

- LEGEND**
- Runoff Node
 - Hydraulic Node
 - 1-ft LiDAR Based Topo
 - 5-ft LiDAR Based Topo
 - Storm Drain Conduits
 - - - Storm Drain Channels
 - Existing Sub-basins
- Drainage System Basins**
- Anderson Rd. 70 AC
 - Arcola St. 34 AC
 - Chenango Dr. 38 AC
 - Downstream 25 AC
 - Morgan St. 24 AC
 - Plum St. 17 AC

DATA SOURCES: ESRI, BING

DISCLAIMER: City parcel, city utility and topographic information was compiled from the best available sources. No warranty is made for the accuracy or completeness.

**CHENANGO STREET
DRAINAGE IMPROVEMENTS**
*Existing Condition
Drainage Area Map*

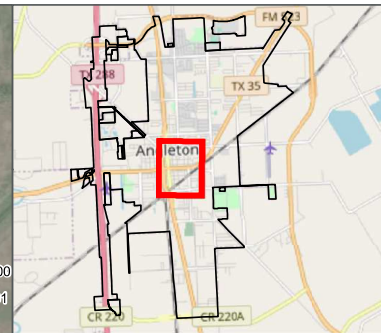
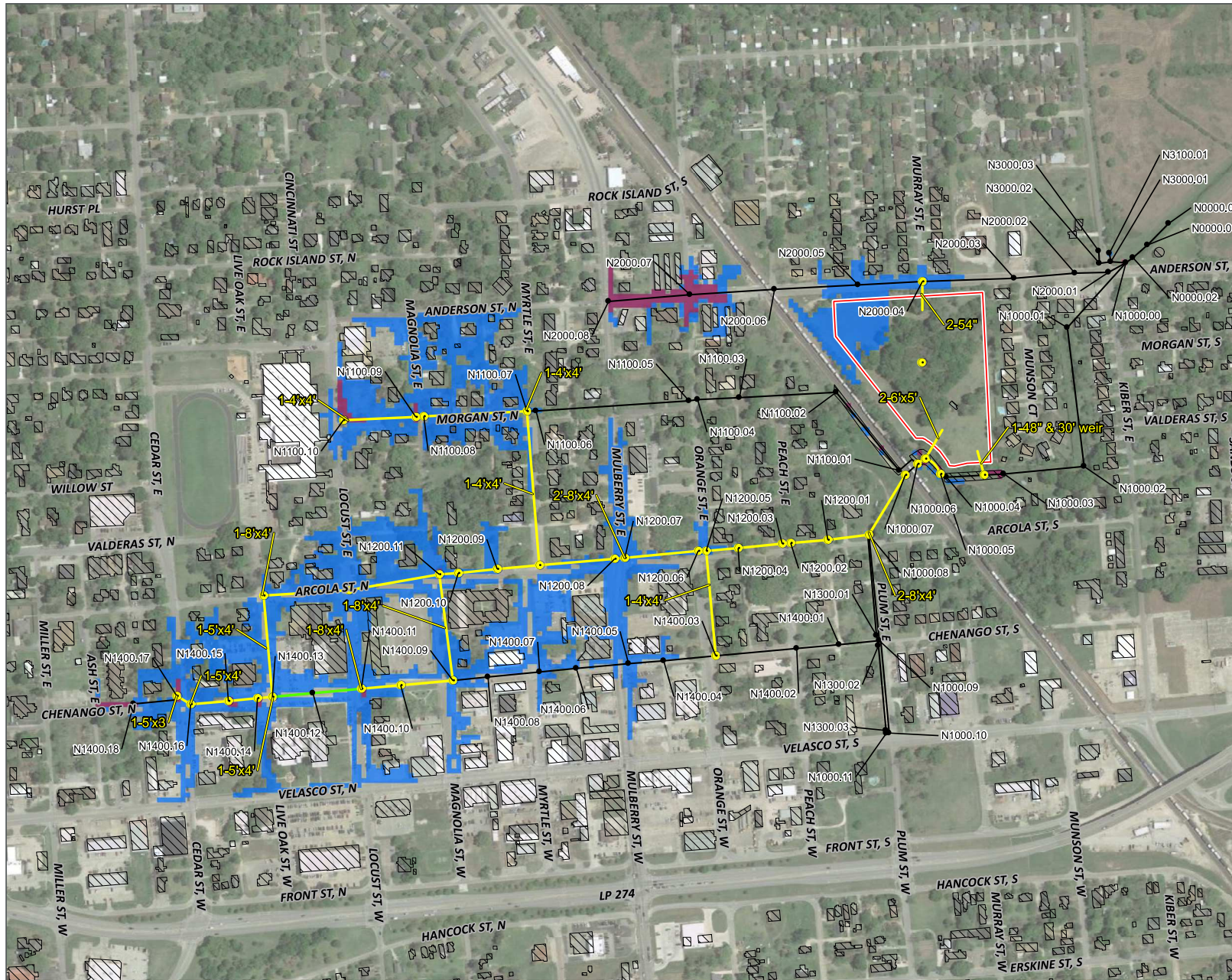
Planning-Level not intended for Construction/Permitting

