GENERAL NOTES

1. All materials and workmanship shall conform to the Town of Addison standards and Specifications and the North Central Texas Council of Government (NCTCOG) Standards and Specifications, except as noted. In the event of a conflict, the Town of Addison Standards and Specifications shall govern.

2. All locations of underground utility lines are approximate. Contractor shall notify all applicable utility companies 48 hours prior to construction so that underground lines can be marked.

Southwestern Bell Telephone	(214) 234-7085
Storer Cable (TCI Cablevision of Dallas)	(214) 840-2388
Lone Star Gas	(214) 487-3885
TU Electric	(214) 323-8913
City of Farmers Branch	(214) 247-3131
City of Carrollton	(214) 466-3470
Town of Addison	(214) 450-2871

3. The Contractor shall be responsible for public safety during construction and will provide the necessary traffic barricades and warning signage to protect the construction site. Construction barricades shall be in conformance with the Texas Manual on Uniform Traffic Control Devices. In areas where long-term (more than 7 days) nighttime barricades are used, barricades shall include high intensity reflective sheeting.

4. All concrete shall have a minimum compressive strength of 3,600 psi (650 flexural) at 28 days (minimum 6 sacks of cement per cubic yard) unless otherwise noted. All reinforcing steel and dowel bars in pavement shall be supported and maintained at the correct clearances by the use of bar chairs or other approved support.

5. The Contractor is responsible for keeping streets, parking areas, sidewalks, etc., adjacent to the project free of mud and debris from construction.

6. Contractor shall assume responsibility for protection of public utilities in the construction of this project. All manholes, valve boxes, fire hydrants, etc., must be adjusted to proper line and grade by the Contractor prior to and/or after placing of permanent paving. The Contractor shall also be responsible for support of existing utility poles, street signs, etc., when excavating in the vicinity of such poles.

7. The Town of Addison and the City of Carrollton Public Works Departments and the City of Farmers Branch Engineering Department are to be notified (min. 5 working days) prior to any construction of paving and utilities in rights-of-way, easements and alleys for coordination of construction activities and proper notification to Emergency Services.

⚠ 8. All disturbed lawn and earth areas are to be finish graded to original or proposed contours. Contractor shall replace disturbed areas including established lawns and other landscaped areas with like materials. Established lawns shall be replaced with block sod. Other areas to be seeded shall be fertilized and hydromulched with bermuda seed according to NCTCOG specifications immediately after construction. Backfill to be select material free of rock and other debris. Contractor shall thoroughly water the hydromulch immediately after placement. The Contractor shall also be responsible for continued maintenance and watering of the newly hydromulched areas until the entire project is completed and accepted by the Town of Addison. Watering of the Bermuda hydromulch shall be done in a manner and quantity as directed by Town of Addison Inspection Personnel.

9. Arrangements for construction water shall be made through the Town of Addison. Contractor shall obtain a meter from the Town of Addison (deposit required), and pay for all water used for construction.

10. Contractor shall maintain adequate sanitary facilities for use by workers throughout construction.

11. Contractor shall dispose of all excess excavation and cleared material off site, including broken concrete, rock, trees and vegetation. Materials hauled off site may not be disposed of within the Town of Addison, the City of Carrollton, or the City of Farmers Branch without written permission from the affected property owner.

12. No trees shall be cut except on specific authority of the Town of Addison.

13. Where street name signs will be relocated by the Contractor, the Contractor will be required to give 5 days notice in advance of the time a street sign must be relocated to clear construction operations.

14. Removal and replacement of fence will be incidental on this project. No pay items will be provided. Any damage to existing fencing shall be repaired at the Contractor's expense.

15. The Contractor shall obtain all necessary permits at least 48 hours prior to start of any construction.

16. Contractor shall conform to the Occupational Safety and Health Administration's (OSHA) standards for trench safety that are in effect during the period of construction.

17. Contractor shall construct barrier-free ramps at all intersections and adjacent to all driveways.

⚠ 18. Contractor shall return all spare traffic signal poles, mast arms, heads, controller cabinet and appurtenances to the Town of Addison storage facility.

⚠ 19. All street lights shall be relocated by T.U. Electric.

⚠ 20. New 2" grey electrical conduit (Schedule 40) shall be placed 1' behind new median curb and under new pavement as required within the project limits. New 8-conductor, stranded, shielded wire shall be pulled from the Marsh Lane controller to the Commercial Drive controller for the traffic signal interconnect. No splicing of the interconnect wire shall be permitted. Payment shall be be incidental to Traffic Signals.

⚠ 21. The Contractor shall retain a licensed irrigator to remove, relocate or replace all existing sprinkler systems affected by construction. Existing irrigation facilities are not shown on these plans. Field verification of location and type of existing sprinkler systems is required prior to bidding. All irrigation work shall be directed by the Town of Addison.

⚠ 22. Refer to the Bid Form for clarification of the traffic signal component requirements.

⚠ 23. All unbroken pavers which are removed during construction shall be placed on a pallet and transported to the Town of Addison Service Center.

⚠ 24. Excavation in medians required for installation of landscape improvements shall be considered as unclassified street excavation for payment purposes.

SUGGESTED CONSTRUCTION SEQUENCING

PHASE I

1. Install the traffic signal foundations, conduits, and cables at both intersections.

2. Complete all improvements at the Belt Line/Business intersection other than the remaining traffic signal work.

PHASE II

1. When the new controllers arrive, install them at both intersections and hook up the wires.

2. When the new poles and mast arms arrive, install the four 55' mast arms and poles at the Belt Line/Marsh intersection on a Sunday and remove the existing poles and mast arms. Operate the signals at this intersection from the new controller and the existing detector loops.

⚠ 3. Relocate two of the existing 36' mast arms and poles from the Belt Line/Marsh intersection and two new 55' mast arms and pole to the Belt Line/Business intersection on a Sunday to make it fully operational.

PHASE III

1. Turn the traffic signal at Belt Line/Marsh to fixed time operation and construct all remaining improvements at this intersection including sawing new detector loops and connecting these to the new controller.

2. Return the traffic signal from fixed time to regular operation and restore the interconnect operation between intersections on Belt Line Road.

