WHERE PUMPER NOZZLE IS PERPENDICULAR TO AND FACING THE NEAREST CURB.



FIRE HYDRANT INSTALLATION	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE: 502.3 | DATE: Aug. 2019 | STANDARD DRAWING NO.: R-4120

STANDARD DRAWING NO. R-4120

RECORD DRAWINGS

no.	revision	by	date

tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS — CAMERON A. SLOWN — 106317 — LICENSED PROFESSIONAL ENGINEER — 4/5/2023

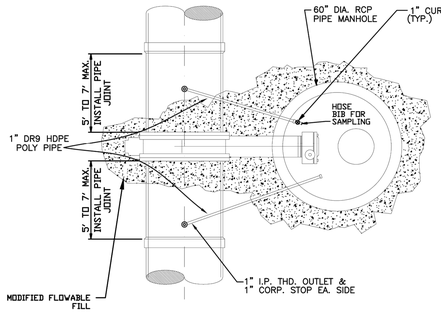
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horiz	N/A
vert	N/A
	APR 2023

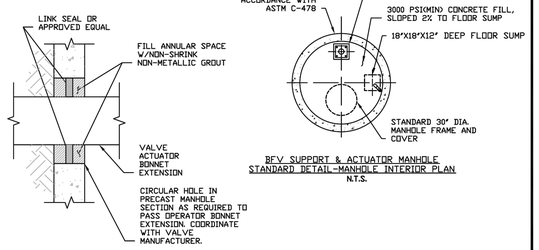
DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
WATER DETAILS SHEET 1 OF 2

tnp project SBD20370
sheet 47 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-WTR DETAILS.dwg, dwg at Apr 05, 2023-7:15am by cslown



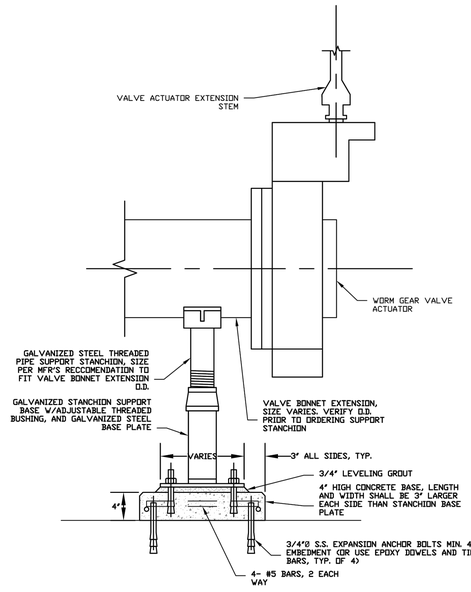


MANHOLE WALL PENETRATION DETAIL
N.T.S.

BFV SUPPORT & ACTUATOR MANHOLE STANDARD DETAIL-MANHOLE INTERIOR PLAN
N.T.S.

SHEET 2 OF 3

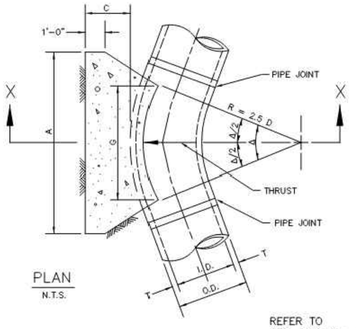
16" THRU 21"	CITY OF ROCKWALL		
HORIZONTAL BUTTERFLY VALVES		DATE AUG '19	DRAWING NO. R-4060



BFV SUPPORT & ACTUATOR MANHOLE STANDARD DETAIL- VALVE ACTUATOR SUPPORT
N.T.S.

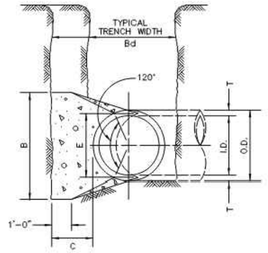
SHEET 3 OF 3

16" THRU 21"	CITY OF ROCKWALL		
HORIZONTAL BUTTERFLY VALVES		DATE AUG '19	DRAWING NO. R-4060



PLAN
N.T.S.

REFER TO STD. DWG. No. 4040 FOR GENERAL NOTES.



SECTION X-X
N.T.S.

HORIZONTAL THRUST BLOCK	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 502.4	
AT PIPE BEND		DATE OCT. '04	STANDARD DRAWING NO. 4010A

I.D. (IN.)	T (IN.)	Δ = 11.25° C (FT.)	Δ = 22.50° C (FT.)	E (FT.)
4,6,8	0.4	1.5	1.5	0.9
10,12	0.5	1.5	1.5	1.2
16,18	0.6	1.5	1.5	1.6
20	0.7	1.5	1.5	1.8
24	0.9	1.5	1.5	2.1
30	2.9	1.5	1.9	2.6
36	4.5	1.5	2.3	3.3
42	5.0	1.8	2.6	3.8
48	5.5	2.0	3.0	4.3
54	6.0	2.3	3.4	4.8
60	6.5	2.5	3.8	5.3
66	6.8	2.8	4.1	5.7
72	7.5	3.0	4.5	6.3
78	7.5	3.3	4.9	6.7
84	8.0	3.5	5.3	7.2
90	8.5	3.8	5.6	7.7
96	9.0	4.0	6.0	8.2

I.D. (IN.)	Δ = 11.25° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	I.D. (IN.)	Δ = 22.50° G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1
10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1
16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3
20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.0	0.4
24	1.1	8.9	3.0	3.5	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.5	0.5
30	1.4	10.4	3.0	3.5	0.6	2.0	3.5	0.4	30	2.7	20.7	5.0	4.5	1.5	3.0	4.0	0.8
36	1.7	15.0	3.5	4.5	0.9	2.0	4.0	0.5	36	3.3	29.8	5.5	5.5	2.3	4.0	4.0	1.3
42	1.9	20.4	4.5	5.0	1.5	2.5	5.0	0.8	42	3.8	40.5	7.0	6.0	3.9	4.5	5.0	2.1
48	2.2	26.6	4.5	6.0	2.0	2.5	6.0	1.1	48	4.4	52.9	8.0	7.0	5.7	4.5	6.0	2.8
54	2.5	33.7	6.0	6.0	3.0	3.0	6.0	1.4	54	4.9	67.0	9.0	8.0	8.0	6.0	6.0	4.1
60	2.7	41.6	6.0	7.0	3.8	3.0	7.0	1.8	60	5.5	82.7	9.5	9.0	10.6	6.0	7.0	5.3
66	3.0	50.3	6.5	8.0	5.1	3.5	8.0	2.7	66	6.0	100.1	10.5	10.0	14.1	6.5	8.0	7.2
72	3.3	59.9	7.5	8.0	6.3	4.0	8.0	3.3	72	6.6	119.1	11.0	11.0	17.6	7.5	8.0	9.1
78	3.6	70.2	8.0	9.0	8.1	4.0	9.0	3.9	78	7.1	139.8	12.0	12.0	22.5	8.0	9.0	11.7
84	3.8	81.5	8.5	10.0	10.3	4.5	10.0	5.3	84	7.6	162.1	13.0	12.5	27.2	8.5	10.0	14.8
90	4.1	93.5	9.5	10.0	12.2	5.0	10.0	6.3	90	8.2	186.1	14.0	13.5	33.7	9.5	10.0	17.7
96	4.4	106.4	10.0	11.0	15.0	5.0	11.0	7.4	96	8.7	211.7	15.0	14.5	41.2	10.0	11.0	21.8

