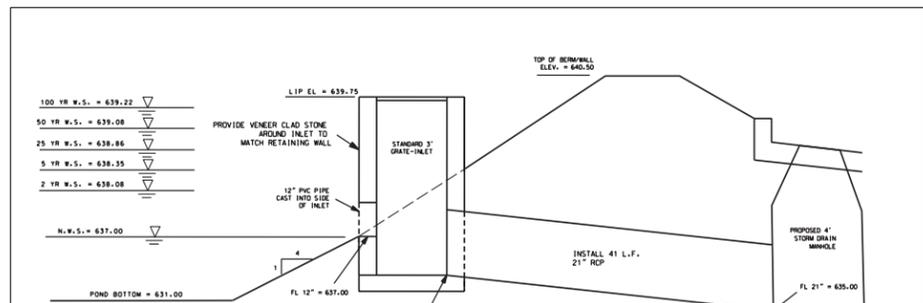


DETENTION POND A



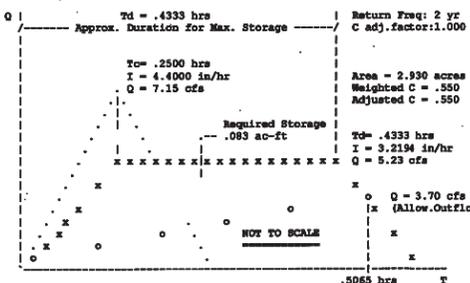
OUTFALL STRUCTURE DETAIL

POND SUBGRADE PREPARATION SHALL BE AS FOLLOWS:
 THE LINER FOR THE LAKE SIDES AND BOTTOM SHALL BE CLAY. THE CLAY MATERIAL UTILIZED FOR THE IMPERVIOUS POND LINER SHALL BE CONSTRUCTED OF CL OR CH SOILS. ALL MATERIAL SHALL HAVE A PLASTICITY INDEX (PI) OF GREATER THAN 20 AND A LIQUID LIMIT (LL) OF GREATER THAN 50. ALL CLAYS MUST BE APPROVED BY THE PROJECT SOILS ENGINEER. CLAY MUST CONSIST OF ON-SITE MATERIAL OR OFF-SITE MATERIAL IF NO CLAY IS AVAILABLE OR IF ON-SITE MATERIAL IS NOT SUFFICIENT.
 CONTRACTOR SHALL EXCAVATE TO SUBGRADE AND SUBGRADE SHALL BE FREE OF ROCKS OR OTHER FOREIGN DEBRIS. ANY AREAS THAT ARE PREDOMINANTLY SAND OR GRAVEL SHOULD BE OVER-EXCAVATED BY A MINIMUM OF TWO FEET AND REPLACED WITH AN APPROVED CLAY SOIL AS DESCRIBED ABOVE.
 AFTER COMPACTION OF THE SUBGRADE THE CONTRACTOR SHALL SPREAD THE SELECTED CLAY SEAL. THE IMPERVIOUS LINER SHALL BE A MINIMUM OF 2 FEET IN COMPACTED THICKNESS AND SHALL BE CONSTRUCTED IN LAYERS NOT TO EXCEED EIGHT (8) INCHES IN COMPACTED THICKNESS. COMPACTION SHALL BE A MINIMUM OF 95% OF ASTM D698 AND THE MOISTURE CONTENT OF THE MATERIAL SHALL BE 0-3% ABOVE OPTIMUM.
 WHEN CONSTRUCTION OF THE IMPERVIOUS POND LINER IS COMPLETE, THE POND SHALL BE FILLED WITH WATER AND KEPT FULL FOR AT LEAST 48 HOURS PRIOR TO MAKING THE TEST OF IMPERVIOUSNESS.

NOTES:
 EARTHEN SIDE SLOPES FOR DETENTION POND ARE TYPICALLY 4:1 (5:1 ABOVE NORMAL POOL LEVEL FOR WET PONDS).
 POND TO HAVE A CONSTANT WATER SURFACE AND SHALL BE SUPPLEMENTED WITH CITY METERED WATER TO MAINTAIN THAT LEVEL. POND SHALL ALSO BE AERATED BY USE OF FOUNTAIN OR BUBBLER.

DETENTION POND DESIGN (2 YR EVENT)
 DETENTION TO BE PROVIDED SUCH THAT PRE-DEVELOPED FLOWS ARE MAINTAINED TO THE EAST.
 Q2(PRE) - 16.0 CFS
 Q2(BYPASS) - 12.3 CFS
 Q2(ALLOWABLE) - OPRE-QBYPASS - 16.0 - 12.3 = 3.7 CFS
 Q2 TO POND:
 AREA - 03-A3-A4 - 2.93 ACRES
 TC - 15 MIN
 C - 0.55
 Q2 - 7.1 CFS

MODIFIED RATIONAL METHOD
 Graphical Summary for Maximum Required Storage Method I
 $Q = CIA \cdot \text{Units Conversion}$ Where Conversion = 43560 / (12 * 3600)
 RETURN FREQUENCY: 2 yr | Allowable Outflow: 3.70 cfs
 'C' Adjustment: 1.000 | Required Storage: .083 ac-ft
 Peak Inflow: 5.23 cfs
 HYG File: 2 yr



LEVEL POOL ROUTING SUMMARY
 HYG Dir = C:\Users\Keith\Documents\
 Inflow HYG file = work_psd.hyg - POND 10 IM 2 yr
 Outflow HYG file = work_psd.hyg - POND 10 OUT 2 yr
 Pond Node Data = POND 10
 Pond Volume Data = POND 10
 Pond Outlet Data = Outlet 1
 No Infiltration
 INITIAL CONDITIONS
 Starting WS Elev = 637.00 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Out = .00 cfs
 Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 Peak Inflow = 5.23 cfs at .2500 hrs
 Peak Outflow = 2.89 cfs at .5500 hrs
 Peak Elevation = 638.08 ft
 Peak Storage = .112 ac-ft

SITE GRADING LEGEND

- FF = FINISHED FLOOR
- TP = TOP PAVEMENT
- TI = TOP INLET
- TG = TOP GRATE INLET
- TC = TOP CURB
- GT = GUTTER
- FG = FINISHED GRADE
- TW = TOP WALL
- BW = BOTTOM WALL
- FL = FLOW LINE

- 690- EXISTING ELEVATION CONTOUR
- 690- PROPOSED ELEVATION CONTOUR



TREE PROTECTION -
 PLACE ORANGE VINYL FENCING ALONG TREE CANOPY/D RIP LINE
 *GRADING AROUND PROTECTED TREES SHALL BE LIMITED TO OUTSIDE OF TREE PROTECTION - NO GRADING INSIDE OF PROTECTIVE FENCING

NOTES:
 EARTHEN SIDE SLOPES FOR DETENTION POND ARE TYPICALLY 5:1

!!!IMPORTANT!!!
 CONTOURS REPRESENT FINISHED GRADES. ALL PAVING SHALL BE EXCAVATED TO SUBGRADE PER TYPICAL PAVING SECTIONS.

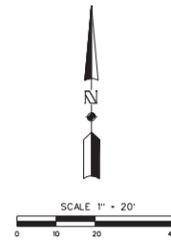
ALL EXCAVATION, TRENCHING AND SHORING OPERATIONS SHALL COMPLY WITH THE REQUIREMENTS OF THE U.S. DEPARTMENT OF LABOR, OSHA, "CONST. SAFETY AND HEALTH REGULATIONS", VOL. 29, SUB PART P, PG. 128-137, AND ANY AMENDMENTS THERETO.

CONSTRUCTION NOTES:
 THE TOP FOUR (4") INCHES OF TOP SOIL SHALL BE REMOVED FROM SITE AND STOCKPILED FOR LANDSCAPE USE. ALL CUT OR FILL SLOPES TO BE 4H:1V OR FLATTER UNLESS OTHERWISE NOTED.

AREAS WITHIN PUBLIC R.O.W. WILL BE HYDROMULCHED AND/OR CURLEX MATTED AFTER CONSTRUCTION AS DIRECTED BY ENGINEER.