0 400 800 FEET

ANGLETON
Where the Heart is

HDR

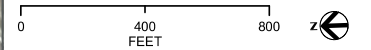
Aug 2020 Exhibit A2



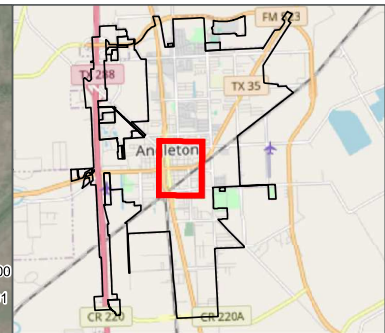
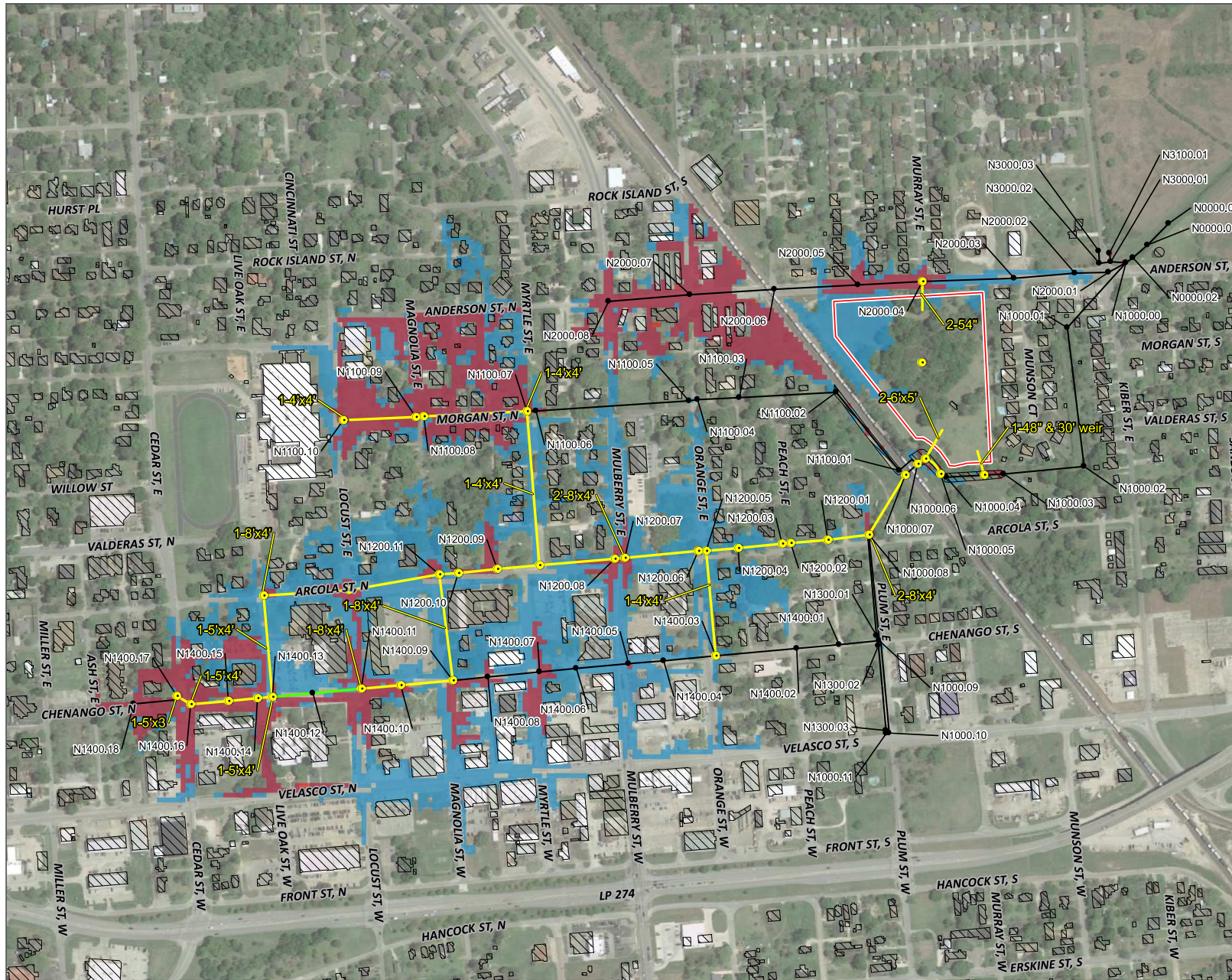
- LEGEND**
- XPSWMM Nodes Proposed Conditions
 - XPSWMM Nodes Existing Conditions
 - XPSWMM Links Proposed Conditions
 - XPSWMM Links Abandoned
 - XPSWMM Links Existing Conditions
 - ▭ Proposed Detention Pond Area
 - ▨ 2D Model Inactive Areas
 - ▭ 2-Yr 2D Inundation Depth Alt 3
 - ▭ 2-Yr 2D Inundation Depth Ex