TABLES OF DIMENSIONS AND QUANTITIES

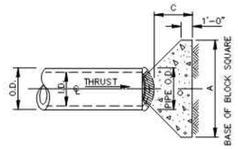
HORIZONTAL THRUST BLOCK	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 502.4	
AT PIPE BEND		DATE OCT. '04	STANDARD DRAWING NO. 4010B

Δ = 30° I.D. (IN.)	G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	Δ = 45° I.D. (IN.)	G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4,6,8	1.5	3.9	2.0	2.0	0.2	1.5	1.5	0.1
10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3
16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.6
20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7
24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1
30	3.6	27.5	6.5	5.0	1.9	3.5	4.0	0.9	30	5.4	40.6	8.5	5.0	3.2	5.5	4.0	1.6
36	4.4	39.5	7.0	6.0	3.4	4.5	4.5	1.6	36	6.5	58.5	10.0	6.0	5.3	6.5	4.5	2.6
42	5.1	53.8	8.0	7.0	5.1	5.5	5.0	2.5	42	7.5	79.6	11.5	7.0	8.1	8.0	5.0	4.2
48	5.8	70.3	9.0	8.0	7.4	6.0	6.0	3.7	48	8.6	104.0	13.0	8.0	11.9	9.0	6.0	6.3
54	6.5	89.0	10.0	9.0	10.3	7.0	6.5	5.3	54	9.7	131.5	15.0	9.0	17.1	10.5	6.5	8.9
60	7.3	110.0	11.0	10.0	13.9	7.5	7.5	7.3	60	10.7	162.4	16.5	10.0	23.1	11.0	7.5	12.0
66	8.0	132.9	12.5	11.0	18.9	8.5	8.0	9.6	66	11.8	196.5	18.0	11.0	30.1	12.0	8.5	16.2
72	8.7	158.2	13.5	12.0	24.0	9.0	9.0	12.3	72	12.9	233.9	19.5	12.0	38.6	14.0	8.5	20.7
78	9.4	185.6	14.5	13.0	30.0	10.0	9.5	15.6	78	13.9	274.5	21.5	13.0	49.8	14.5	9.5	25.9
84	10.1	215.3	15.5	14.0	37.1	10.5	10.5	19.5	84	15.0	318.4	23.0	14.0	61.2	15.5	10.5	32.6
90	10.9	247.1	16.5	15.0	45.0	11.5	11.0	23.9	90	16.1	365.5	24.5	15.0	74.5	17.5	10.5	39.6
96	11.6	281.2	18.0	16.0	55.5	12.5	11.5	28.9	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5

Δ = 67.50° I.D. (IN.)	G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)	Δ = 90° I.D. (IN.)	G (FT.)	THRUST (TONS)	EARTH A (FT.)	EARTH B (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK B (FT.)	ROCK VOL. (C.Y.)
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	4,6,8	2.7	7.1	5.0	1.5	0.4	2.0	2.0	0.2
10,12	3.1	12.6	5.5	2.5	0.8	3.5	2.0	0.4	10,12	4.0	16.0	6.5	2.5	1.0	3.5	2.5	0.5
16,18	4.7	28.3	7.5	4.0	1.9	5.5	3.0	0.9	16,18	6.0	36.0	9.0	4.0	2.4	4.5	4.0	1.0
20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.2	20	6.6	44.4	10.0	4.5	3.1	6.0	4.0	1.5
24	6.2	50.3	11.5	4.5	3.5	6.5	4.0	1.6	24	7.9	64.0	14.5	4.5	5.0	8.0	4.0	2.1
30	7.8	58.9	12.0	5.0	4.8	7.5	4.0	2.2	30	9.9	75.0	15.0	5.0	6.7	10.0	4.0	3.3
36	9.4	84.9	14.5	6.0	8.2	9.5	4.5	3.8	36	11.9	108.0	18.0	6.0	11.4	12.0	4.5	5.3
42	10.9	115.5	17.0	7.0	12.8	11.0	5.5	6.3	42	13.9	147.0	21.0	7.0	17.8	14.0	5.5	8.7
48	12.5	150.9	19.0	8.0	18.4	13.0	6.0	9.2	48	15.9	192.0	24.0	8.0	26.2	16.0	6.0	12.4
54	14.0	191.0	21.5	9.0	26.0	15.0	6.5	12.9	54	17.9	243.0	27.0	9.0	36.9	18.0	7.0	18.1
60	15.6	235.8	24.0	10.0	35.6	16.0	7.5	17.6	60	19.9	299.8	30.0	10.0	50.3	20.0	7.5	24.0
66	17.1	285.3	26.0	11.0	46.0	18.0	8.0	23.0	66	21.8	362.8	33.0	11.0	66.2	22.0	8.5	32.5
72	18.7	339.5	28.5	12.0	57.8	19.0	9.0	28.4	72	23.8	431.8	36.0	12.0	85.6	24.0	9.0	41.0
78	20.2	398.5	31.0	13.0	75.7	21.0	9.5	37.4	78	25.7	506.7	39.0	13.0	108.2	26.0	10.0	53.2
84	21.8	462.1	33.5	14.0	94.7	22.0	10.5	46.5	84	27.7	587.7	42.0	14.0	134.4	28.0	10.5	64.8
90	23.3	530.5	35.5	15.0	114.4	24.5	11.0	58.2	90	29.0	674.6	45.0	15.0	164.9	30.0	11.5	81.2
96	24.9	603.6	38.0	16.0	138.9	25.5	12.0	70.0	96	31.6	767.5	48.0	16.0	199.0	32.0	12.0	95.1

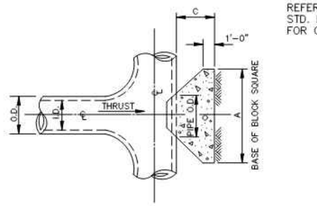
TABLES OF DIMENSIONS AND QUANTITIES

HORIZONTAL THRUST BLOCK	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 502.4	
AT PIPE BEND		DATE OCT. '04	STANDARD DRAWING NO. 4010C



PLAN OF PLUG THRUST BLOCK
N.T.S.