⚠ NOTE: The Contractor shall maintain 3 lanes of traffic at each intersection at all times unless approved by the Town of Addison for specific phases of the Work. Remove existing pavement markings through construction zone and install temporary pavement markings to provide minimum 10' lanes and 3' work space on outside lane and inside lane respectively. Taper at temporary markings shall not exceed 1' in 30' (See Detail A). The temporary pavement markings shall be the same used for permanent pavement markings. Payment for temporary pavement markings shall be incidental to the lump sum pay items for Traffic Control for each intersection.

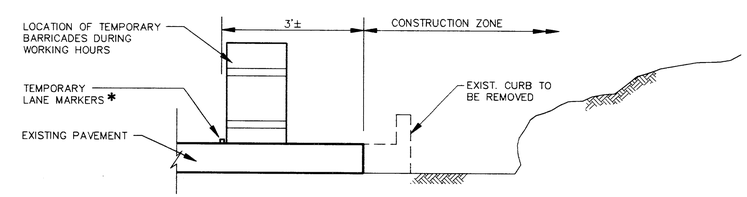
TRAFFIC SEQUENCING NOTES

1. The Contractor shall be responsible for public safety during construction and will provide necessary traffic barricades, warning signage and temporary pavement markings to protect the construction site. Construction barricades, signage and markings shall be in conformance with the Texas Manual on Uniform Traffic Control Devices. In areas where long term nighttime barricades are used, barricades should include high intensity reflective sheeting.

2. Construction activities shall be limited to the following hours:

MONDAY – FRIDAY	9 A.M. – 5 P.M.
SATURDAY, SUNDAY	7 A.M. – 7 P.M.

3. The Contractor may submit an alternate construction sequencing plan to the Town of Addison at his discretion. However, the Contractor's plan must meet certain requirements of these construction plans and be approved by the Town prior to Construction.



* Same as specified for permanent lane markers.

DETAIL A

NO.	REVISION	BY	DATE
⚠	Revise/Add General Notes	BG	4-19-94

DESIGNED BY: B GRANTHAM
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: NONE
DATE: JANUARY 1994
FILE: \ADDISON\BUSINESS\GENNOTES

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

GENERAL NOTES

INTERSECTION IMPROVEMENTS

for

THE TOWN OF ADDISON

SHEET NO. 2 OF 46 SHEETS

JOB NO. 15411

SUMMARY OF QUANTITIES
BELT LINE AT MARSH LANE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
1	Mobilization	L.S.	1
2	Clearing and Grubbing	AC.	0.70
3	Remove Concrete Curb and/or Curb/Gutter	L.F.	4,200
4	Remove Concrete Pavement	S.Y.	2,080
5	Remove Concrete Sidewalk	S.Y.	1,200
6	Cement Treated Base (6")	S.Y.	4,670
7	Reinforced Concrete Pavement (8")	S.Y.	3,850
8	Reinforced Concrete Sidewalk (4")	S.Y.	740
9	Barricading, Signing and Traffic Control	L.S.	1
10	Integral Curb	L.F.	3,980
11	Reinforced Concrete Curb and Gutter	L.F.	1,680
12	Unclassified Street Excavation	C.Y.	1,800
13	Sawed Breakout Groove	L.F.	6,160
14	Variable Height Wall	L.F.	441
15	Remove Existing Inlet	EA.	8
16	6' Standard Curb Inlet	EA.	2
17	6' Recessed Curb Inlet	EA.	1
18	8' Recessed Curb Inlet	EA.	1
19	10' Recessed Curb Inlet	EA.	4
20	21" Reinforced Concrete Pipe (RCP) w/Concrete Collars	L.F.	68
21	15" PVC Drain Pipe for Slotted Drains	L.F.	54
22	Slotted Drain (C.O.D. Std. 251D-1-2005)	L.F.	70
23	6"x6" White Reflective Jiggle Bar	EA.	230
24	Permark P-7W (4") White Non-reflective Ceramic Marker	EA.	275
25	Permark P-15W (4") White Reflective Ceramic Marker	EA.	275
26	24" Reflective Thermoplastic Stop Bar	L.F.	255
27	4" Reflective White Thermoplastic Stripe	L.F.	790
28	White Reflective Pavement Directional Marker	EA.	50
29	Traffic Signalization	L.S.	1
30	Wye Connection	EA.	1
31	Relocate Sign	EA.	9
32	Relocate Water Meter	EA.	1
33	Relocate Fire Hydrant and appurtenances	EA.	3
34	Adjust Water Valves	EA.	2
35	All Irrigation Work	L.S.	1
36	Landscape	L.S.	1
37	Lowering 12" Water Main	L.S.	1
38	Relocate Dart Pads	EA.	2
39	Bermuda Block Sodding	S.Y.	8,150
40	Bermuda Hydromulching	S.Y.	13,630
42	Pattern A Pavestone Pavers	S.F.	300
43	Pattern B Pavestone Pavers	S.F.	3,200

SUMMARY OF QUANTITIES
BELT LINE AT BUSINESS AVENUE

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
43	Clearing and Grubbing	AC.	0.40
44	Remove Concrete Curb and/or Curb/Gutter	L.F.	3,445
45	Remove Concrete Pavement	S.Y.	725
46	Remove Concrete Sidewalk	S.Y.	450
47	Cement Treated Base (6")	S.Y.	2,635
48	Reinforced Concrete Pavement (8")	S.Y.	2,000
49	Reinforced Concrete Sidewalk (4")	S.Y.	465
50	Barricading, Signing and Traffic Control	L.S.	1
51	Integral Curb	L.F.	1,945
52	Reinforced Concrete Curb and Gutter	L.F.	1,575
53	Unclassified Street Excavation	C.Y.	1,640
54	Sawed Breakout Groove	L.F.	3,770
55	Variable Height Wall	L.F.	557
56	Remove Existing Inlet	EA.	2
57	10' Recessed Curb Inlet	EA.	2
58	18" Reinforced Concrete Pipe (RCP) w/Concrete Collars	L.F.	15
59	21" Reinforced Concrete Pipe (RCP) w/Concrete Collars	L.F.	7
60	Wye Connections	EA.	1
61	45° Bend (18" RCP)	EA.	1
62	6"x6" White Reflective Jiggle Bar	EA.	170
63	Permark P-7W (4") White Non-reflective Ceramic Marker	EA.	175
64	Permark P-15W (4") White Reflective Ceramic Marker	EA.	175
65	Permark P-117Y Yellow Double Reflective Ceramic Pavement Marker	EA.	21
66	24" Reflective Thermoplastic Stop Bar	L.F.	195
67	4" Reflective White Thermoplastic Stripe	L.F.	160
68	White Reflective Pavement Directional Marker	EA.	33
69	Traffic Signalization	L.S.	1
70	Relocate Sign	EA.	4
71	Adjust Manhole	EA.	1
72	Adjust Water Valves	EA.	1
73	All Irrigation Work	L.S.	1
74	All Landscaping Work	L.S.	1
75	Bermuda Block Sodding	S.Y.	2,900
76	Bermuda Hydromulching	S.Y.	7,850
77	Pattern A Pavestone Pavers	S.F.	320
78	Pattern B Pavestone Pavers	S.F.	1,600