DATA SOURCES: TNRIS, USGS, FEMA, ESRI, BING
DISCLAIMER: Topographic map information was compiled from the best available sources. No warranty is made for the accuracy or completeness.

CHENANGO ST DRAINAGE IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT
2-Year Inundation Map
Existing VS Alternative 3
Planning-Level not intended for Construction/Permitting



	Aug 2020	ExhibitA16



LEGEND

- XPSWMM Nodes Proposed Conditions
- XPSWMM Nodes Existing Conditions
- XPSWMM Links Proposed Conditions
- XPSWMM Links Abandoned
- XPSWMM Links Existing Conditions
- Proposed Detention Pond Area
- ▨ 2D Model Inactive Areas
- 10-Yr 2D Inundation Depth Alt 3
- 10-Yr 2D Inundation Depth Ex

DATA SOURCES: TNRIS, USGS, FEMA, ESRI, BING

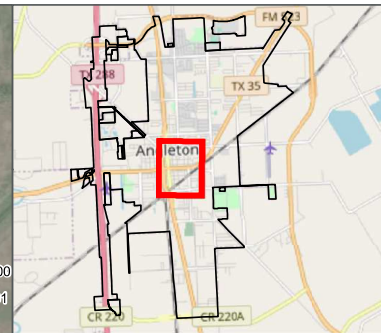
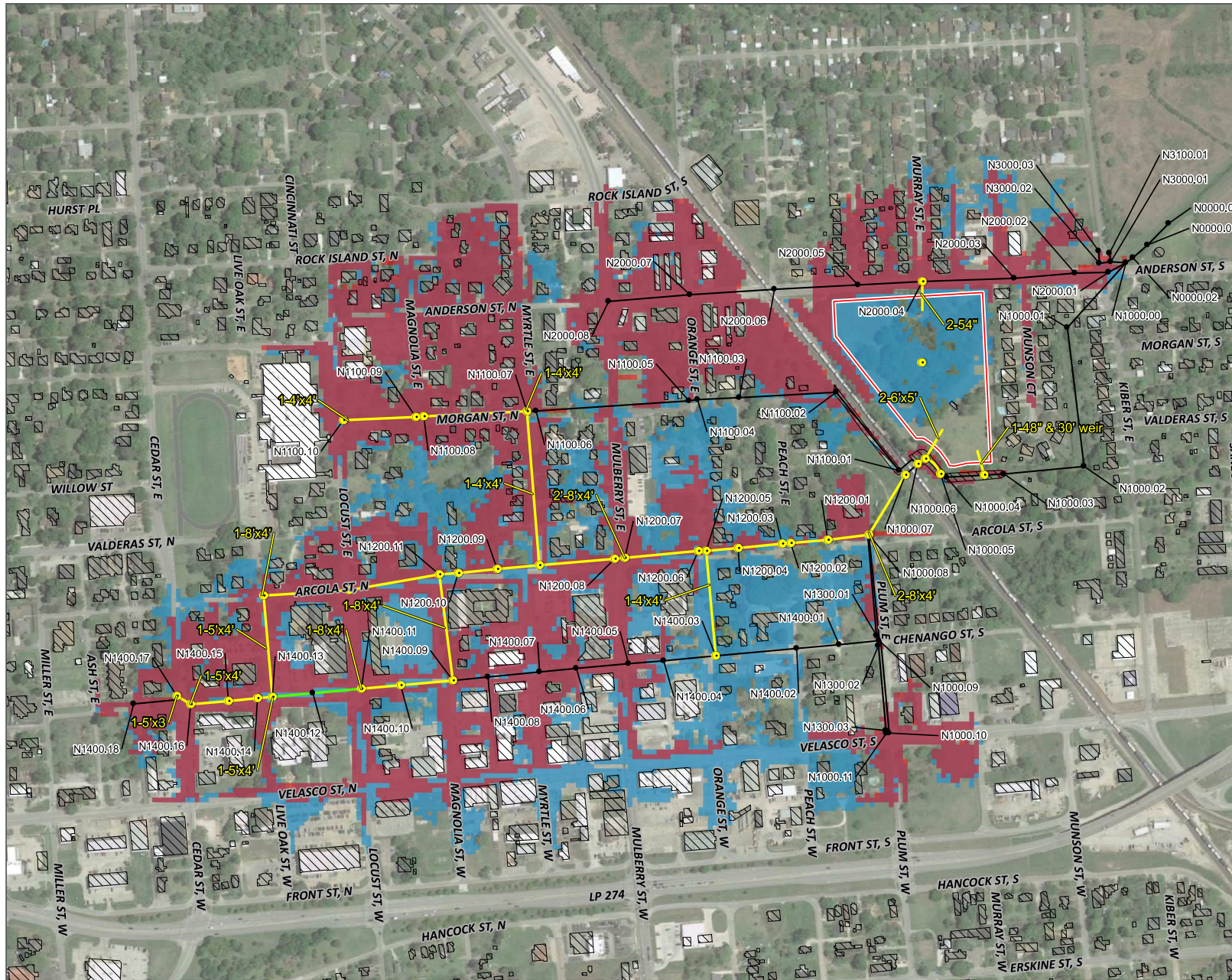
DISCLAIMER: Topographic map information was compiled from the best available sources. No warranty is made for the accuracy or completeness.