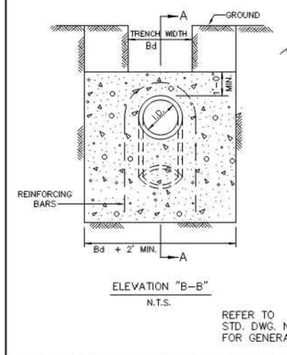
REFER TO STD. DWG. No. 4040 FOR GENERAL NOTES.



PLAN OF TEE THRUST BLOCK
N.T.S.

I.D. (IN.)	THRUST (TONS)	C (FT.)	EARTH A (FT.)	EARTH VOL. (C.Y.)	ROCK A (FT.)	ROCK VOL. (C.Y.)
4,6,8	5.1	1.5	2.5	0.3	2.0	0.2
10,12	11.3	1.5	3.5	0.6	2.5	0.3
16,18	25.5	2.0	5.5	1.6	4.0	0.9
20	31.5	2.0	6.0	1.9	4.0	0.9
24	45.2	2.5	7.0	3.1	5.0	1.7
30	53.0	3.0	7.5	4.1	5.5	2.4
36	76.3	4.0	9.0	7.3	6.5	4.2
42	104.0	4.5	10.5	11.0	7.5	6.2
48	136.0	5.0	12.0	15.6	8.5	8.7
54	172.0	5.5	13.5	21.4	9.5	11.9
60	212.0	6.0	15.0	28.4	10.5	15.7
66	257.0	6.5	16.5	36.8	11.5	20.5
72	305.0	7.5	17.5	47.2	12.5	27.2
78	358.0	8.0	19.0	58.9	13.5	33.7
84	416.0	8.5	20.5	72.3	14.5	41.2
90	477.0	9.0	22.0	87.7	15.5	49.7
96	543.0	9.5	23.5	104.8	16.5	61.0

HORIZONTAL THRUST BLOCK	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 502.4	
AT TEES AND PLUGS		DATE OCT. '04	STANDARD DRAWING NO. 4020



ELEVATION "B-B"
N.T.S.

SECTION "A-A"
N.T.S.

REFER TO STD. DWG. No. 4040 FOR GENERAL NOTES.

Δ → I.D. (IN.)	11.25° THRUST (TONS)	11.25° VOL. (C.Y.)	22.50° THRUST (TONS)	22.50° VOL. (C.Y.)	30° THRUST (TONS)	30° VOL. (C.Y.)	45° THRUST (TONS)	45° VOL. (C.Y.)	67.50° THRUST (TONS)	67.50° VOL. (C.Y.)	90° THRUST (TONS)	90° VOL. (C.Y.)	← Δ I.D. (IN.)
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30
36	14.9	7.5	29.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36
42	20.3	10.1	39.8	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42
48	26.5	13.2	51.9	26.0	67.9	33.9	96.0	48.0	126.0	62.7	136.0	67.9	48
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	75.0	196.0	98.0	212.0	106.0	60
66	50.1	25.0	98.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	543.0	272.0	96

VERTICAL THRUST BLOCK	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 502.4	
AT PIPE BEND		DATE OCT. '04	STANDARD DRAWING NO. 4030

GENERAL NOTES FOR ALL THRUST BLOCKS:

1. CONCRETE FOR BLOCKING SHALL BE CLASS "B".
2. ALL CALCULATIONS ARE BASED ON INTERNAL PRESSURE OF 200 PSI FOR DUCTILE IRON, P.V.C., AND 150 PSI FOR CONCRETE PIPE.
3. VOLUMES OF THRUST BLOCKS ARE NET VOLUMES OF CONCRETE TO BE FURNISHED. THE CORRESPONDING WEIGHT OF THE CONCRETE (CLASS "B") IS EQUAL TO OR GREATER THAN THE VERTICAL COMPONENT OF THE THRUST ON THE VERTICAL BEND.
4. WALL THICKNESS (T) ASSUMED HERE FOR ESTIMATING PURPOSES ONLY.
5. POUR CONCRETE FOR BLOCK AGAINST UNDISTURBED EARTH.
6. DIMENSIONS MAY BE VARIED AS REQUIRED BY FIELD CONDITIONS WHERE AND AS DIRECTED BY THE ENGINEER. THE VOLUME OF CONCRETE BLOCKING SHALL NOT BE LESS THAN SHOWN HERE.
7. THE SOIL BEARING PRESSURES ARE BASED ON 1000 LBS./S.F. IN SOIL AND 2000 LBS./S.F. IN ROCK.
8. USE POLYETHYLENE WRAP OR EQUAL BETWEEN CONCRETE AND BEND, TEE, OR PLUG TO PREVENT THE CONCRETE FROM STICKING TO IT.
9. CONCRETE SHALL NOT EXTEND BEYOND JOINTS.