LEGEND

- 12"W — WATER LINE (SIZE)
- 8"SS — SANITARY SEWER (SIZE) LINE & MANHOLE (SIZE)
- TEL — SOUTHWESTERN BELL TELEPHONE CABLE
- 4"G — LONE STAR GAS LINE
- OHE — PP — OVERHEAD POWER LINE AND POLE
- CATV — UNDERGROUND CABLE TV
- UGE — TU ELECTRIC UNDERGROUND CABLE
- GAS METER
- LIGHT POLE
- SIGN
- WATER VALVE
- WATER METER
- FIRE HYDRANT
- CLEANOUT
- REMOVE EXISTING PAVEMENT AND SIDEWALK
- CONSTRUCT NEW SIDEWALK
- CONSTRUCT NEW PAVEMENT
- EXISTING CURB
- PROPOSED CURB
- +636.23 PROPOSED ELEVATION
- +636.23 EXISTING ELEVATION

VARIABLE HEIGHT SOLID CONCRETE INTERLOCKING RETAINING WALL AT BACK OF SIDEWALK OR 6' BEHIND BACK OF CURB:

Belt Line Road at Marsh Lane

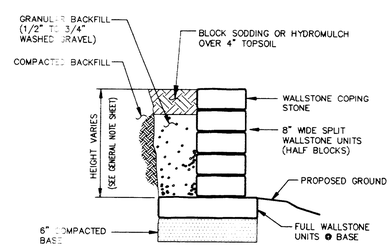
Location				Maximum Exposed Height	Length
STA. W 1+17	to STA. W 1+64	(Right)		18"	47'
STA. W 2+09	to STA. W 2+30	(Right)		18"	21'
STA. W 2+75	to STA. W 3+30	(Right)		18"	55'
STA. N 0+79	to STA. E 0+90	(Left)		18"	60'
STA. E 1+32	to STA. E 1+85	(Left)		18"	53'
STA. N 1+20	to STA. N 1+75	(Right)		18"	55'
STA. N 2+10	to STA. N 3+50	(Left)		24"	150'
				TOTAL LENGTH	441'

Belt Line Road at Business Avenue

STA. 10+40	to STA. 12+82	(Right)		18"	242'
STA. 13+33	to STA. 16+50	(Right)		18"	315'
				TOTAL LENGTH	557'

NOTE:

Provide a smooth taper at the top of the retaining wall to match natural ground. Confirm top of wall height with the Town of Addison prior to installation.



TYPICAL RETAINING WALL SECTION (STRAIGHT STACK)

N.T.S.

TRAFFIC SIGNAL POLE AND MAST ARM PAINTING NOTES

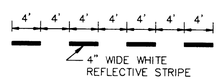
The Contractor shall repaint the two 36' mast arms and poles to be relocated from Belt Line/Marsh to Belt Line/Business and touch up any damaged paint on the six new 55' mast arms and poles in accordance with the following specifications:

1. Surface Preparation – The exterior steel surface is blast cleaned to Steel Painting Council Surface Preparation Specification No. 6 (SSPC-SP6) requirements.
2. Coating Material – A two-part epoxy paint to be approved by the Town of Addison shall be used.
3. Payment – Payment shall be subsidiary to traffic signal installation.

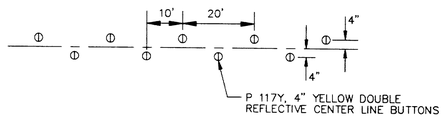
PAVEMENT MARKING LEGEND

TRAFFIC MOVEMENT PAVEMENT MARKINGS; PLACED AT THE LOCATIONS AND STATIONS SHOWN ON PLAN

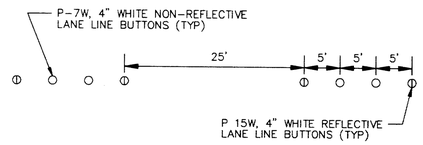
LEFT/RIGHT TURN LANE



PUPPY TRACKS



TWO-WAY DIVIDE LINE



NORMAL LANE LINE

NOTE:

1. ALL PAVEMENT MARKING ARROWS, STOP BARS, AND PUPPY TRACKS SHALL BE ALKYD THERMOPLASTIC.
2. ALL BUTTONS AND JIGGLE BARS SHALL BE CERAMIC.

NO.	REVISION	BY	DATE
1	Revised Entire Sheet	BG	4-19-94

DESIGNED BY: B GRANTHAM
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: NONE
DATE: JANUARY 1994
FILE: \ADDISON\BUSINESS\QUANTITY