CHENANGO ST DRAINAGE IMPROVEMENTS PRELIMINARY ENGINEERING REPORT 10-Year Inundation Map Existing VS Alternative 3

Planning-Level not intended for Construction/Permitting



Aug 2020 ExhibitA17



- LEGEND**
- XPSWMM Nodes Proposed Conditions
 - XPSWMM Nodes Existing Conditions
 - XPSWMM Links Proposed Conditions
 - XPSWMM Links Abandoned
 - XPSWMM Links Existing Conditions
 - Proposed Detention Pond Area
 - 2D Model Inactive Areas
 - 100-Yr 2D Inundation Depth Alt 3
 - 100-Yr 2D Inundation Depth Ex

DATA SOURCES: TNRIS, USGS, FEMA, ESRI, BING
DISCLAIMER: Topographic map information was compiled from the best available sources. No warranty is made for the accuracy or completeness.

CHENANGO ST DRAINAGE IMPROVEMENTS
PRELIMINARY ENGINEERING REPORT
100-Year Inundation Map
Existing VS Alternative 3
Planning-Level not intended for Construction/Permitting



**TABLE C3: OPINIONS OF PROBABLE CONSTRUCTION COST ESTIMATE FOR ALTERNATIVE 3
CITY OF ANGLETON, TEXAS
CHENANGO STREET DRAINAGE IMPROVEMENTS**