THRUST BLOCK GENERAL NOTES	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 502.4	
		DATE OCT. '04	STANDARD DRAWING NO. 4040

no.	revision	by	date

tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
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214.461.9867 ph 214.461.9864 fx
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TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS
CAMERON A. SLOWN
106317
LICENSED PROFESSIONAL ENGINEER
4/5/2023

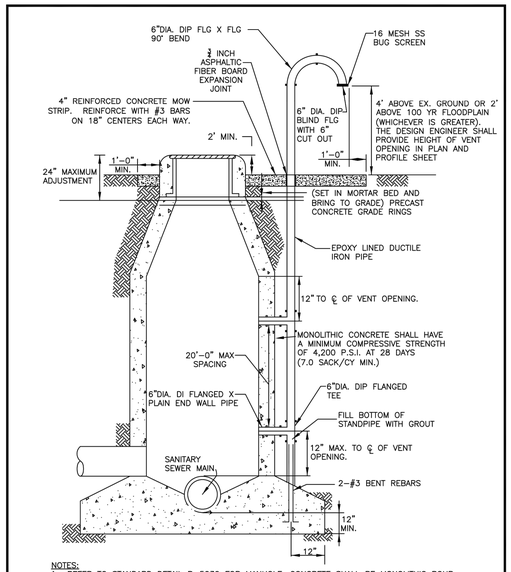
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horiz	N/A
vert	N/A
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
WATER DETAILS SHEET 2 OF 2

tnp project	sheet	of
SBD20370	48	51

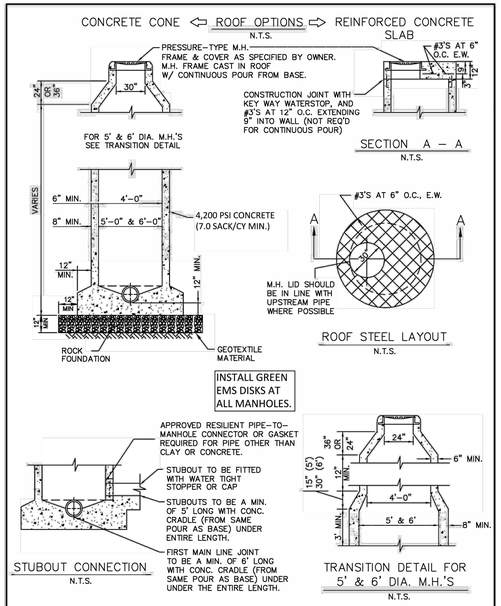
Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-WTR DETAILS.dwg at Apr 05, 2023-7:15am by cslown



NOTES:
1. REFER TO STANDARD DETAIL R-5030 FOR MANHOLE. CONCRETE SHALL BE MONOLITHIC POUR.
2. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS, MANHOLE JOINTS, AND ON OUTSIDE OF STRUCTURE.

SHEET 1 OF 2

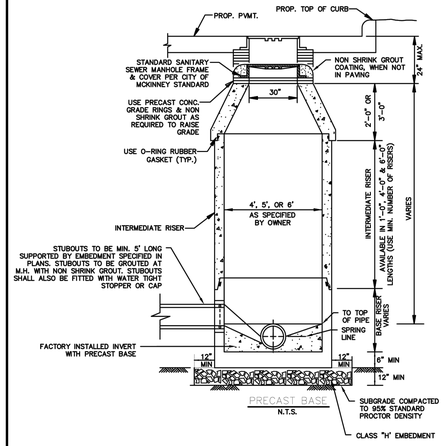
WASTEWATER MANHOLE	CITY OF ROCKWALL		
VENTED		DATE AUG '19	DRAWING NO. R-5060



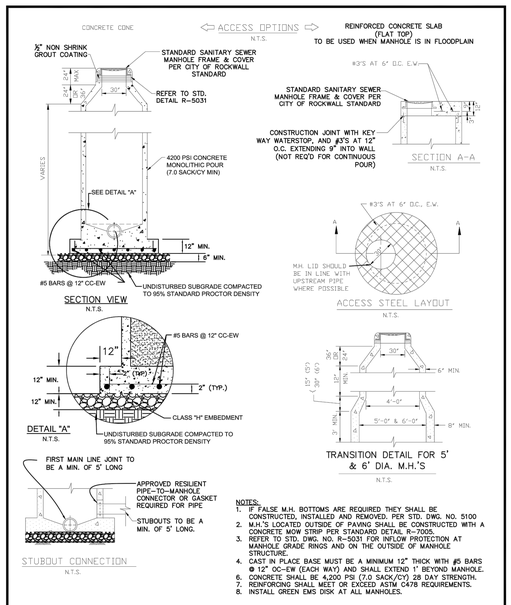
WASTEWATER MANHOLE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.1.4.1.5*	
PRESSURE-TYPE		DATE Mar. 2018	STANDARD DRAWING NO. R-5050

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

NOTES:
1. FIRST MAIN LINE JOINT TO BE A MIN. OF 5' LONG.
2. IF FALSE M.H. ARE REQUIRED, THEY SHALL BE CONSTRUCTED, INSTALLED AND REMOVED PER STD. DWG. NO. 5100.
3. M.H.'S LOCATED OUTSIDE OF PAVING SHALL BE CONSTRUCTED WITH A CONCRETE MOW STRIP PER STD. DWG. NO. R-7005.
4. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS, MANHOLE JOINTS AND ON OUTSIDE OF STRUCTURE.
5. REFER TO STD. DWG. NO. R-5032 FOR CORROSION PROTECTION.
6. CONCRETE SHALL BE 4,200 PSI (7.0 SACK/CY) 28 DAY STRENGTH.
7. REINFORCING SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
8. INSTALL GREEN EMS DISK AT ALL MANHOLES.
9. LIP TO BE PRECAST.