STATE OF TEXAS — JAMES F. WALDSAUER — 65676 — PROFESSIONAL ENGINEER

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

QUANTITY SUMMARY

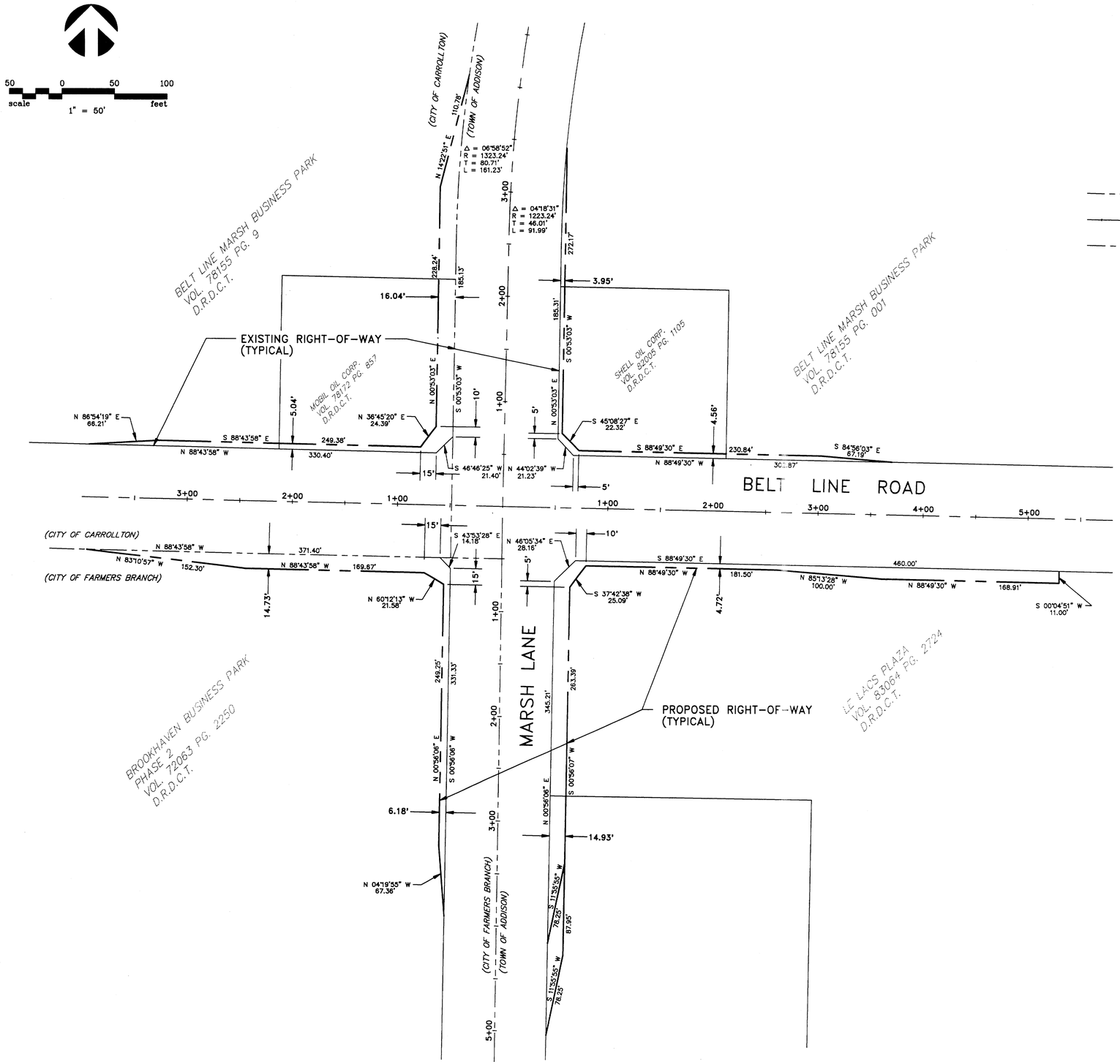
INTERSECTION IMPROVEMENTS

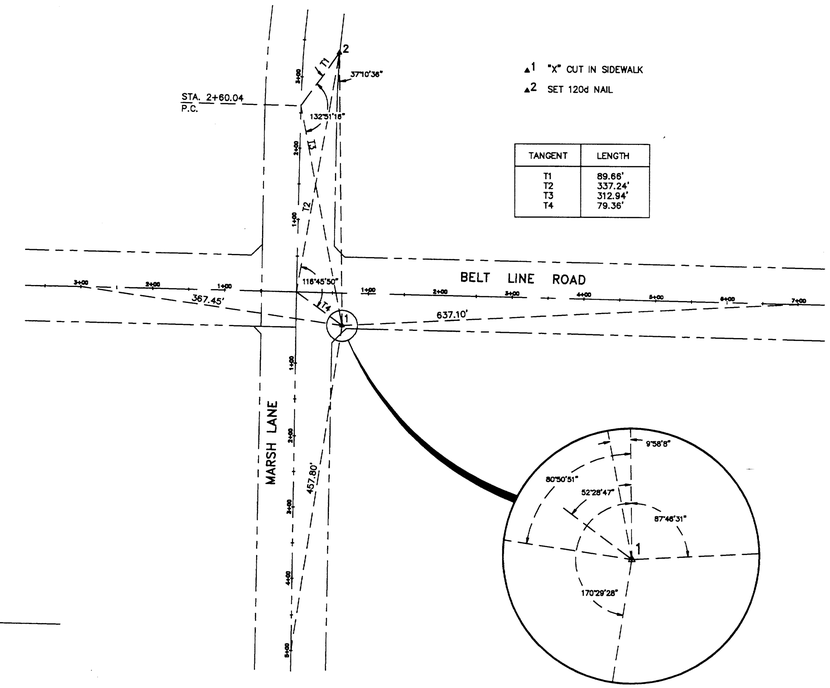
for

THE TOWN OF ADDISON

SHEET NO. 3 OF 46 SHEETS

JOB NO. 15411





TANGENT	LENGTH
T1	89.66'
T2	337.24'
T3	312.94'
T4	79.35'

HORIZONTAL CONTROL

NO.	REVISION	BY	DATE
1	ADD HORIZONTAL CONTROL & REVISE R.O.W.	C.P.	4/94

DESIGNED BY: J WALDBAUER
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 50'
DATE: DECEMBER, 1993
FILE: \ADDISON\PROJECT2\BMROW