ITEM NO.	DESCRIPTION OF ITEM AND UNIT PRICES (IN WORDS)	EST. QUAN.	UNIT	UNIT PRICE	AMOUNT
GENERAL ITEMS					
1	Traffic Control, including Flagmen, Signs, Barrels, Barricades, Arrow Boards, Maintaining All Weather Access to Traffic, Temporary Transitions from Proposed Pavement to Existing Pavement, Relocating Existing Mailboxes and Traffic Signs, and Temporary Mailboxes complete in place, the sum of:	1	LS	\$ 150,000.00	\$ 150,000.00
2	Easement acquisition from private property	10.3	AC.	\$ 83,250.00	\$ 83,250.00
	TOTAL GENERAL ITEMS				\$ 233,250.00
PAVING ITEMS					
3	Remove and dispose of existing concrete pavement with asphalt overlay, base material, and curbs, complete in place, the sum of:	25900	S.Y.	\$ 10.00	\$ 259,000.00
4	7" reinforced concrete pavement, complete in place, the sum of:	25900	S.Y.	\$ 66.00	\$ 1,709,400.00
5	8" lime stabilized subgrade, complete in place, the sum of:	28210	S.Y.	\$ 5.00	\$ 141,050.00
6	Lime for stabilized subgrade (7% by dry weight), complete in place, the sum of:	750	TON	\$ 200.00	\$ 150,000.00
7	Remove and replace with 6" concrete driveway, complete in place, the sum of:	1500	S.Y.	\$ 80.00	\$ 120,000.00
8	Proposed curb ramp, complete in place, the sum of:	2600	S.F.	\$ 30.00	\$ 78,000.00
9	Remove existing curb ramp, complete in place, the sum of:	2600	S.F.	\$ 10.00	\$ 26,000.00
10	Proposed concrete walkway/sidewalk, all widths (4" thick), complete in place, the sum of:	17100	S.F.	\$ 7.00	\$ 119,700.00
11	Remove existing walkway/sidewalk, all widths, complete in place, the sum of:	17100	S.F.	\$ 3.00	\$ 51,300.00
12	Standard 6" curb, complete in place, the sum of:	13270	L.F.	\$ 5.00	\$ 66,350.00
13	Standard pavement header without undercut, including expansion joint per City Details, complete in place, the sum of:	1200	L.F.	\$ 30.00	\$ 36,000.00
	TOTAL PAVING ITEMS				\$ 2,756,800.00
DRAINAGE ITEMS					
14	Remove existing storm sewer pipe or culvert, all sizes, complete in place, the sum of:	5100	L.F.	\$ 40.00	\$ 204,000.00
15	Install brick plug existing or proposed storm sewer, per detail, all sizes, including mortar and grout, complete in place, the sum of:	2	EA.	\$ 500.00	\$ 1,000.00
16	Remove existing inlet, all types, complete in place, the sum of:	40	EA.	\$ 790.00	\$ 31,600.00
17	Remove existing manhole or junction box, all types, complete in place, the sum of:	7	EA.	\$ 850.00	\$ 5,950.00
18	Swale and/or ditch regrading, including cut and fill as required to provide positive drainage per plans, complete in place, the sum of:	150	L.F.	\$ 15.00	\$ 2,250.00
19	Furnish and install 24-in RCP, ASTM C76, Class III storm sewer, rubber gasket joints, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	540	L.F.	\$ 115.00	\$ 62,100.00
20	Furnish and install 36-in RCP, ASTM C76, Class III storm sewer, rubber gasket joints, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	70	L.F.	\$ 165.00	\$ 11,550.00
21	Furnish and install 48-in RCP, ASTM C76, Class III storm sewer, rubber gasket joints, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	100	L.F.	\$ 240.00	\$ 24,000.00
22	Furnish and install 54-in RCP, ASTM C76, Class III storm sewer, rubber gasket joints, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	120	L.F.	\$ 260.00	\$ 31,200.00
23	Furnish and install 4'x4' precast reinforced box culvert, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	1870	L.F.	\$ 225.00	\$ 420,750.00
24	Furnish and install 5'x3' precast reinforced box culvert, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	70	L.F.	\$ 225.00	\$ 15,750.00