UTILITY RELOCATION NOTE:
 IF ANY EXISTING UTILITY POLES, POWER POLES, GUY WIRES, TELEPHONE UTILITIES, ETC. ARE FOUND TO BE IN CONFLICT WITH THESE CONSTRUCTION PLANS, THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANY AND COORDINATE THE RELOCATION OF ANY AND/OR ALL SUCH UTILITIES (NO SPECIAL PAY).

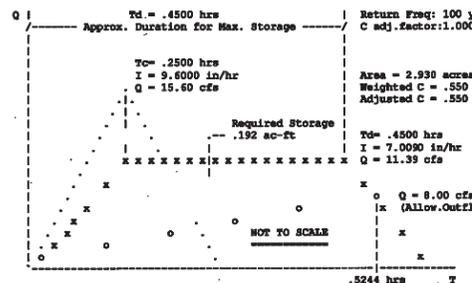
!!! CRITICAL !!!
 LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE AND ARE BASED ON PUBLIC RECORDS. THE CONTRACTOR IS COMPLETELY RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES, BOTH HORIZONTALLY AND VERTICALLY, BEFORE THE COMMENCEMENT OF ANY CONSTRUCTION.



DETENTION POND DESIGN (100 YR EVENT)
 DETENTION TO BE PROVIDED SUCH THAT PRE-DEVELOPED FLOWS ARE MAINTAINED TO THE EAST.
 Q100(PRE) - 34.9 CFS
 Q100(BYPASS) - 26.9 CFS
 Q100(ALLOWABLE) - OPRE-OBYPASS - 34.9 - 26.9 = 8.0 CFS
 Q100 TO POND:
 AREA - 03-A3-A4 - 2.93 ACRES
 TC - 15 MIN
 C - 0.55
 Q100 - 15.5 CFS

MODIFIED RATIONAL METHOD
 Graphical Summary for Maximum Required Storage Method I
 $Q = CIA \cdot \text{Units Conversion}$ Where Conversion = 43560 / (12 * 3600)

RETURN FREQUENCY: 100 yr | Allowable Outflow: 8.00 cfs
 'C' Adjustment: 1.000 | Required Storage: .192 ac-ft
 Peak Inflow: 11.39 cfs
 HYG File: 100 yr



LEVEL POOL ROUTING SUMMARY
 HYG Dir = C:\Users\Keith\Documents\
 Inflow HYG file = work_psd.hyg - POND 10 IM 100 yr
 Outflow HYG file = work_psd.hyg - POND 10 OUT 100 yr
 Pond Node Data = POND 10
 Pond Volume Data = POND 10
 Pond Outlet Data = Outlet 1
 No Infiltration
 INITIAL CONDITIONS
 Starting WS Elev = 637.00 ft
 Starting Volume = .000 ac-ft
 Starting Outflow = .00 cfs
 Starting Infiltr. = .00 cfs
 Starting Total Out = .00 cfs
 Time Increment = .0500 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY
 Peak Inflow = 11.39 cfs at .2500 hrs
 Peak Outflow = 5.03 cfs at .6000 hrs
 Peak Elevation = 639.22 ft
 Peak Storage = .266 ac-ft

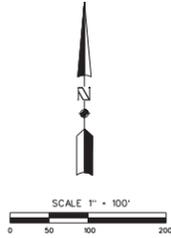
HAMILTON
 DUFFY, PC
 CONSULTING
 CIVIL & ENVIRONMENTAL ENGINEERS - PLANNERS - CONSTRUCTION MANAGERS
 8241 MID-CITIES BLVD., SUITE 100 NORTH RICHLAND HILLS, TEXAS 76182
 PHONE (817) 268-8498 FAX (817) 284-8488

SITE CONSTRUCTION PLANS
 EDEN ESTATES
 CITY OF NORTH RICHLAND HILLS, TEXAS
 DETENTION POND A

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 THESE DOCUMENTS ARE FOR DESIGN REVIEW AND NOT INTENDED FOR CONSTRUCTION, BIDDING, OR PERMIT PURPOSES. THEY WERE PREPARED BY OR UNDER SUPERVISION OF:
 KEITH M. HAMILTON 87384 EDATES
 PE NO. DATE

JOB	345-002
DATE	6-8-19
DESIGNED	K.M.H.
DRAWN	J.B.E.
CHECKED	K.M.H.
SCALE	AS SHOWN
DATE	
BY	
NO.	
REVISION	

SHEET
 C1.01D



I, Keith M. Hamilton, a Professional Engineer registered in the State of Texas, have prepared this drainage study in compliance with the latest published requirements and criteria of the City of North Richland Hills, and have verified that the topographic information used in this study is in compliance with said requirements and is otherwise suitable for developing their workable Plan of Drainage which can be implemented through proper subsequent detailed construction planning.
 Signature _____, P.E. • 87384

DRAINAGE AREA COMPUTATIONS

BASIS:
 Q • CIA (Rational Method)
 Q • Storm discharge (cubic feet per second)
 C • runoff coefficient, based on land use
 I • average rainfall intensity for time of concentration (inches per hour) (per Technical Paper No. 40)
 A • area contributing runoff (acres)

RUNOFF COEFFICIENT:
 C • 0.30 Parks and Open Areas
 C • 0.55 Single Family Residential
 C • 1.00 Roofs/Paved Areas

STORM FREQUENCY:
 5 Years - Enclosed Pipe System
 100 Years - Combined Enclosed Pipe System • Street • R.O.W.

TIME OF CONCENTRATION:
 Combination of inlet time and time of flow in the drain being the time for water to flow over the surface of the ground to the storm drain inlet (onsite - offsite, if applicable)

MINIMUM INLET TIME OF CONCENTRATION:

Undeveloped, Park Areas	20 minutes
Residential, Single Family	15 minutes
Commercial, Business	10 minutes

TIME OF CONCENTRATION DETERMINATION:
 (AREA B1)

CHANNELIZED FLOW n = 0.030 (short grass)
 500' @ 1.3% time = 4.4 min.

Tc = 15 + 4.4 = 19.4 minutes
 (Tc used to determine rainfall intensity "I")