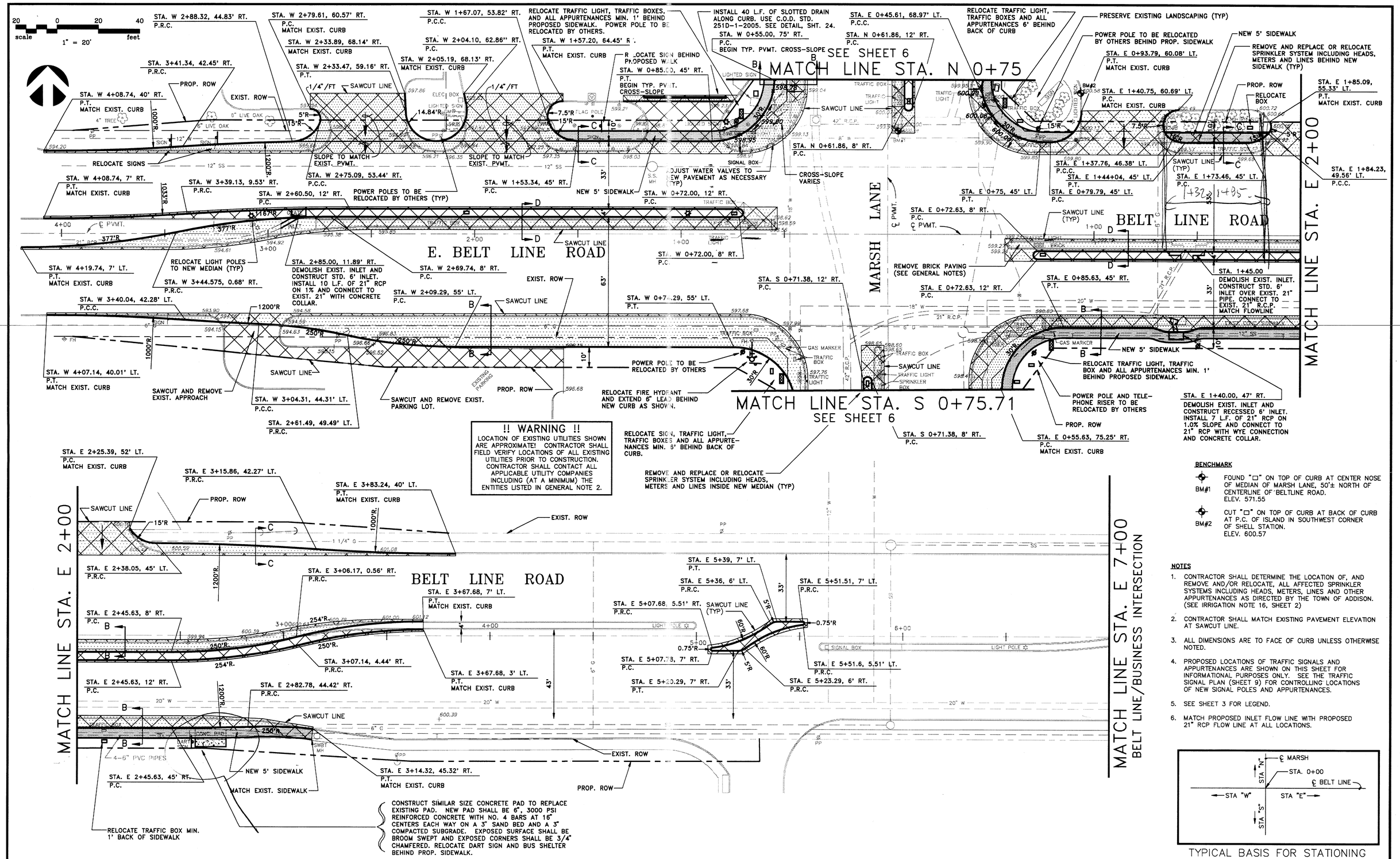
STATE OF TEXAS — BRUCE R. GRANTHAM — 62659 — REGISTERED PROFESSIONAL ENGINEER

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

RIGHT-OF-WAY PLAN

INTERSECTION IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO. 4 OF 46 SHEETS
JOB NO. 13921



BENCHMARK

BM#1 — FOUND "□" ON TOP OF CURB AT CENTER NOSE OF MEDIAN OF MARSH LANE, 50'± NORTH OF CENTERLINE OF BELTLINE ROAD. ELEV. 571.55

BM#2 — CUT "□" ON TOP OF CURB AT BACK OF CURB AT P.C. OF ISLAND IN SOUTHWEST CORNER OF SHELL STATION. ELEV. 600.57

NOTES

1. CONTRACTOR SHALL DETERMINE THE LOCATION OF, AND REMOVE AND/OR RELOCATE, ALL AFFECTED SPRINKLER SYSTEMS INCLUDING HEADS, METERS, LINES AND OTHER APPURTENANCES AS DIRECTED BY THE TOWN OF ADDISON. (SEE IRRIGATION NOTE 16, SHEET 2)
2. CONTRACTOR SHALL MATCH EXISTING PAVEMENT ELEVATION AT SAWCUT LINE.
3. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
4. PROPOSED LOCATIONS OF TRAFFIC SIGNALS AND APPURTENANCES ARE SHOWN ON THIS SHEET FOR INFORMATIONAL PURPOSES ONLY. SEE THE TRAFFIC SIGNAL PLAN (SHEET 9) FOR CONTROLLING LOCATIONS OF NEW SIGNAL POLES AND APPURTENANCES.
5. SEE SHEET 3 FOR LEGEND.
6. MATCH PROPOSED INLET FLOW LINE WITH PROPOSED 21" RCP FLOW LINE AT ALL LOCATIONS.

TYPICAL BASIS FOR STATIONING

NO.	REVISION	BY	DATE
1	REVISE PAVEMENT REMOVAL	B.G.	7/15/94

DESIGNED BY: J WALDBAUER
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 20'
DATE: DECEMBER 1993
FILE: \ADDISON\PROJECT2\BM1NEW