25	Furnish and install 5'x4' precast reinforced box culvert, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	790	L.F.	\$ 250.00	\$ 197,500.00
26	Furnish and install 5'x6' precast reinforced box culvert, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	320	L.F.	\$ 300.00	\$ 96,000.00
27	Furnish and install 8'x4" precast reinforced box culvert, all depths, cement stabilized sand bedding and backfill, complete in place, the sum of:	5020	L.F.	\$ 665.00	\$ 3,338,300.00
28	Furnish and install storm sewer inlet, complete in place, the sum of:	54	EA.	\$ 3,400.00	\$ 183,600.00
29	Furnish and install manhole, all depths, complete in place, the sum of:	2	EA.	\$ 5,000.00	\$ 10,000.00
30	Manway on box culvert, complete in place, the sum of:	11	EA.	\$ 2,000.00	\$ 22,000.00
31	Furnish and install 6'x6' junction box, all depths, complete in place, the sum of:	1	EA.	\$ 20,000.00	\$ 20,000.00
32	Furnish and install 9'x9' junction box, all depths, complete in place, the sum of:	4	EA.	\$ 37,000.00	\$ 148,000.00
33	Furnish and install 10'x10' junction box, all depths, complete in place, the sum of:	4	EA.	\$ 45,000.00	\$ 180,000.00
34	Furnish and install 12'x8' junction box, all depths, complete in place, the sum of:	5	EA.	\$ 50,000.00	\$ 250,000.00
35	Furnish and install 6'x6' utility conflict box for utility crossing, all depths, complete in place, the sum of:	1	EA.	\$ 20,000.00	\$ 20,000.00
36	Furnish and install 9x5' utility conflict box for utility crossing, all depths, complete in place, the sum of:	1	EA.	\$ 36,000.00	\$ 36,000.00
37	Furnish and install 12'x5' utility conflict box for utility crossing, all depths, complete in place, the sum of:	14	EA.	\$ 47,000.00	\$ 658,000.00
38	Trench Safety for storm sewer, all depths, complete in place, the sum of:	8900	L.F.	\$ 1.00	\$ 8,900.00
39	Clearing of proposed easements, complete in place, the sum of:	10.3	AC.	\$ 18,000.00	\$ 185,400.00
40	Detention pond excavation, complete in place, the sum of:	10700	C.Y.	\$ 15.00	\$ 160,500.00
41	Concrete headwall on intake structure at detention pond, complete in place, the sum of:	1	EA.	\$ 25,000.00	\$ 25,000.00
42	Backslope swales, complete in place, the sum of:	2510	L.F.	\$ 15.00	\$ 37,650.00
43	Backslope interceptor structure, including pipe, bedding and backfill, complete in place, the sum of:	4	EA.	\$ 9,000.00	\$ 36,000.00
44	5" thick reinforced concrete pilot channel, including toe wall, complete in place, the sum of:	1260	S.Y.	\$ 100.00	\$ 126,000.00
45	5" thick reinforced concrete slope protection at pipe outfall, including toe wall, complete in place, the sum of:	1	LS	\$ 5,000.00	\$ 5,000.00
46	30' wide spillway at detention pond, complete in place, the sum of:	1	EA.	\$ 15,000.00	\$ 15,000.00
47	Hydromulch in detention pond, complete in place, the sum of:	10.3	AC.	\$ 2,300.00	\$ 23,690.00
	TOTAL DRAINAGE ITEMS				\$ 6,592,690.00
UTILITY ITEMS					
48	Furnish and install 12-in PVC C-900 DR18 water line, all fittings, by auger construction as shown on plans, complete in place, the sum of:	20	L.F.	\$ 125.00	\$ 2,500.00
49	Furnish and install 8-in PVC C-900 DR18 water line, all fittings, by auger construction as shown on plans, complete in place, the sum of:	140	L.F.	\$ 80.00	\$ 11,200.00
50	Furnish and install 4-in PVC C-900 DR18 water line, all fittings, by auger construction as shown on plans, complete in place, the sum of:	80	L.F.	\$ 35.00	\$ 2,800.00