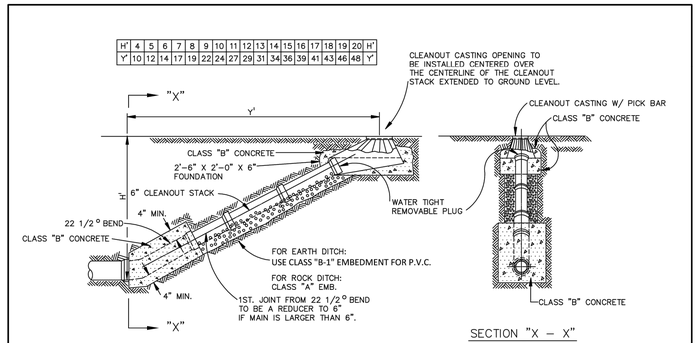


WASTEWATER MANHOLE	CITY OF ROCKWALL		
PRECAST		DATE AUG '19	DRAWING NO. R-5020



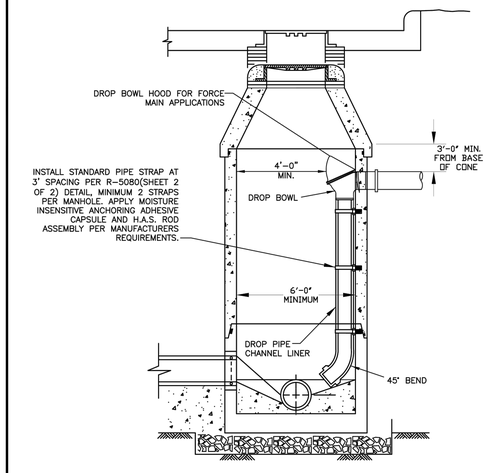
NOTES:
1. IF FALSE M.H. BOTTOMS ARE REQUIRED THEY SHALL BE CONSTRUCTED, INSTALLED AND REMOVED. PER STD. DWG. NO. 5100
2. M.H.'S LOCATED OUTSIDE OF PAVING SHALL BE CONSTRUCTED WITH A CONCRETE MOW STRIP PER STANDARD DETAIL R-7005.
3. REFER TO STD. DWG. NO. R-5031 FOR INFLOW PROTECTION AT MANHOLE GRADE RINGS AND ON THE OUTSIDE OF MANHOLE STRUCTURE.
4. CAST IN PLACE BASE MUST BE A MINIMUM 12" THICK WITH #5 BARS @ 12" OC-EW (EACH WAY) AND SHALL EXTEND 1' BEYOND MANHOLE.
6. CONCRETE SHALL BE 4,200 PSI (7.0 SACK/CY) 28 DAY STRENGTH.
7. REINFORCING SHALL MEET OR EXCEED ASTM C478 REQUIREMENTS.
8. INSTALL GREEN EMS DISK AT ALL MANHOLES.

WASTEWATER MANHOLE	CITY OF ROCKWALL		
CAST-IN-PLACE		DATE AUG '19	DRAWING NO. R-5030



NOTES:
1. IF CLEANOUT IS PLACED IN ADVANCE OF PAVEMENT PLACE SAND AROUND CLEANOUT CASTING IN LIEU OF CLASS "B" CONCRETE.
2. IF CLEANOUT IS OUTSIDE OF PAVEMENT, CENTER CASTING IN 15"x15" CLASS "A" CONCRETE PAD "4" THICK.

STANDARD DRAWING NO. R-5110	WASTEWATER MAIN CLEANOUT	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 502.2	
			DATE Mar. 2018	STANDARD DRAWING NO. R-5110



NOTE:
1. DROP BOWL, DROP PIPE CHANNEL LINER AND STAINLESS STEEL PIPE CLAMPS AS MANUFACTURED BY RELINER/DURAN INC. OR APPROVED EQUAL.

SHEET 1 OF 2

WASTEWATER MANHOLE	CITY OF ROCKWALL		
DROP CONNECTIONS		DATE AUG '19	DRAWING NO. R-5080

RECORD DRAWINGS

no.	revision	by	date

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TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS — CAMERON A. SLOWN — 106317 — LICENSED PROFESSIONAL ENGINEER
4/5/2023

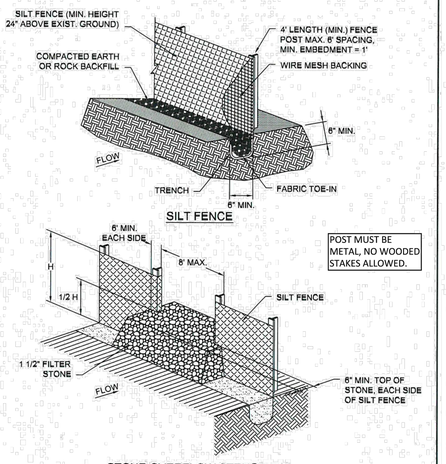
scale	
when bar is 1 inch long	
horiz	N/A
vert	N/A
APR 2023	

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
SANITARY SEWER DETAILS

tnp project	sheet	of
SBD20370	49	51

Drawing: P:\PROJECTS\SBD\20370\CAD\Sheets\SBD20370-SS DETAILS.dwg at Apr 05, 2023-7:18am by cslown



SILT FENCE

POST MUST BE METAL, NO WOODED STAKES ALLOWED.

STONE OVERFLOW STRUCTURE

SILT FENCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.5 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1020A

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

SILT FENCE GENERAL NOTES:

1. POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF ONE FOOT.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (e.g. PAVEMENT), WEIGHT FABRIC FLAP WITH ROCK ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.

3. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

4. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH SUPPORT POST OR TO WIRE BACKING, WHICH IN TURN IS ATTACHED TO THE FENCE POST. THERE SHALL BE A 3 FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.

5. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

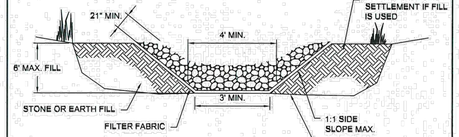
6. SILT FENCE SHALL BE REMOVED WHEN FINAL STABILIZATION IS ACHIEVED OR ANOTHER EROSION OR SEDIMENT CONTROL DEVICE IS EMPLOYED.

7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF HALF THE HEIGHT OF THE FENCE. THE SILT SHALL BE DISPOSED OF AT AN APPROVED SITE AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.

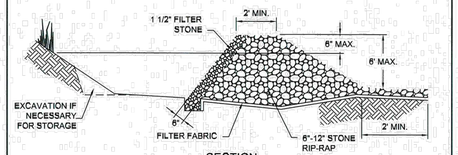
8. FILTER STONE SHALL BE WRAPPED IN FILTER FABRIC AND BURIED SIX (6") INCHES MINIMUM.

SILT FENCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.5 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1020B

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



VIEW LOOKING UPSTREAM



SECTION

NOTE: FILTER STONE SHALL BE WRAPPED IN APPROPRIATE SIZED WIRE MESH TO CONTAIN STONE.

STONE OUTLET SEDIMENT TRAP	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.12 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1090

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

ROCK CHECK DAM GENERAL NOTES:

1. STONE SHALL BE WELL GRADED WITH SIZE RANGE FROM 1½ TO 3½ INCHES IN DIAMETER DEPENDING ON EXPECTED FLOWS.

2. THE CHECK DAM SHALL BE INSPECTED AS SPECIFIED IN THE SWPPP AND SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

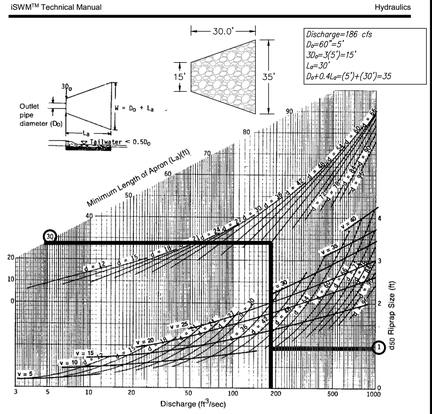
3. WHEN SILT REACHES A DEPTH EQUAL TO ONE–THIRD OF THE HEIGHT OF THE CHECK DAM OR ONE FOOT, WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF PROPERLY.