STATE OF TEXAS — BRUCE R. GRANTHAM — 52659 — REGISTERED PROFESSIONAL ENGINEER

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
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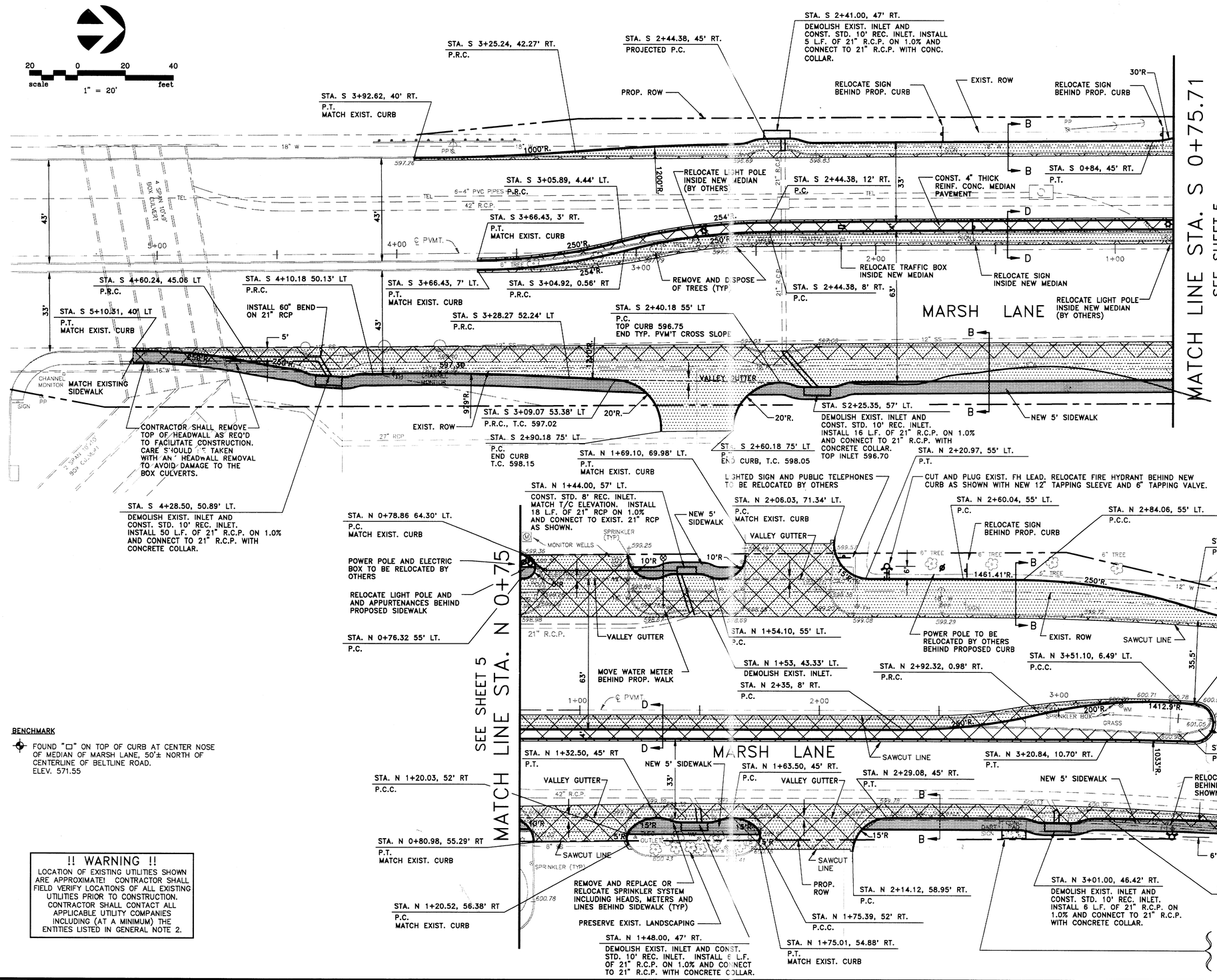
PAVING PLAN

PAVING AND DRAINAGE IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO. 5 OF 46 SHEETS
JOB NO. 13921



NOTES

1. CONTRACTOR SHALL DETERMINE THE LOCATION OF, AND REMOVE AND/OR RELOCATE, ALL AFFECTED SPRINKLER SYSTEMS INCLUDING HEADS, METERS, LINES AND OTHER APPURTENANCES AS DIRECTED BY THE TOWN OF ADDISON. (SEE IRRIGATION NOTE 16, SHEET 2)
2. CONTRACTOR SHALL MATCH EXISTING PAVEMENT ELEVATION AT SAWCUT LINE.
3. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
4. PROPOSED LOCATIONS OF TRAFFIC SIGNALS AND APPURTENANCES ARE SHOWN ON THIS SHEET FOR INFORMATIONAL PURPOSES ONLY. SEE THE TRAFFIC SIGNAL PLAN (SHEET 9) FOR CONTROLLING LOCATIONS OF NEW SIGNAL POLES AND APPURTENANCES.
5. SEE SHEET 3 FOR LEGEND.
6. MATCH PROPOSED INLET FLOW LINE WITH PROPOSED 21" RCP FLOW LINE AT ALL LOCATIONS.
7. THE CONTRACTOR SHALL VERIFY THE 12" WATER MAIN DEPTH WHERE IT CROSSES THE 21" RCP ON THE WEST SIDE OF MARSH LANE AT STA. N 1+40±. IF A CONFLICT EXISTS, THE CONTRACTOR SHALL LOWER THE 12" WATER MAIN IN ACCORDANCE WITH DALLAS WATER UTILITIES FILE 414W-31.

BENCHMARK

FOUND "□" ON TOP OF CURB AT CENTER NOSE OF MEDIAN OF MARSH LANE, 50'± NORTH OF CENTERLINE OF BELTLINE ROAD.
ELEV. 571.55

!! WARNING !!

LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE! CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL CONTACT ALL APPLICABLE UTILITY COMPANIES INCLUDING (AT A MINIMUM) THE ENTITIES LISTED IN GENERAL NOTE 2.