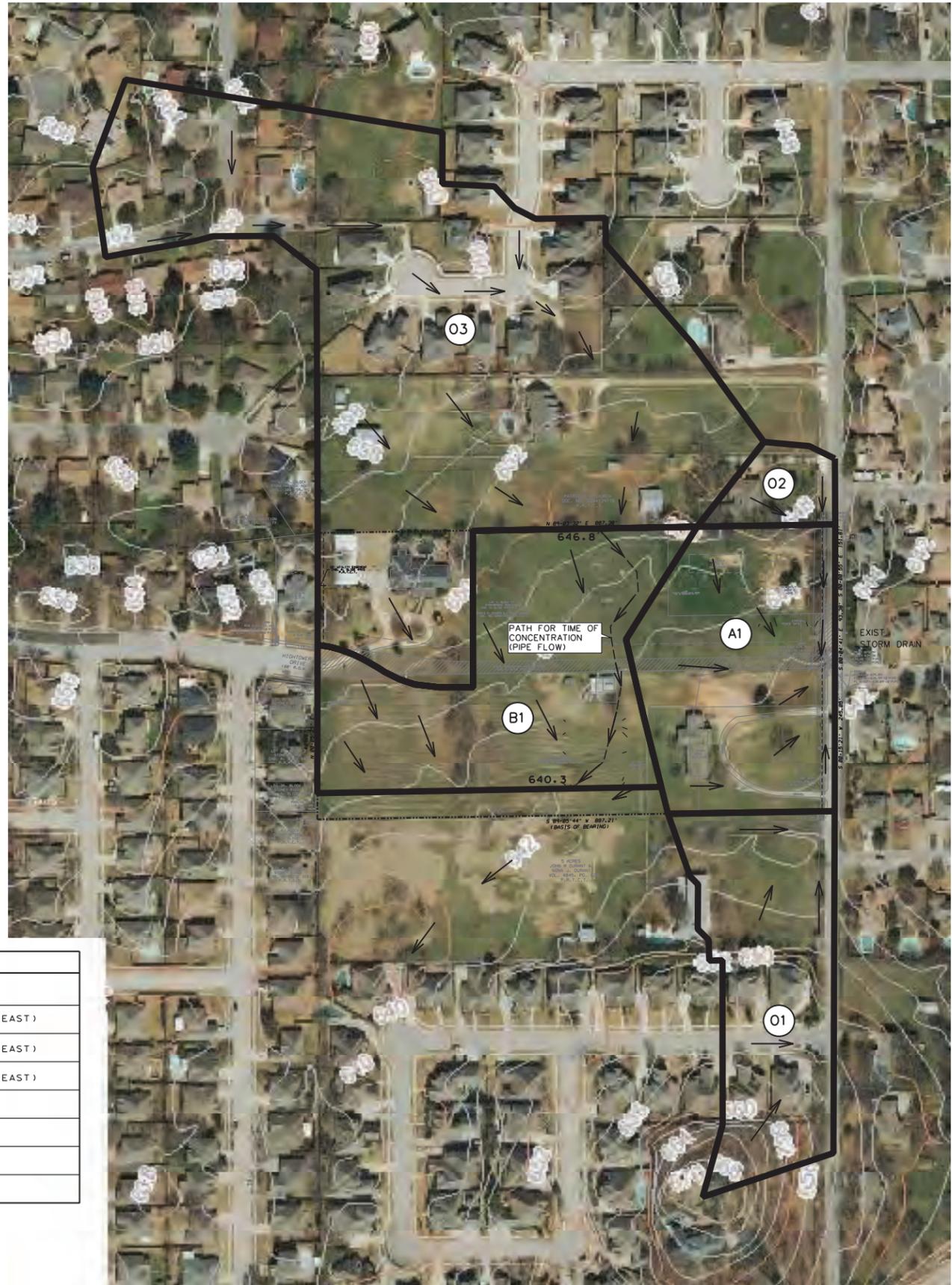
LEGEND

(A1) DRAINAGE AREA
 — DRAINAGE DIVIDE
 → FLOW DIRECTION ARROW

DRAINAGE NOTES:
 1. ALL DRAINAGE DESIGN IS IN ACCORDANCE WITH CITY OF NORTH RICHLAND HILLS'S DESIGN CRITERIA MANUAL.

PRE-DEVELOPED SITE DRAINAGE DATA														COMMENTS
MARK	AREA (AC)	C	Tc (MIN.)	I ₂ (IN/HR)	I ₅ (IN/HR)	I ₁₅ (IN/HR)	I ₃₀ (IN/HR)	I ₆₀ (IN/HR)	Q ₂ (CFS)	Q ₅ (CFS)	Q ₁₅ (CFS)	Q ₃₀ (CFS)	Q ₆₀ (CFS)	
O1	3.05	0.55	15	4.4	5.6	7.7	8.7	9.6	7.4	9.4	12.9	14.6	16.1	TO STORM DRAIN (EAST)
O2	0.56	0.55	15	4.4	5.6	7.7	8.7	9.6	1.4	1.7	2.4	2.7	3.0	TO STORM DRAIN (EAST)
A1	3.52	0.46 ¹	15	4.4	5.6	7.7	8.7	9.6	7.1	9.1	12.5	14.1	15.5	TO STORM DRAIN (EAST)
O1+O2+A1	7.13	0.51 ²	15	4.4	5.6	7.7	8.7	9.6	16.0	20.4	28.0	31.6	34.9	TOTAL TO EAST
O3	12.49	0.55	15	4.4	5.6	7.7	8.7	9.6	30.2	38.5	52.9	59.8	65.9	TO B1
B1	4.37	0.30	15	4.4	5.6	7.7	8.7	9.6	5.8	7.3	10.1	11.4	12.6	TO SOUTH
O3+B1	16.86	0.49 ³	19.4 ⁴	3.8	5.0	6.7	7.7	8.4	31.4	41.3	55.4	63.6	69.4	TOTAL TO SOUTH

NOTES:
 1. WEIGHTED C = [2.23(0.55)+1.29(0.30)]/3.52 = 0.46
 2. WEIGHTED C = [3.61(0.55)+3.52(0.46)]/7.13 = 0.32
 3. WEIGHTED C = [12.49(0.55)+4.37(0.30)]/16.86 = 0.49
 4. TC = 20 MIN (SEE CALCS THIS SHEET)



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 PHONE (817) 268-8488 FAX (817) 264-8488

SITE CONSTRUCTION PLANS
EDEN ESTATES
CITY OF NORTH RICHLAND HILLS, TEXAS
PRE-DEVELOPED DRAINAGE AREA MAP

PRELIMINARY FOR REVIEW ONLY
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 KEITH M. HAMILTON 87384 DATE: _____
 PE NO. _____

JOB NO.	345-002
DATE	6-6-19
DESIGNED BY	K.M.H.
DRAWN BY	J.B.E.
CHECKED BY	K.M.H.
SCALE	AS SHOWN
ENGINEERING FIRM NUMBER	F-5560

SHEET
C1.01A

**HAMILTON
DUFFY, PC**
CONSULTING
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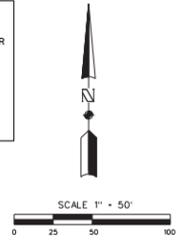
SITE CONSTRUCTION PLANS
EDEN ESTATES
CITY OF NORTH RICHLAND HILLS, TEXAS

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NO.	REVISION	DATE	BY	DATE	JOB
		6-26-19	K.M.H.		345-002
			J.B.E.		
			K.M.H.		

SHEET **C1.02**

BENCHMARKS:
PRIMARY BM: CITY OF NORTH RICHLAND HILLS SURVEY MARKER 408 2" BRASS DISK STAMPED "CITY OF NORTH RICHLAND HILLS BENCHMARK 408" SET IN THE CENTERLINE OF A 10" CURB INLET AT THE NW CORNER OF THE INTERSECTION OF STEPHANIE DRIVE AND STORYBROOK DRIVE. (ELEV = 626.873)
SITE BENCHMARK #53: AN "X" CUT IN THE CURB ON THE EAST SIDE OF EDEN ROAD, APPROXIMATELY 18'-2" EAST OF THE NE CORNER OF THE SURVEYED PROPERTY (ELEV = 644.75)
SITE BENCHMARK #52: AN "X" CUT IN THE SE CORNER OF A 6 INLET FOUND ON THE WEST SIDE OF EDEN ROAD, APPROXIMATELY 230' NW OF THE SE CORNER OF THE SURVEYED PROPERTY (ELEV = 639.27)



CRITICAL!!!
LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE AND ARE BASED ON PUBLIC RECORDS. THE CONTRACTOR IS COMPLETELY RESPONSIBLE FOR LOCATING ALL EXISTING UTILITIES, BOTH HORIZONTALLY AND VERTICALLY, BEFORE THE COMMENCEMENT OF ANY CONSTRUCTION.

UTILITY RELOCATION NOTE:
IF ANY EXISTING UTILITY POLES, POWER POLES, GUY WIRES, TELEPHONE UTILITIES, ETC. ARE FOUND TO BE IN CONFLICT WITH THESE CONSTRUCTION PLANS, THE CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY COMPANY AND COORDINATE THE RELOCATION OF ANY AND/OR ALL SUCH UTILITIES (NO SPECIAL PAY).

CONSTRUCTION NOTES:
THE TOP FOUR (4) INCHES OF TOP SOIL SHALL BE REMOVED FROM SITE AND STOCKPILED FOR LANDSCAPE USE. ALL CUT OR FILL SLOPES TO BE 4:1 OR FLATTER UNLESS OTHERWISE NOTED.
AREAS WITHIN PUBLIC ROW WILL BE HYDROMULCHED AND/OR CURLEX MATTED AFTER CONSTRUCTION AS DIRECTED BY ENGINEER.