4. WHEN THE SITE HAS ACHIEVED FINAL STABILIZATION OR ANOTHER EROSION OR SEDIMENT CONTROL DEVICE IS EMPLOYED, THE CHECK DAM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

5. FILTER STONE SHALL BE WRAPPED IN APPROPRIATE SIZED WIRE MESH TO CONTAIN STONE AND BURIED SIX (6") INCHES MINIMUM.

ROCK CHECK DAM	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.9 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1060B

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



Curves may not be extrapolated.

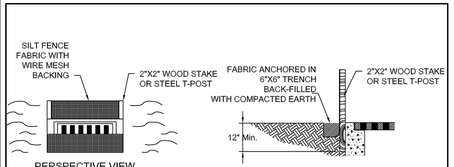
Figure 4.2 Design of Riprap Apron under Minimum Tailwater Conditions

(Source: USDA, SCS, 1975)

iSWM RIP RAP CALCULATIONS

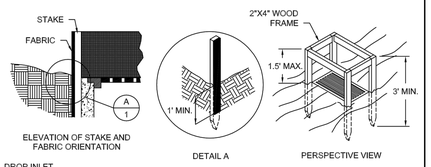
Energy Dissipation
April 2010, Revised 9/2014

HA-213



PERSPECTIVE VIEW

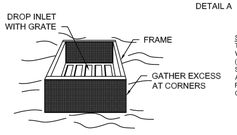
I. STANDARD INSTALLATION



ELEVATION OF STAKE AND FABRIC ORIENTATION

DETAIL A

PERSPECTIVE VIEW



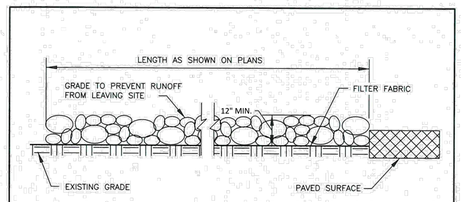
PERSPECTIVE VIEW

SPECIFIC APPLICATION:
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5 %) WHERE THE INLET SHEET OR OVER-LAND FLOWS (NOT TO EXCEED 1 C.F.S.) ARE TYPICAL. THE METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS SUCH AS IN STREETS OR HIGHWAY MEDIANS.

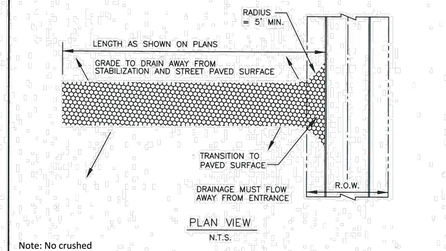
II. ALTERNATE INSTALLATION

INLET PROTECTION FILTER BARRIER	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 202.14 *	
		DATE OCT. '04	STANDARD DRAWING NO. 1120

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



PROFILE VIEW
N.T.S.



PLAN VIEW
N.T.S.

Note: No crushed concrete or recycled concrete allowed.

STABILIZED CONSTRUCTION ENTRANCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.11 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1070A

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

STABILIZED CONSTRUCTION ENTRANCE GENERAL NOTES:

1. STONE SHALL BE 4 TO 6 INCH DIAMETER COARSE AGGREGATE.

2. MINIMUM LENGTH SHALL BE 50 FEET AND WIDITH SHALL BE 20 FEET.

3. THE THICKNESS SHALL NOT BE LESS THAN 12 INCHES.

4. THE WIDTH SHALL BE NO LESS THAN THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.

5. WHEN NECESSARY, VEHICLES SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO A PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WITH DRAINAGE FLOWING AWAY FROM BOTH THE STREET AND THE STABILIZED ENTRANCE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.

6. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PAVED SURFACES. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PAVED SURFACES MUST BE REMOVED IMMEDIATELY.

7. THE ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

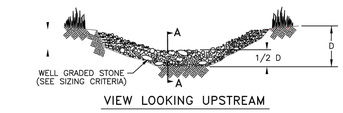
8. PREVENT SHORTCUTTING OF THE FULL LENGTH OF THE CONSTRUCTION ENTRANCE BY INSTALLING BARRIERS AS NECESSARY.

9. INSPECTION SHALL BE AS SPECIFIED IN THE SWPPP.

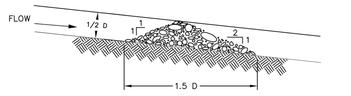
10. NO CRUSHED OR RECYCLED CONCRETE ALLOWED.

STABILIZED CONSTRUCTION ENTRANCE	CITY OF ROCKWALL	STANDARD SPECIFICATION REFERENCE 202.11 *	
		DATE Mar. 2018	STANDARD DRAWING NO. R-1070B

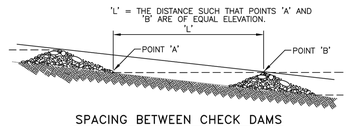
*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*



VIEW LOOKING UPSTREAM



SECTION A – A



SPACING BETWEEN CHECK DAMS

ROCK CHECK DAM	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 202.9 *	
		DATE OCT. '04	STANDARD DRAWING NO. 1060A

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

ROCK CHECK DAM GENERAL NOTES:

1. STONE SHALL BE WELL GRADED WITH SIZE RANGE FROM 1½ TO 3½ INCHES IN DIAMETER DEPENDING ON EXPECTED FLOWS.

2. THE CHECK DAM SHALL BE INSPECTED AS SPECIFIED IN THE SWPPP AND SHALL BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.

3. WHEN SILT REACHES A DEPTH EQUAL TO ONE–THIRD OF THE HEIGHT OF THE CHECK DAM OR ONE FOOT, WHICHEVER IS LESS, THE SILT SHALL BE REMOVED AND DISPOSED OF PROPERLY.

4. WHEN THE SITE HAS ACHIEVED FINAL STABILIZATION OR ANOTHER EROSION OR SEDIMENT CONTROL DEVICE IS EMPLOYED, THE CHECK DAM AND ACCUMULATED SILT SHALL BE REMOVED AND DISPOSED OF IN AN APPROVED MANNER.