NO.	REVISION	BY	DATE

DESIGNED BY: J WALDBAUER
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 20'
DATE: JUNE 1994
FILE: \ADDISON\PROJECT2\BM2NEW-2

STATE OF TEXAS — BRUCE R. GRANTHAM — 52659 — REGISTERED PROFESSIONAL ENGINEER

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
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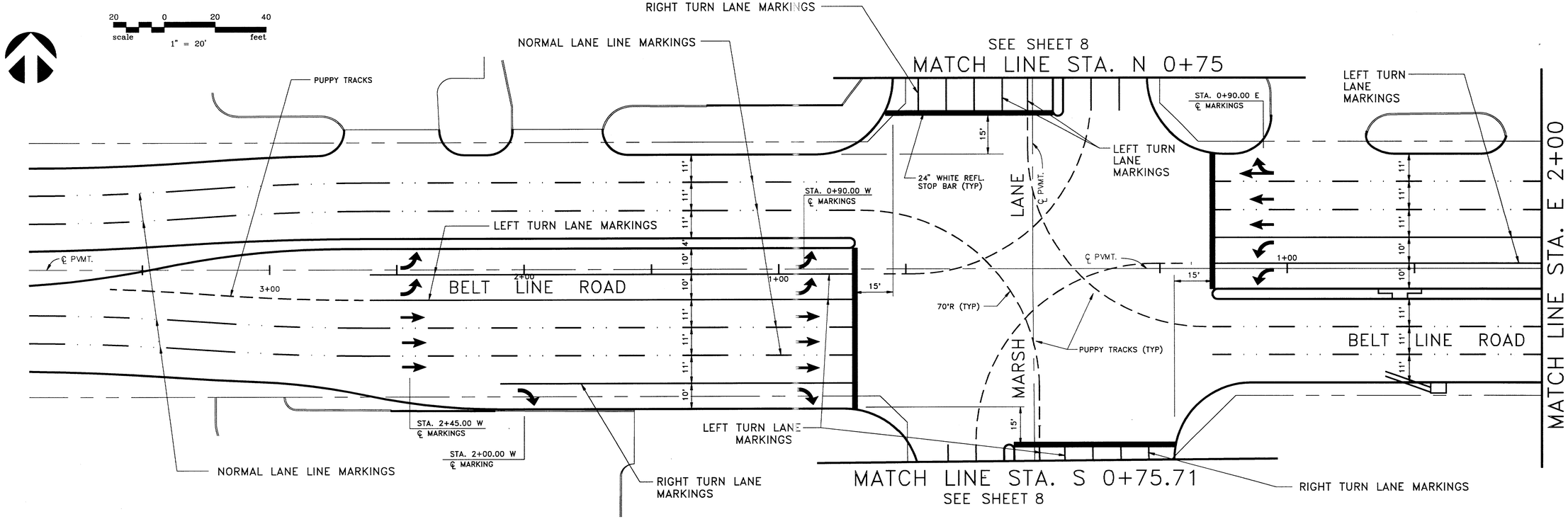
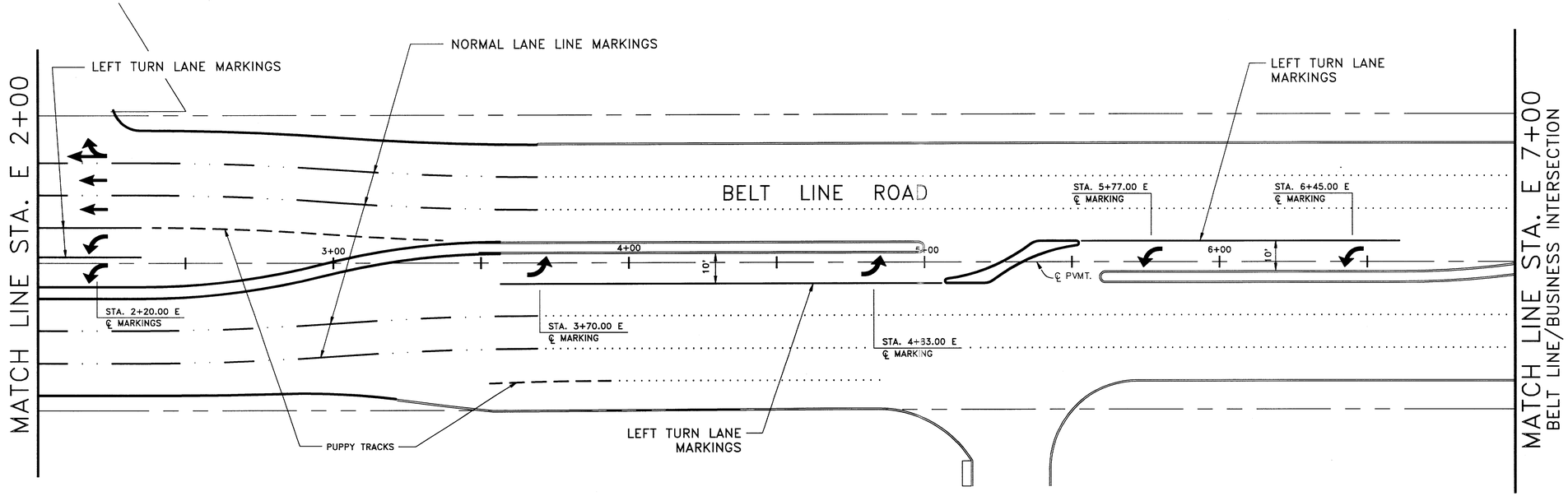
Dallas, Texas 75240 (214) 387-0771

PAVING PLAN

PAVING AND DRAINAGE IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO. 6 OF 46 SHEETS
JOB NO. 13921





NOTE

1. ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
2. SEE SHEET 3 FOR LEGEND.