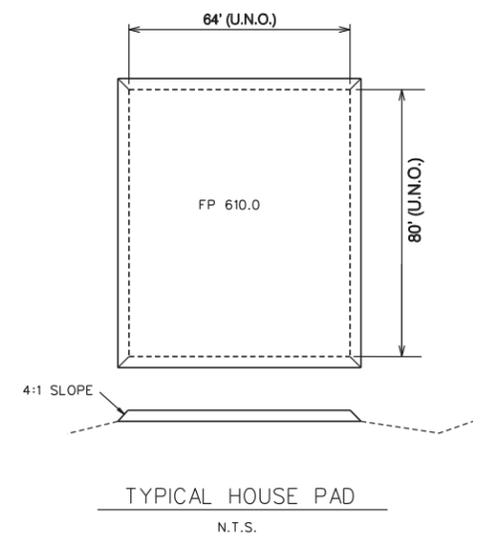
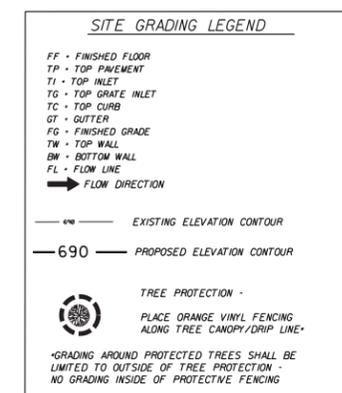
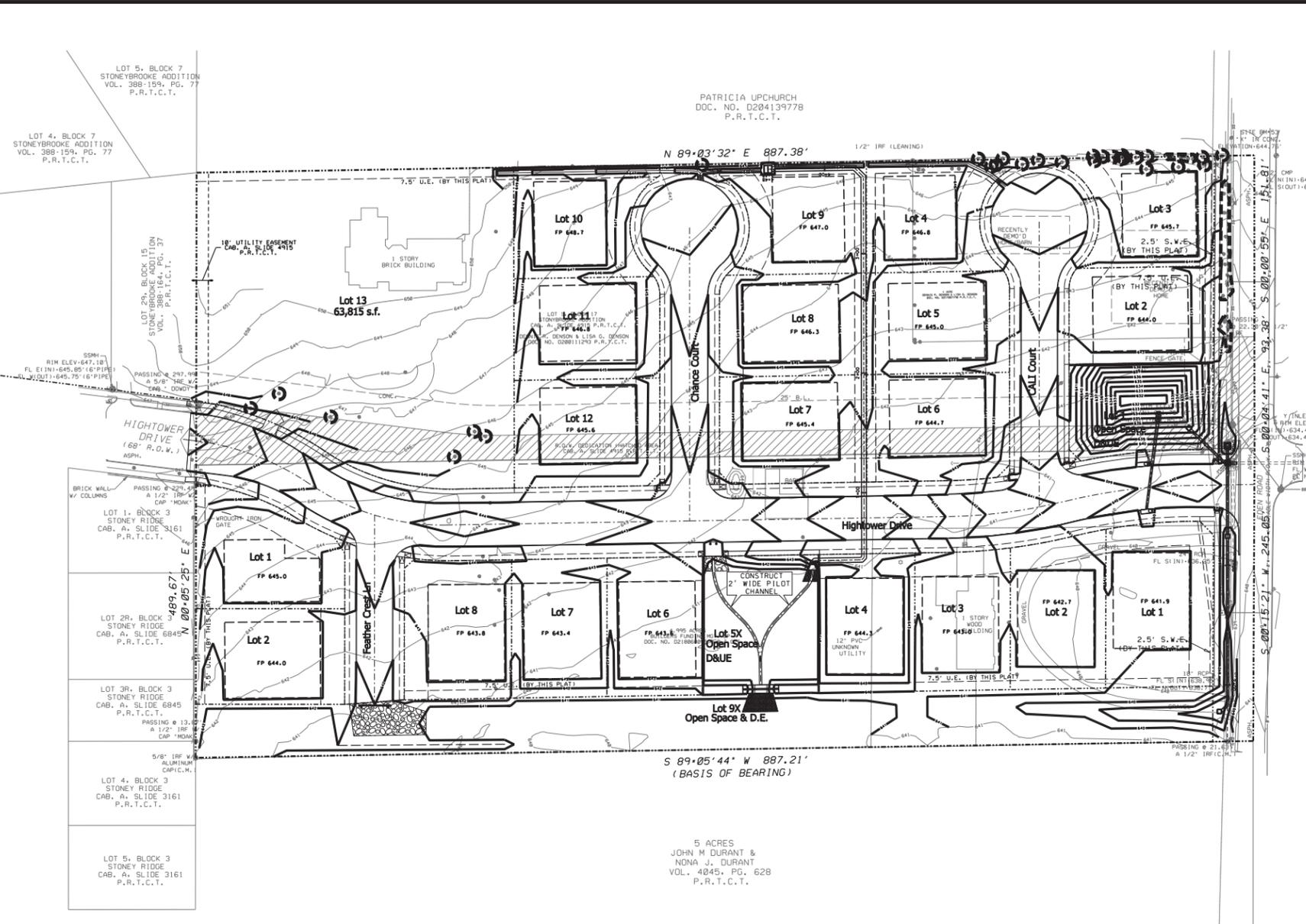
NOTE:
CONTRACTOR MUST PROVIDE A TRAFFIC CONTROL PLAN PRIOR TO BEGINNING WORK WITHIN EDEN ROAD.

IMPORTANT!!!
CONTOURS REPRESENT FINISHED GRADES. ALL PAVING SHALL BE EXCAVATED TO SUBGRADE PER TYPICAL PAVING SECTIONS.

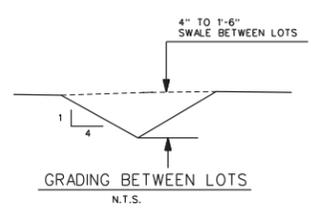
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GENERAL GRADING NOTES