ROCK CHECK DAM	North Central Texas Council of Governments	STANDARD SPECIFICATION REFERENCE 202.9 *	
		DATE OCT. '04	STANDARD DRAWING NO. 1060B

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. *Public Works Construction Standards North Central Texas, Fifth Edition.*

RECORD DRAWINGS

no.	revision	by	date

tnp

teague nall and perkins, inc
825 Watters Creek Blvd., Suite M300
Allen, Texas 75013
214.461.9867 ph 214.461.9864 fx
www.tnpinc.com
TBPELS: ENGR F-230; SURV 10011600, 10011601, 10194381
GBPE: PEF007431; TBAE: BR 2673

STATE OF TEXAS · CAMERON A. SLOWN · 106317 · LICENSED PROFESSIONAL ENGINEER

4/5/2023

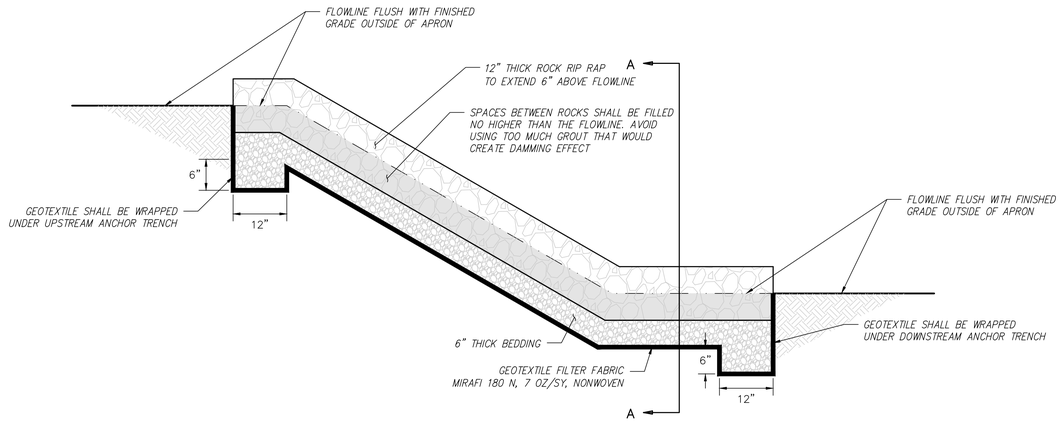
scale
when bar is 1 inch long
horiz N/A
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
PH: 972.960.9941

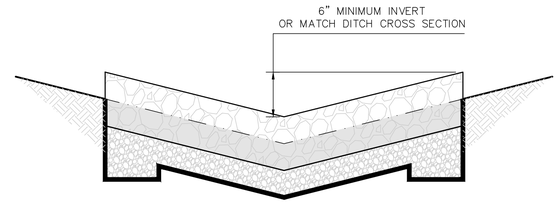
Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
EROSION CONTROL DETAILS 1 OF 2

tnp project SBD20370
sheet 50 of 51

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-EROS DETAILS.dwg at Apr 05, 2023-7:16am by cslown



PROFILE SECTION



CROSS SECTION A–A

ROCK RIP–RAP GRADATION	
12" THICKNESS OF RIP–RAP	
SIEVE SIZE – SQUARE MESH	% PASSING
15"	100
12"	70 – 100
8"	45 – 75
6"	30 – 55
3"	10 – 30
1–1/2"	0 – 10

BEDDING GRADATION	
6" THICKNESS OF BEDDING	
SIEVE SIZE – SQUARE MESH	% PASSING
3"	100
1.5"	55 – 100
3/4"	25 – 60
3/8"	5 – 30
NO. 4	0 – 10

GROUTED ROCK RIP RAP APRON

NOT TO SCALE

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STATE OF TEXAS
CAMERON A. SLOWN
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4/5/2023

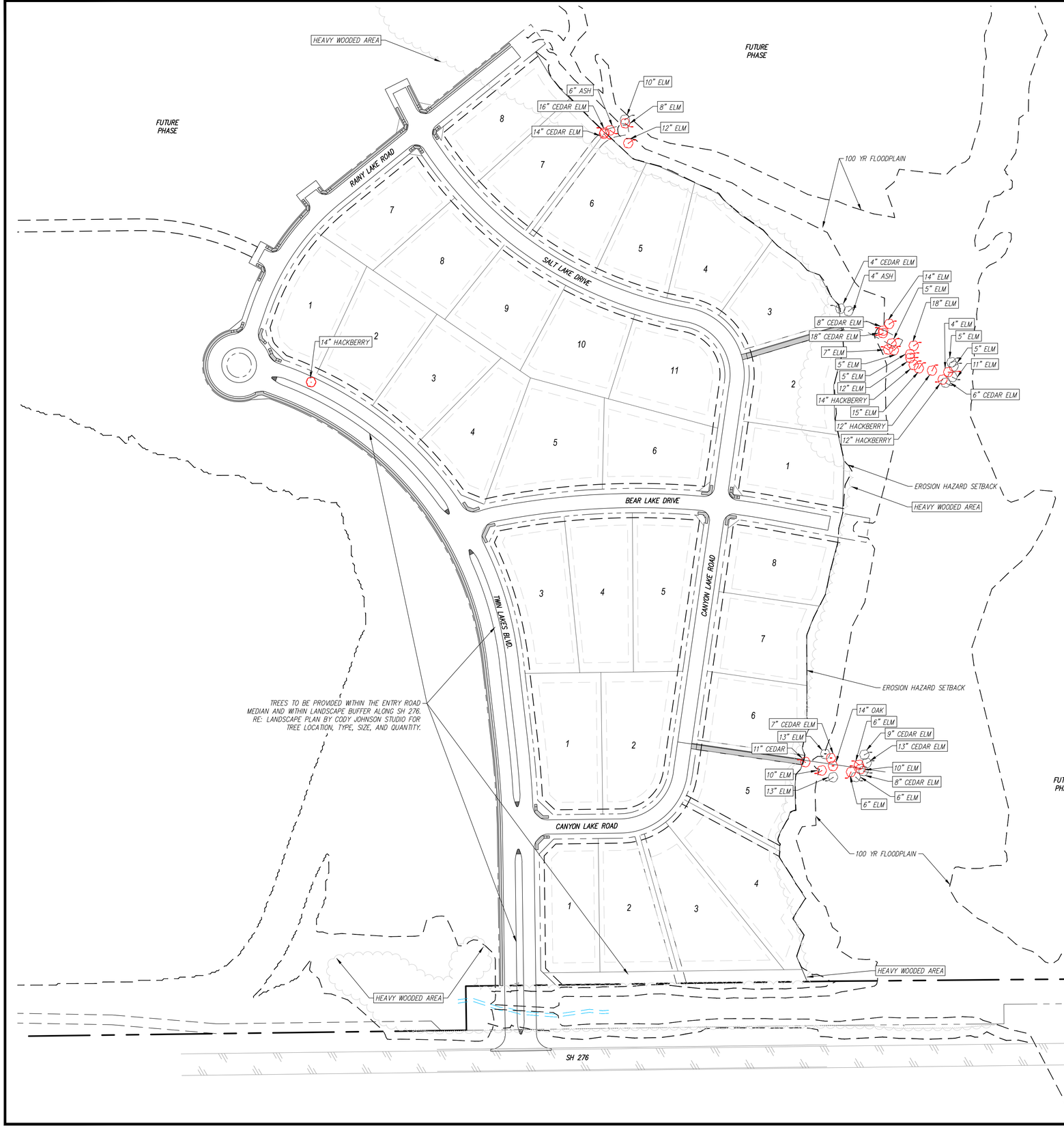
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when bar is 1 inch long
horiz N/A
vert N/A
APR 2023