**TABLE C3: OPINIONS OF PROBABLE CONSTRUCTION COST ESTIMATE FOR ALTERNATIVE 3
CITY OF ANGLETON, TEXAS
CHENANGO STREET DRAINAGE IMPROVEMENTS**

ITEM NO.	DESCRIPTION OF ITEM AND UNIT PRICES (IN WORDS)	EST. QUAN.	UNIT	UNIT PRICE	AMOUNT
51	12-inch diameter wet connection, complete in place, the sum of:	2	EA.	\$ 2,500.00	\$ 5,000.00
52	8-inch diameter wet connection, complete in place, the sum of:	14	EA.	\$ 2,000.00	\$ 28,000.00
53	4-inch diameter wet connection, complete in place, the sum of:	8	EA.	\$ 800.00	\$ 6,400.00
54	12-inch cut, plug & abandon, complete in place, the sum of:	2	EA.	\$ 800.00	\$ 1,600.00
55	8-inch cut, plug & abandon, complete in place, the sum of:	14	EA.	\$ 700.00	\$ 9,800.00
56	4-inch cut, plug & abandon, complete in place, the sum of:	8	EA.	\$ 350.00	\$ 2,800.00
57	Trench Safety for water line, all depths, complete in place, the sum of:	240	L.F.	\$ 1.00	\$ 240.00
58	Remove and replace 10" sanitary sewer with PVC (SDR 26 Class 160), including full circle single clamp couplings, bedding, backfill and cleanout where applicable, all depths, complete in place, the sum of:	80	L.F.	\$ 115.00	\$ 9,200.00
59	Remove and replace 8" sanitary sewer with PVC (SDR 26 Class 160), including full circle single clamp couplings, bedding, backfill and cleanout where applicable, all depths, complete in place, the sum of:	160	L.F.	\$ 105.00	\$ 16,800.00
60	Remove and replace 6" sanitary sewer with PVC (SDR 26 Class 160), including full circle single clamp couplings, bedding, backfill and cleanout where applicable, all depths, complete in place, the sum of:	40	L.F.	\$ 100.00	\$ 4,000.00
61	18" steel casing on 10" sanitary sewer, all depths, complete in place, the sum of:	80	L.F.	\$ 275.00	\$ 22,000.00
62	16" steel casing on 8" sanitary sewer, all depths, complete in place, the sum of:	160	L.F.	\$ 225.00	\$ 36,000.00
63	14" steel casing on 6" sanitary sewer, all depths, complete in place, the sum of:	40	L.F.	\$ 200.00	\$ 8,000.00
64	Trench Safety for sanitary sewer, all depths, complete in place, the sum of:	280	L.F.	\$ 1.00	\$ 280.00
	TOTAL UTILITY ITEMS				\$ 166,620.00
	TREE PROTECTION ITEMS				
65	Tree removal, clearance pruning, tree protection fencing, root pruning trench, zero curb cutback, and checkerplates, complete in place, the sum of:	1	LS	\$ 35,000.00	\$ 35,000.00
	TOTAL TREE PROTECTION ITEMS				\$ 35,000.00
	BID SUMMARY				
	GENERAL ITEMS				\$ 233,250.00
	PAVING ITEMS				\$ 2,756,800.00
	DRAINAGE ITEMS				\$ 6,592,690.00
	UTILITY ITEMS				\$ 166,620.00
	TREE PROTECTION ITEMS				\$ 35,000.00
	TOTAL BASE BID AMOUNT				\$ 9,784,360.00
	30% CONTINGENCY				\$ 2,935,308.00
	TOTAL OPINION OF PROBABLE CONSTRUCTION COST ESTIMATE				\$ 12,719,668.00
	SERVICE FEE				
	GEOTECHNICAL				\$ 40,500.00
	URBAN FORESTRY				\$ 15,000.00
	ENVIRONMENTAL				\$ 60,000.00
	TRAFFIC CONTROL				\$ 40,000.00
	STORM WATER POLLUTION PROTECTION PLAN				\$ 15,000.00
	TOPOGRAPHIC SURVEY				\$ 87,400.00
	METES & BOUNDS SURVEY				\$ 15,000.00
	SUE SERVICES				\$ 15,000.00
	TXDOT COORDINATION				\$ 20,000.00
	DESIGN PHASE				\$ 828,800.00
	BID PHASE				\$ 8,000.00
	CONSTRUCTION ADMINISTRATION				\$ 236,300.00
	CONSTRUCTION OBSERVATION (HALF TIME)				\$ 240,400.00
	TOTAL PROJECT COST ESTIMATE				\$ 14,341,068.00

Any opinion of construction costs prepared by HDR is supplied for the general guidance of the Client only. Since HDR has no control over competitive bidding or market conditions, HDR cannot guarantee the accuracy of such opinions as compared to contract bids or actual costs to Client.