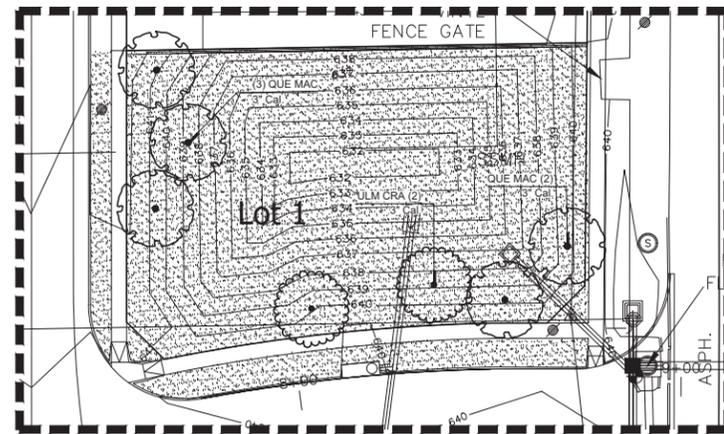
- GRADING CONTRACTOR IS RESPONSIBLE FOR DEMOLITION, CLEARING AND REMOVAL OF EXISTING STRUCTURES INCLUDING REMOVAL OF ANY EXISTING UTILITIES THAT MAY CONFLICT WITH THE PROPOSED LAYOUT.
- ADEQUATE MEASURES SHALL BE TAKEN TO PREVENT EROSION. THE GRADING CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLATION OF EROSION CONTROL SYSTEMS PRIOR TO BEGINNING CONSTRUCTION. THE UTILITY CONTRACTOR SHALL BE RESPONSIBLE FOR INLET PROTECTION UPON COMPLETION OF ALL STORM SEWER HEADWALLS, AND INLET TOPS. IN THE EVENT THAT SIGNIFICANT EROSION OCCURS AS A RESULT OF CONSTRUCTION, THE CONTRACTOR SHALL RESTORE THE ERODED AREA TO ORIGINAL CONDITION OR BETTER. RESTORED AREAS INCLUDE, BUT ARE NOT LIMITED TO, TRENCH BACKFILL, SIDE SLOPES, FENCES, CULVERT PIPE, DRAINAGE DITCHES, DRIVEWAYS, PRIVATE YARDS AND ROADWAYS.
- ALL AREAS TO BE FILLED ARE TO BE SCARIFIED AND PROOFROLLED PRIOR TO FILL PLACEMENT. ALL SOFT AREAS FOUND DURING PROOFROLLING SHALL BE OVER-EXCAVATED. ALL FILL SHALL BE COMPACTED TO A DENSITY OF AT LEAST 95% OF STANDARD PROCTOR DENSITY AND AS APPROVED BY THE CITY. ALL FILL SHALL BE TESTED AS INSTALLED AND CERTIFIED BY AN APPROVED SOILS LAB. ALL COSTS FOR TESTING SHALL BE BORNE BY THE CONTRACTOR.
- GRADING CONTRACTOR IS RESPONSIBLE FOR DISPOSAL OFF-SITE OF ALL EXCAVATED MATERIAL WHICH SOILS LAB DECLARES TO BE UNSUITABLE FOR ON-SITE USE.
- DRAINAGE SHALL NOT BE DIRECTED TOWARD THE BUILDING PAD. GRADING CONTRACTOR SHALL PROVIDE A MINIMUM OF 1.5% SLOPE AROUND BUILDING PAD.
- FINISH FLOOR ELEVATIONS TO BE 0.1' ABOVE FINISHED PAD ELEVATION. DRIVEWAYS ARE NOT TO EXCEED 10% SLOPE. FRONT YARD SLOPES SHALL NOT EXCEED 20%. REAR LOT SLOPES SHALL NOT EXCEED 6% FOR THE FIRST 15' FROM THE PAD WITH THE BALANCE NOT TO EXCEED 20%.
- INITIAL SITE GRADING SHALL BE COMPLETED TO A TOLERANCE OF PLUS OR MINUS ONE TENTH OF A FOOT IN STREETS AND PLUS OR MINUS THREE TENTHS OF A FOOT FOR BUILDING PADS. FINAL BUILDING PAD GRADING, TO BE DONE UPON COMPLETION OF PAVING AND UTILITY FACILITIES, SHALL BE PROVIDED TO A TOLERANCE OF PLUS OR MINUS TWO TENTHS OF A FOOT AT ALL FOUR CORNERS AND CENTER OF THE PAD. IN ALL SWALES AND LOT CORNERS.
- CONTRACTOR SHALL FURNISH ALL CONSTRUCTION STAKING UNLESS NOTED OTHERWISE IN THE SPECS.
- CONTRACTOR SHALL REPLACE ANY EROSION CONTROL MATERIALS AT THE END OF EACH WORK DAY IF SAID MATERIALS WERE REMOVED DURING THE DAY FOR EASE OF CONSTRUCTION OR ACCESS.
- IF ROCK IS ENCOUNTERED IN THE STREET SUBGRADE, THE ROCK SHALL BE EXCAVATED TO A DEPTH OF SIX INCHES, REMOVED FROM THE STREET, AND NON-ROCK MATERIAL SHALL BE REPLACED FOR THE STREET SUBGRADE. ROCK IN STREET PARKWAYS SHALL BE REMOVED AND REPLACED WITH SIX INCHES OF TOP SOIL. THIS SHALL BE ACCOMPLISHED BY THE EXCAVATION CONTRACTOR, SUBSIDIARY TO THIS CONTRACT.
- CONTRACTOR SHALL ADHERE TO ALL TERMS AND CONDITIONS AS OUTLINED IN THE GENERAL T.P.D.E.S. PERMIT FOR STORM WATER DISCHARGE ASSOCIATED WITH CONSTRUCTION ACTIVITIES.
- ALL PARKWAYS ARE TO BE FINAL GRADED TOWARDS THE STREET AT 1/4" PER FOOT FROM THE TOP OF THE CURB TO THE PROPERTY LINE.



NOTE FOR GRASS/TURF AREAS:
1. 1.5% MINIMUM SLOPE
2. 4:1 MAX SLOPE

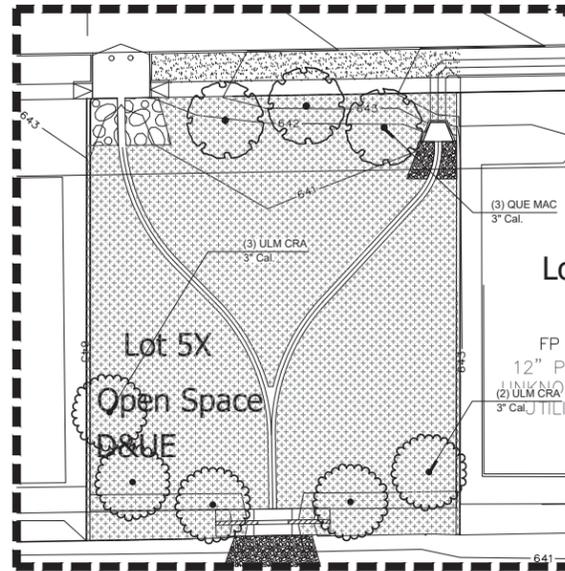


ENLARGEMENT 'A'

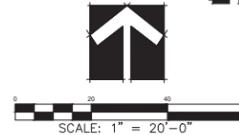


NOTE:
ALL LAWN AREA SHALL BE SOLID BERMUDA SOD.

ENLARGEMENT 'B'



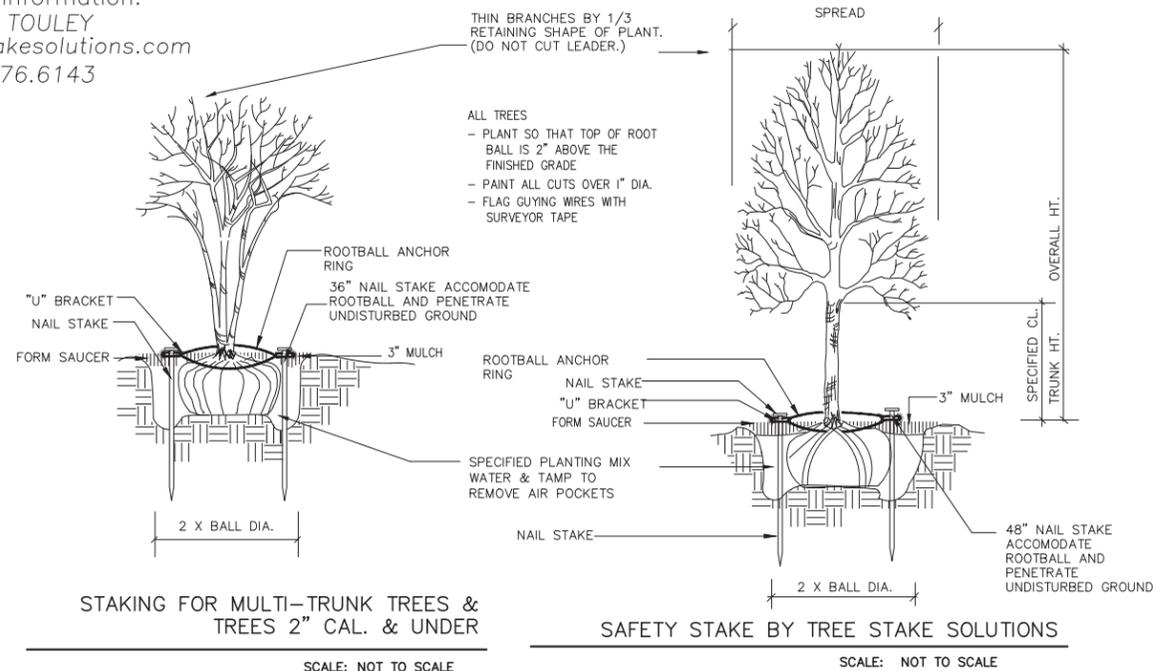
NOTE:
ALL DETENTION PONDS SHALL BE SEEDED WITH *Tripsacum dactyloides* (Eastern Gamagrass) AT A RATE OF 12 POUNDS PER ACRE. CONTRACTOR SHALL WATER UNTILL ESTABLISHED AND ACCEPTED BY OWNER.