DISCOVERY LAKES, LLC.
15400 KNOLL TRAIL DRIVE, SUITE 230
DALLAS, TX 75248
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Rockwall, Texas
Improvements for
DISCOVERY LAKES - PHASE 1
EROSION CONTROL DETAILS 2 OF 2

tnp project SBD20370
sheet 51 of 51

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TREE MITIGATION CHART *

Tag#	Diameter	Type	TO BE REMOVED?	REPLACEMENT DIA.
1000	14	Hackberry	YES	7
9501	14	Cedar Elm	YES	14
9502	16	Cedar Elm	YES	16
9503	6	ASH	YES	6
9504	10	Elm	NO	0
9505	8	Elm	YES	8
9506	12	Elm	YES	12
9507	4	ASH	NO	0
9508	4	Cedar Elm	NO	0
9509	8	Cedar Elm	YES	8
9510	18	Cedar Elm	YES	18
9511	14	Elm	YES	14
9512	5	Elm	YES	5
9513	7	Elm	YES	7
9514	5	Elm	YES	5
9515	18	Elm	YES	18
9516	5	Elm	YES	5
9517	12	Elm	YES	12
9518	14	Hackberry	YES	7
9519	15	Elm	YES	15
9520	12	Hackberry	YES	6
9521	12	Hackberry	YES	6
9522	6	Cedar Elm	NO	0
9523	11	Elm	NO	0
9524	4	Elm	YES	4
9525	5	Elm	NO	0
9526	5	Elm	NO	0
9527	11	Cedar	YES	11
9528	10	Elm	YES	10
9529	13	Elm	NO	0
9530	14	Oak	YES	14
9531	7	Cedar Elm	YES	7
9532	13	Elm	NO	0
9533	6	Elm	YES	6
9534	6	Elm	NO	0
9535	10	Elm	YES	10
9536	6	Elm	YES	6
9537	13	Cedar Elm	NO	0
9538	8	Cedar Elm	NO	0
9539	9	Cedar Elm	NO	0
TOTAL CALIPER INCHES TO BE REPLACED==>				257

* NOTE: ONSITE TREES NOT PROVIDED IN THE TREE MITIGATION CHART ARE ON THE "NOT PROTECTED LIST".

SCALE IN FEET
1" = 100'

LEGEND

- PROP. WATER LINE
- PROP. FIRE HYDRANT ASSEMBLY
- PROP. VALVE
- PROP. SANITARY SEWER LINE
- PROP. SANITARY SEWER MANHOLE
- MAJOR CONTOUR
- BUILDING SETBACKS
- FLOOD PLAIN
- TREE LINE
- TREES TO BE REMOVED
- PROTECTED TREE TO REMAIN

TREE MITIGATION NOTE

*1. THERE WILL BE A MINIMUM OF TWO, THREE INCH (4") CALIPER TREES PLANTED ON EACH RESIDENTIAL LOT IN ADDITION TO TWO, THREE INCH (3") CALIPER TREES PLANTED IN EACH CORNER LOT FOR A SUM TOTAL OF (2*4*32=256") + (2*3*12=72) 328" TO BE PLANTED WITHIN PHASE 1 OF THE DEVELOPMENT. ALL TREES PLANTED ARE TO BE FROM THE LIST OF CANOPY AND ACCENT TREES PROVIDED IN ARTICLE 8, LANDSCAPE STANDARDS, OF THE UNIFIED DEVELOPMENT CODE (UDC).*

2. EXISTING ONSITE TREES NOT PROVIDED IN THE TREE MITIGATION CHART ARE ON THE 'NOT PROTECTED LIST'.

3. ALL LOT PADS WITHIN PHASE 1 ADJACENT TO THE FLOOD PLAIN WILL BE CUSTOM AND CONSTRUCTED BY THE BUILDER. DRAINAGE PLANS WILL BE DESIGNED TO PREVENT GRADING WITHIN THE HEAVY WOODED AREA.

TREE MITIGATION COMPARISON CHART	
CALIPER INCHES OF TREES TO BE REMOVED	CALIPER INCHES OF TREES TO BE PLANTED IN LOTS , MEDIAN, AND LANDSCAPE BUFFER
257	496

OWNER:
DISCOVERY LAKES, LLC.
15400 Knoll Trail Drive, Suite 230
Dallas, Texas 75248

Tree Mitigation Plan
32 Residential Lots

Discovery Lakes Phase 1

Being a 307.18 Ac. Tract of land situated in the M.E. Hawkins Survey, Abstract No. 100 and the Robert K. Briscoe Survey, Abstract No. 16 in the City of Rockwall, Rockwall County Texas

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PROJECT INFORMATION
Project No.: SBD20370
Date: December 10, 2021
Drawn By: CAS
Scale: 1"=100'

SHEET 1 of 1

FOR CONSTRUCTION

Drawing: P:\PROJECTS\SBD20370\CAD\Sheets\SBD20370-TREE MITIGATION PLAN.dwg at Apr 05, 2023-7:16am by cstown