NORTH RICHLAND HILLS LANDSCAPE REQUIREMENTS		
REQUIRED DETENTION POND LANDSCAPING	ONE TREE PER 50 PERIMETER FT.	
	REQUIRED	PROVIDED
	360 LF / 50 = 7 TREES	7 TREES

NORTH RICHLAND HILLS LANDSCAPE REQUIREMENTS		
REQUIRED DETENTION POND LANDSCAPING	ONE TREE PER 50 PERIMETER FT.	
	REQUIRED	PROVIDED
	395 LF / 50 = 8 TREES	8 TREES

Contact Information:
JEFF TOULEY
www.treestakesolutions.com
903.676.6143



STAKING FOR MULTI-TRUNK TREES & TREES 2" CAL. & UNDER

SCALE: NOT TO SCALE

SAFETY STAKE BY TREE STAKE SOLUTIONS

SCALE: NOT TO SCALE

PLANTING NOTES:

1. PLANT SIZE, TYPE, AND CONDITION SUBJECT TO APPROVAL OF OWNER'S REPRESENTATIVE.
2. ALL PLANT MATERIAL TO BE NURSERY GROWN STOCK.
3. CONTRACTOR RESPONSIBLE FOR MAINTENANCE OF ALL PLANT MATERIAL UNTIL PROJECT ACCEPTANCE.
4. ALL CONTAINER GROWN PLANTS TO HAVE FULL, VIGOROUS ROOT SYSTEM, COMPLETELY ENCOMPASSING CONTAINER.
5. ALL PLANTS WELL ROUNDED AND FULLY BRANCHED. ALL TREES WITH SPREAD 2/3 OF HEIGHT.
6. CONTRACTOR TO PROVIDE OWNER WITH PREFERRED MAINTENANCE SCHEDULE OF ALL PLANTS AND LAWNS.
7. MAINTAIN/PROTECT VISIBILITY TRIANGLE WITH PLANT MATERIAL PER CITY STANDARDS AT ALL ENTRANCES TO SITE.
8. PREP ENTIRE WIDTH OF ALL DEFINED PLANTING BEDS WITH MIX AS OUTLINED IN SPECS. WHERE SHRUBS ARE LOCATED ALONG CURB, SET SHRUBS BACK FROM CURB 3 FT.
9. SEE DETAIL SHEET FOLLOWING FOR PLANTING DETAILS.
10. CONTRACTOR RESPONSIBLE FOR LOCATION OF ALL UTILITIES, INCLUDING BUT NOT LIMITED TO TELEPHONE, TELECABLE, ELECTRIC, GAS, WATER AND SEWER. ANY DAMAGE TO UTILITIES TO BE REPAIRED BY CONTRACTOR AT NO COST TO OWNER.
11. IF EXISTING TREES ARE SHOWN TO REMAIN, CONTRACTOR SHALL PRUNE AS DIRECTED BY OWNER'S REPRESENTATIVE. WORK TO INCLUDE REMOVAL OF ALL SUCKER GROWTH; DEAD AND DISEASED BRANCHES AND LIMBS; VINES, BRIARS AND OTHER INVASIVE GROWTH; AND ALL INTERFERING BRANCHES. MAKE ALL CUTS FLUSH TO REMAINING LIMB. RETAIN NATURAL SHAPE OF PLANT. ALL WORK SUBJECT TO APPROVAL OF OWNER'S REPRESENTATIVE.
12. QUANTITIES ARE PROVIDED AS A COURTESY AND NOT INTENDED FOR BID PURPOSES. CONTRACTOR TO VERIFY PRIOR TO PRICING.
13. INSTALL EDGING BETWEEN LAWN AND PLANTING BEDS. REFER TO SPECIFICATIONS. FILE ALL CORNERS SMOOTH.
14. INSTALL CURLEX BLANKET (OR EQUAL) PER MANUFACTURERS INSTRUCTIONS ON ALL GROUND COVER/SHRUB BEDS WITH A SLOPE OF 4:1 OR GREATER.
15. AT TIME OF PLAN PREPARATION, SEASONAL PLANT AVAILABILITY CANNOT BE DETERMINED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SECURE AND RESERVE ALL B&B PLANTS WHEN AVAILABLE IN CASE ACTUAL INSTALLATION OCCURS DURING THE OFF-SEASON. PURCHASE AND HOLD B&B PLANTS FOR LATE SEASON INSTALLATION.
16. CONTRACTOR SHALL STAKE ALL TREE LOCATIONS FOR OWNER APPROVAL PRIOR TO PLANTING.
16. BERM ALL PARKING LOT ISLANDS AS SHOWN ON ENCLOSED DETAIL SHEET. (BERMS MAY NOT BE SHOWN ON GRADING PLAN.)
17. NO PLANTINGS WITHIN 18" OF PARKING LOT CURBS.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR CONFIRMING TREE AND SHRUB SIZES CONFORM TO CITY LANDSCAPE STANDARDS AND MITIGATION REQUIREMENTS.

PLANT SCHEDULE

TREES	CODE	BOTANICAL NAME	COMMON NAME	SIZE	HEIGHT	SPACING	QTY	REMARKS
	QUE MAC	Quercus macrocarpa	Burr Oak	3" Cal.	12' Min HT	As Shown	8	Single Straight Trunk
	ULM CRA	Ulmus crassifolia	Cedar Elm	3" Cal.	12' Min HT	As Shown	8	Single Straight Trunk
GROUND COVERS	CODE	BOTANICAL NAME	COMMON NAME	SIZE	CONTAINER	SPACING	QTY	REMARKS
	CYN DAC	Cynodon dactylon	Bermuda Grass	---	Hydro-Mulch		11,023 sf	
	TRI FAK	Tripsacum dactyloides	Fakahatchee Grass	seed			10,400 sf	

TEMPORARY IRRIGATION WILL BE REQUIRED TO ESTABLISH TURF IN ALL DISTURBED AREAS WITHOUT A PERMANENT IRRIGATION SYSTEM. INSTALL SOD TO ESTABLISH TURF IN ALL DISTURBED AREAS AS IDENTIFIED ON GRADING AND EROSION CONTROL PLANS.

CAUTION!!!
UNDERGROUND UTILITIES ARE LOCATED IN THIS AREA. 48 HOURS PRIOR TO ANY CONSTRUCTION ACTIVITIES, CONTACT LINE LOCATES FOR FRANCHISE UTILITY INFO. CALL BEFORE YOU DIG.
TEXAS EXCAVATION SAFETY SYSTEM (TESS)
1-800-344-8377
TEXAS ONE CALL SYSTEMS
1-800-245-4545
LONE STAR NOTIFICATION CENTER
1-800-669-8344 EXT. 5

Date AUG 9, 2019
Drawn By GAC
Checked By GAC
Revisions

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Sheet No.
L-2

LANDSCAPE PLAN

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SECTION 02830
TREES, SHRUBS, AND GROUNDCOVERS

PART I GENERAL

1.01 DESCRIPTION OF WORK

A. Scope

1. Bed prep
2. Metal edging
3. Topsoil
4. Planting
5. Mulching
6. Guarantee

B. Related Work Specified Elsewhere

1. General Requirements - All locations
2. Section 02740 - Irrigation Trenching
3. Section 02750 - Irrigation
4. Section 02800 - Lawns

1.02 QUALITY ASSURANCE

A. Contractor Qualifications

Minimum of three (3) years experience on projects of similar characteristics and size.

B. Reference Standards:

1. American Joint Committee Of Horticultural Nomenclature: Standardized Plant Names, Second Edition, 1942;
2. American Association Of Nurserymen: American Standard For Nursery Stock, 1973

C. Substitutions

1. Substitutions accepted only upon written approval of Landscape Architect and Owner.
2. Submit substitutions possessing same characteristics as indicated on plans and specifications.

D. Inspection and Testing

1. The project Owner's representative reserves the right to inspect and tag plants at the place of growth with the Contractor.
2. Inspection at place of growth does not preclude the right of rejection due to improper digging or handling.
3. Owner's representative reserves the right to request soil samples and analysis of soil and plant mix. Remove or correct unacceptable soil. Cost of testing by Contractor.

1.03 SUBMITTALS

A. Certificates

1. Submit State and Federal certificates of inspection with invoice. (Only if required by Landscape Architect.)
2. File certificates with Owner's representative prior to material acceptance.

1.04 PRODUCT DELIVERY, STORAGE, & HANDLING

A. Preparation of Delivery

1. Balled & Burlaped (B&B) Plants
 - a. Dig and prepare for shipment in manner that will not damage roots, branches, shape, and future development after replanting.
 - b. Ball with firm, natural ball of soil, wrapped tightly with burlap covering entire ball.
 - c. Ball size and ratios: conform to American Association of Nurserymen standards unless otherwise shown on plant list.
2. Pack plant material to protect against climatic & seasonal damage, as well as breakage injuries during transit.
3. Securely cover plant tops with ventilated tarpaulin or canvas to minimize wind-whipping and drying in transit.
4. Pack and ventilate to prevent sweating of plants during transit. Give special attention to insure prompt delivery and careful handling to point of delivery at job site.

B. Delivery

1. Deliver fertilizer, fertilizer labels, peat, mulch, soil additives, and amendment materials to site in original, unopened containers, bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to State law.
2. Deliver plants with legible identification and size labels on example plants.
3. Protect during delivery to prevent damage to root ball or desiccation of leaves.
4. Notify Owner's representative of delivery schedule in advance so plant material may be inspected upon arrival at job site.
5. Deliver plants to job site only when areas are prepared.

C. Storage

1. Protect roots of plant material from drying or other possible injury with wetted mulch or other acceptable material.
2. Protect from weather.
3. Maintain and protect plant material not to be planted immediately upon delivery.

D. Handling

1. Do not drop plants.
2. Do not damage ball, trunk, or crown.
3. Lift and handle plants from bottom of container or ball.

1.05 JOB CONDITIONS

- A. Planting Season - Perform actual planting only when weather and soil conditions are suitable in accordance with locally acceptable practices.
- B. Protection - Before excavations are made, take precautionary measures to protect areas trucked over and where soil is temporarily stacked.

1.06 GUARANTEE

- A. Guarantee new plant material for one year after acceptance of final installation (ie. Final Acceptance of project).
- B. Make replacement (one per plant) during one year guarantee period at appropriate season with original plant type, size and planting mixture.
- C. Repair damage to other plants, lawns, & irrigation caused during plant replacement at no cost to Owner.
- D. Use only plant replacements of indicated size and species.

PART II PRODUCTS

2.01 MATERIALS

A. Plant Materials

1. Hardy under climatic conditions similar to locality of project.
2. True to botanical and common name variety.
3. Sound, healthy, vigorous, well branched, and densely foliated when in leaf, with healthy well-developed root system.
4. Free from disease, insects, and defects such as knots, sun-scald, windburn, injuries, disfigurement, or abrasions.
5. Conform to measurements after pruning with branches in normal positions.
6. Conform to American Association of Nurserymen standards unless shown differently on plant list.
7. Trees:
 - a. Single, straight trunks, unless indicated otherwise
 - b. Trees with weak, thin trunks not capable of support will not be accepted.
 - c. All multi-stem trees are to have a minimum of three stems, similar in size and shape, with a spread of approximately 2/3 of the height. All saplings to be female. Grape myrtle color selection by Landscape Architect.
8. Nursery grown stock only.
9. Subject to approval of Landscape Architect.
10. Seasonal color:
 - a. Annuals in 4" pots or as specified
 - b. Perennials in 4" pots, clumps, bubs as specified

B. Topsoil

1. Natural, fertile, friable soils having a textural classification of loam or sandy loam possessing characteristics of soils in vicinity which produce heavy growth of crops, grass, or other vegetation.
2. Free of subsoil, brush, organic litter, objectionable weeds, clods, shale, stones 3/4" diameter or larger, stumps, roots or other material harmful to grading, planting, plant growth, or maintenance operations.
3. Presence of vegetative parts of Bermuda grass (Cynodon dactylon), Johnson grass, nut grass (Cyperus rotundus), and other hard to eradicate weeds or grass will be cause for rejection of topsoil.
4. Test topsoil (cost by Contractor):
 - a. Available nitrogen
 - b. Available phosphorus
 - c. Available potash
 - d. Iron
 - e. Ph. 5.5 to 7.0
 - f. Decomposed organic matter: 6-10%

C. Mulch

1. Top Dressing Mulch - Shredded cypress or hard wood only
2. Mulch for soil prep - Shredded pine bark
3. In pre-packaged bags only; bulk shredded material is unacceptable

D. Peat Moss Commercially available baled peat moss or approved equivalent.

E. Staking Material

1. Stakes for tree support:
 - a. Construction grade yellow pine, stain brown
 - b. Size as noted on plans
2. Wires:
 - a. Padded with rubber hose to protect tree
 - b. Galvanized
 - c. With galvanized turnbuckle
 - d. Evenly tighten turnbuckles with plant in vertical position.

F. Water

1. Free of oils, acids, alkali, salt, and other substances harmful to plant growth
2. Location: Furnish temporary hoses and connections on site.

G. Sand - Washed builders sand

H. Antidesiccant - "Wilt-proof" or equal.

I. Edging - 3/16" X 4" green, new and unused; with stakes.

2.02 MIXES

D. Planting Mixture

1. Existing topsoil - 50%
2. Shredded pine bark - 50%
3. Fertilizer 10:20:10 at 30 lb./1000 SF

E. Planting Mix for Annuals/Perennials

1. Prepare above mix
2. Add 2" of sand

F. Azalea mix: solid peat moss in hole 9" wider than root ball each direction. Plant in solid peat moss and provide mound at base of plant to allow for drainage.

G. Japanese maple, dogwood, camellias: Provide 50/50 peat moss to topsoil mix, raise for drainage.

PART III - EXECUTION

3.01 UTILITIES - verify location of all utilities prior to initiating construction; repair any damage caused by construction at no cost to owner.

3.02 INSPECTION

- A. Inspect plants for injury and insect infestation; prune prior to installation.
- B. Inspect site to verify suitable job conditions.

3.03 FIELD MEASUREMENTS

- A. Location of all trees and shrubs to staked in the field and approved by Owner's representative prior to installation.
- B. Location of all groundcover and seeding limits as shown on plans.

3.04 EXCAVATION FOR PLANTING

A. Pits

1. Shape - Vertical hand scarified sides and flat bottom.
2. Size for trees - 2 feet wider or twice the root ball, whichever is greater.
3. Size for shrubs - Size of planting bed as shown on drawings.
4. Roto-till soil mix thoroughly, full depth.
5. NOTE: If beds are proposed beneath drip line of existing tree canopy, pocket prep plants. Do not roto-till beneath existing trees.

B. Obstructions Below Ground

1. Remove rock or underground obstructions to depth necessary to permit planting.
2. If underground obstructions cannot be removed, notify Owner's representative for instruction.

C. Excess Soil Dispense of unacceptable or excess soil away from the project site at Contractor's expense.

3.05 PLANTING

A. General

1. Set plants 2" above existing grade to allow for settling.
2. Set plants plumb and rigidly braced in position until planting mixture has been tamped solidly around ball.
3. Apply soil in accordance with standard industry practice for the region.
4. Thoroughly settle by water jetting and tamping soil in 6" lifts.
5. Prepare 3" dish outside root ball after planting.
6. Thoroughly water all beds and plants.
7. Stake trees and large shrubs as indicated on plans.
8. Apply anti-desiccant according to manufacturer's instructions.
9. Apply commercially manufactured root stimulator as directed by printed instruction.
10. Plant and fertilize bedding plants per trade standards.
11. Apply 3" mulch top dressing.

B. Balled Plants

1. Place in pit of planting mixture that has been hand tamped prior to placing plant.
2. Place with burlap intact to ground line. Top of ball to be 2" above surrounding soil to allow for settling.
3. Remove binding at top of ball and lay top of burlap back 6".
4. Do not pull wrapping from under ball, but cut all binding cord.
5. Do not plant if ball is cracked or broken before or during planting process or if stem or trunk is loose.
6. Backfill with planting mixture in 6" lifts.

C. Container Grown Plants

1. Place in pit on planting mixture that has been hand tamped prior to placing plant.
2. Cut cans on two sides with an acceptable can cutter, and remove root ball from can. Do not injure root ball.
3. Carefully remove plants without injury or damage to root balls.
4. Backfill with planting mixture in 6" lifts.

D. Mulching

1. Cover planting bed evenly with 3" of mulch.
2. Water immediately after mulching.
3. Where mulch has settled, add additional mulch to regain 3" thickness.
4. Hose down planting area with fine spray to wash leaves of plants.

D. Pruning

1. Prune minimum necessary to remove injured twigs and branches, dead wood, and succors; remove approximately 1/3 of twig growth as directed by landscape architect; do not cut leaders or other major branches of plant unless directed by landscape architect.
2. Make cuts flush, leaving no stubs.
3. Paint cuts over 1" diameter with approved tree wound paint.
4. Do not prune evergreens except to remove injured branches.

3.06 EDGING

- A. Stake edging alignment with string line prior to installation. Use framing square to insure right angles are true.
- B. Install all edging straight and true as indicated on drawings. Where edging layout is circular in design, maintain true and constant radii as shown.
- C. When required on slopes, make vertical cuts (approximately 6" on center) on bottom of edging to allow bending without crimping edging.
- D. Install edging so that approximately 1" is exposed on lawn side. Edging should not be visible from bed side after application of mulch.
- E. Align edging with architectural features (ie pavement joints, windows, columns, wall, etc.) when drawings indicate.
- F. Bend all corners, do not cut corners.
- G. Interlock all pieces with pre-fabricated connectors.
- H. Install with all stakes on inside of planting bed.
- I. Remove, file off all sharp corners and burrs.

3.07 CLEAN-UP

A. Sweep and wash all paved surfaces.

Remove all planting and construction debris from site, including rocks, trash and all other miscellaneous materials.

3.08 MAINTENANCE

A. Contractor responsible for routine, and regular maintenance of site until Final Acceptance is awarded by Owner. Work includes:

1. Weeding (weekly)
2. Watering (as required)
3. Pruning
4. Spraying
5. Fertilizing
6. Mulching
7. Mowing (weekly)

B. Provide Owner and Landscape Architect with preferred maintenance schedule in writing. Schedule shall include the above-listed tasks and shall address all frequencies, rates, times, levels, etc.

END OF SECTION

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Date AUG 9, 2019
Drawn By GAC
Checked By GAC
Revisions _____



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HIGHTOWER DRIVE
NORTH RICHLAND HILLS, TX

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L-3



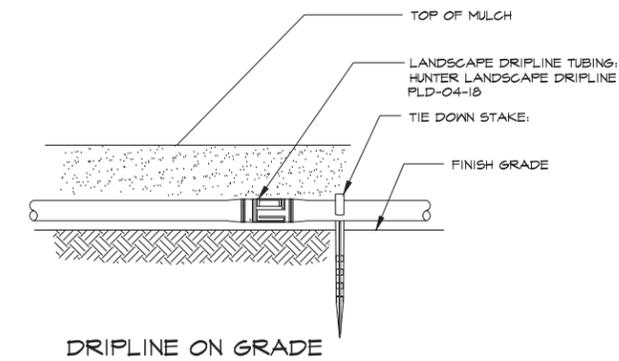
CAUTION!!!
UNDERGROUND UTILITIES ARE LOCATED IN THIS AREA. 48 HOURS PRIOR TO ANY CONSTRUCTION ACTIVITIES, CONTACT LINE LOCATES FOR FRANCHISE UTILITY INFO. CALL BEFORE YOU DIG. TEXAS EXCAVATION SAFETY SYSTEM (TESS) 1-800-344-8377 TEXAS ONE CALL SYSTEMS 1-800-245-4545 LONE STAR NOTIFICATION CENTER 1-800-669-8344 EXT. 5



BEFORE YOU DIG...

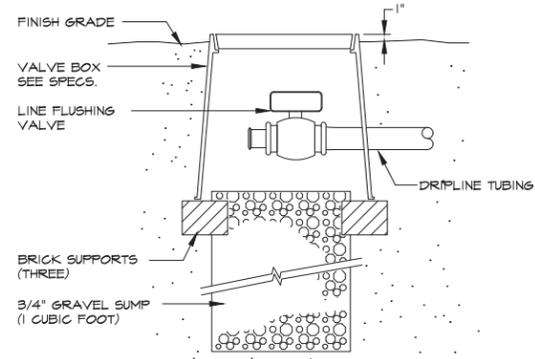
PLANTING SPECIFICATIONS

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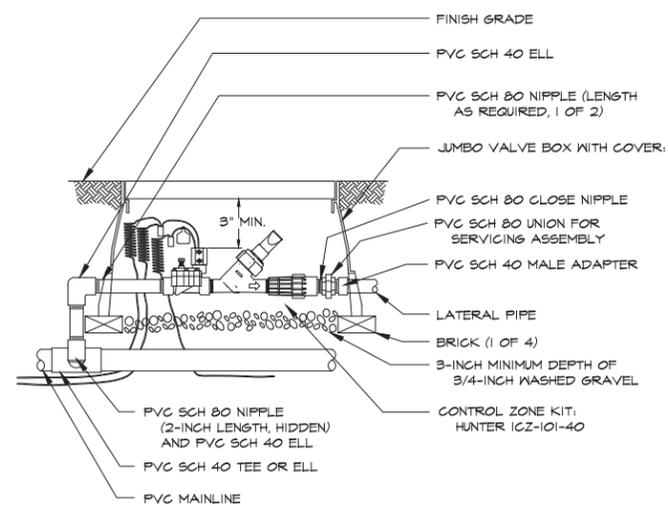
DRIPLINE ON GRADE

SCALE: NOT TO SCALE



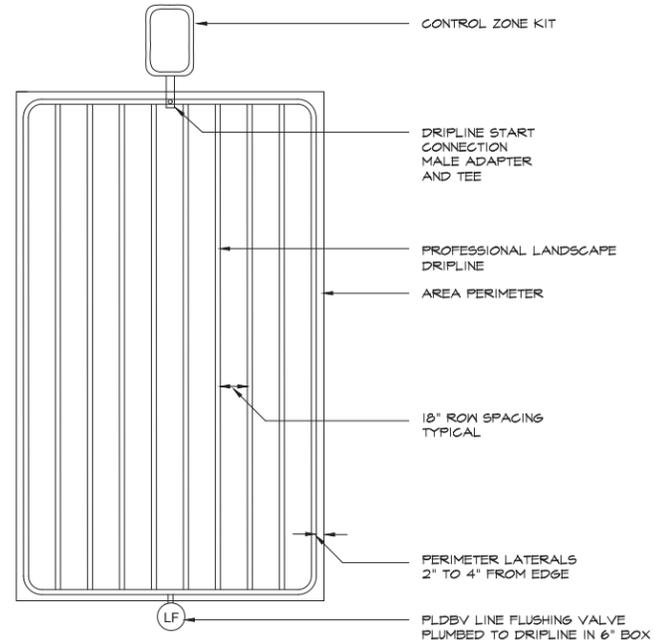
LINE FLUSHING VALVE

SECTION - NO SCALE



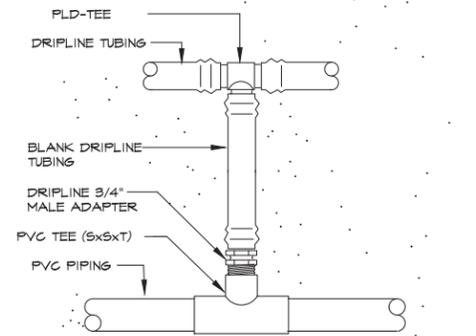
FLOW CONTROL ZONE KIT

SCALE: NOT TO SCALE



Typical DRIPLINE END FEED LAYOUT

DETAIL - NO SCALE



DRIPLINE START CONNECTION

SECTION - NO SCALE



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DRIP DETAILS

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