NO.	REVISION	BY	DATE

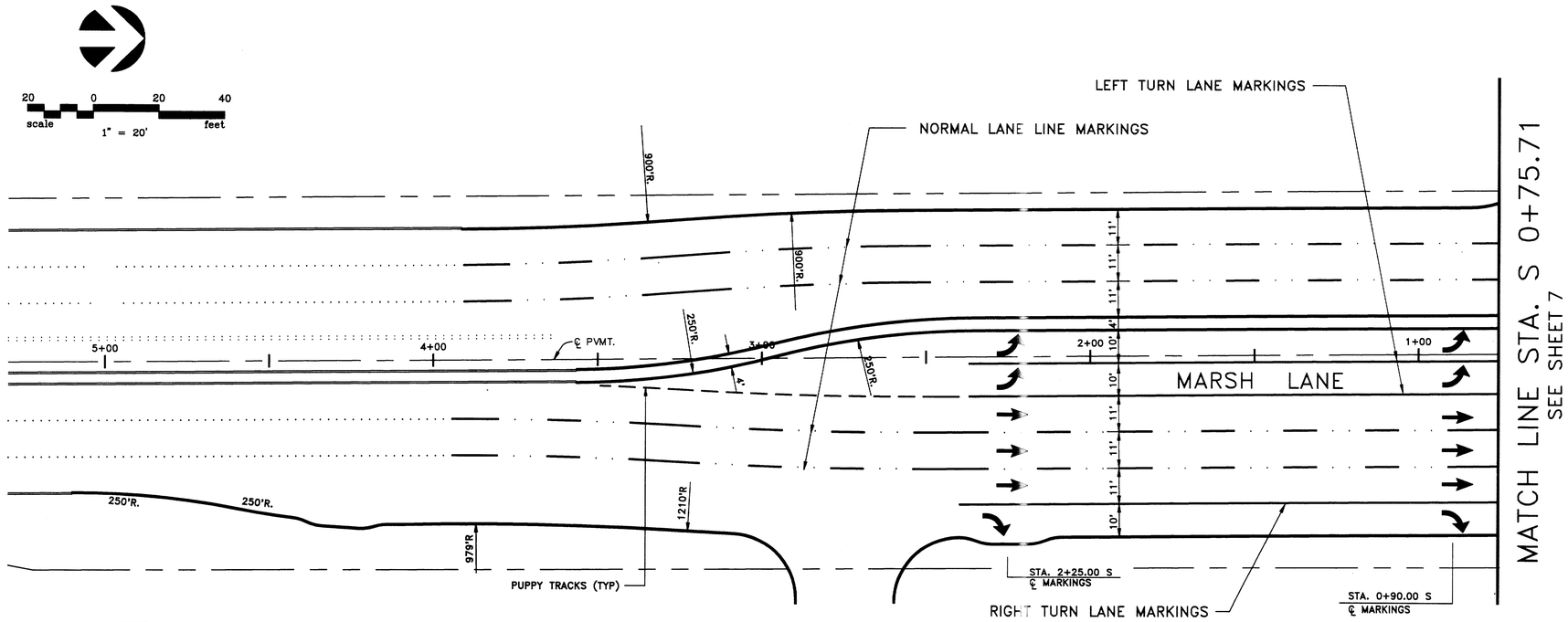
DESIGNED BY: J WALDBAUER
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 20'
DATE: DECEMBER, 1993
FILE: \ADDISON\PROJECT2\PMBM1

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

PAVEMENT MARKING PLAN

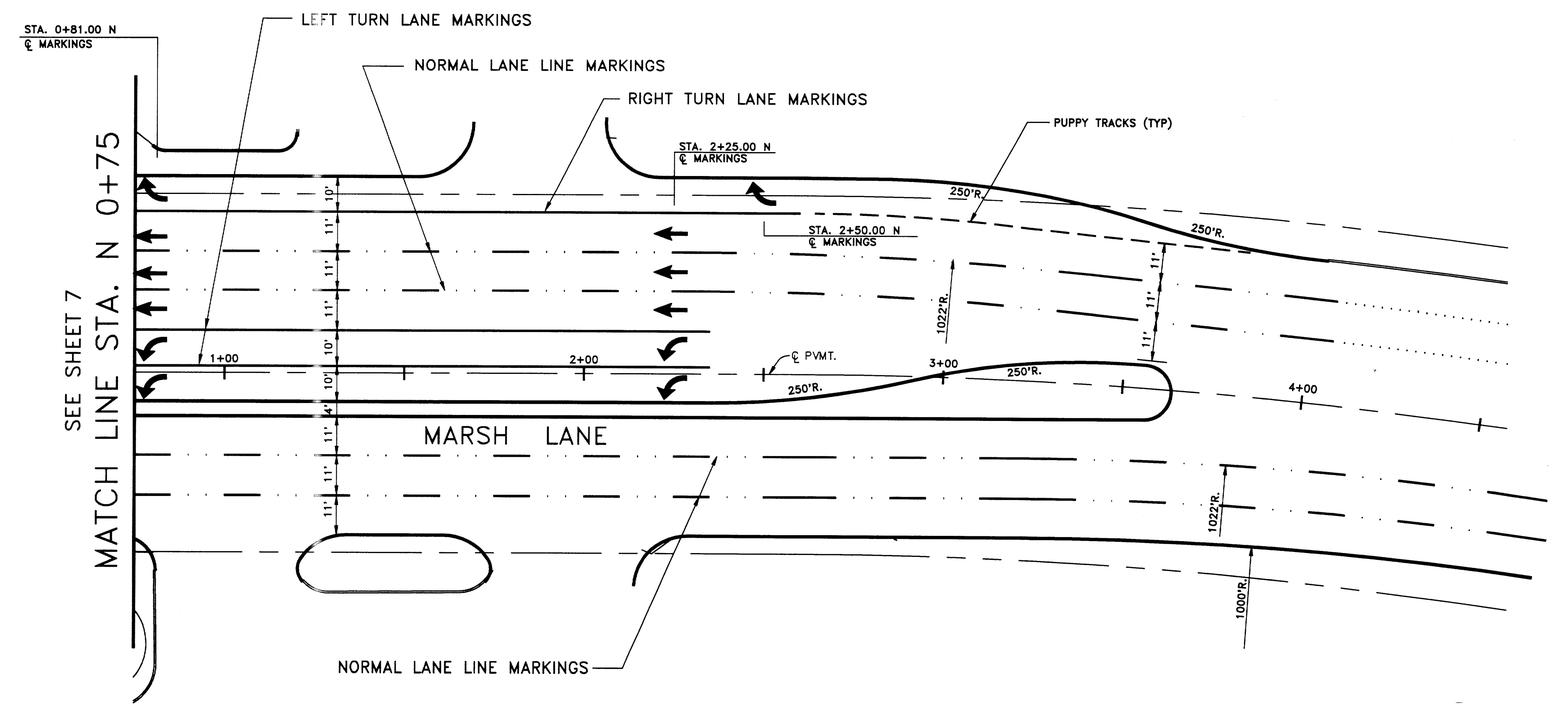
INTERSECTION IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO. 7 OF 46 SHEETS
JOB NO. 13921



NOTE

1. ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
2. SEE SHEET 3 FOR LEGEND.



NO.	REVISION	BY	DATE

DESIGNED BY: J WALDBAUER
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 20'
DATE: DECEMBER, 1993
FILE: \ADDISON\PROJECT2\PMBM2

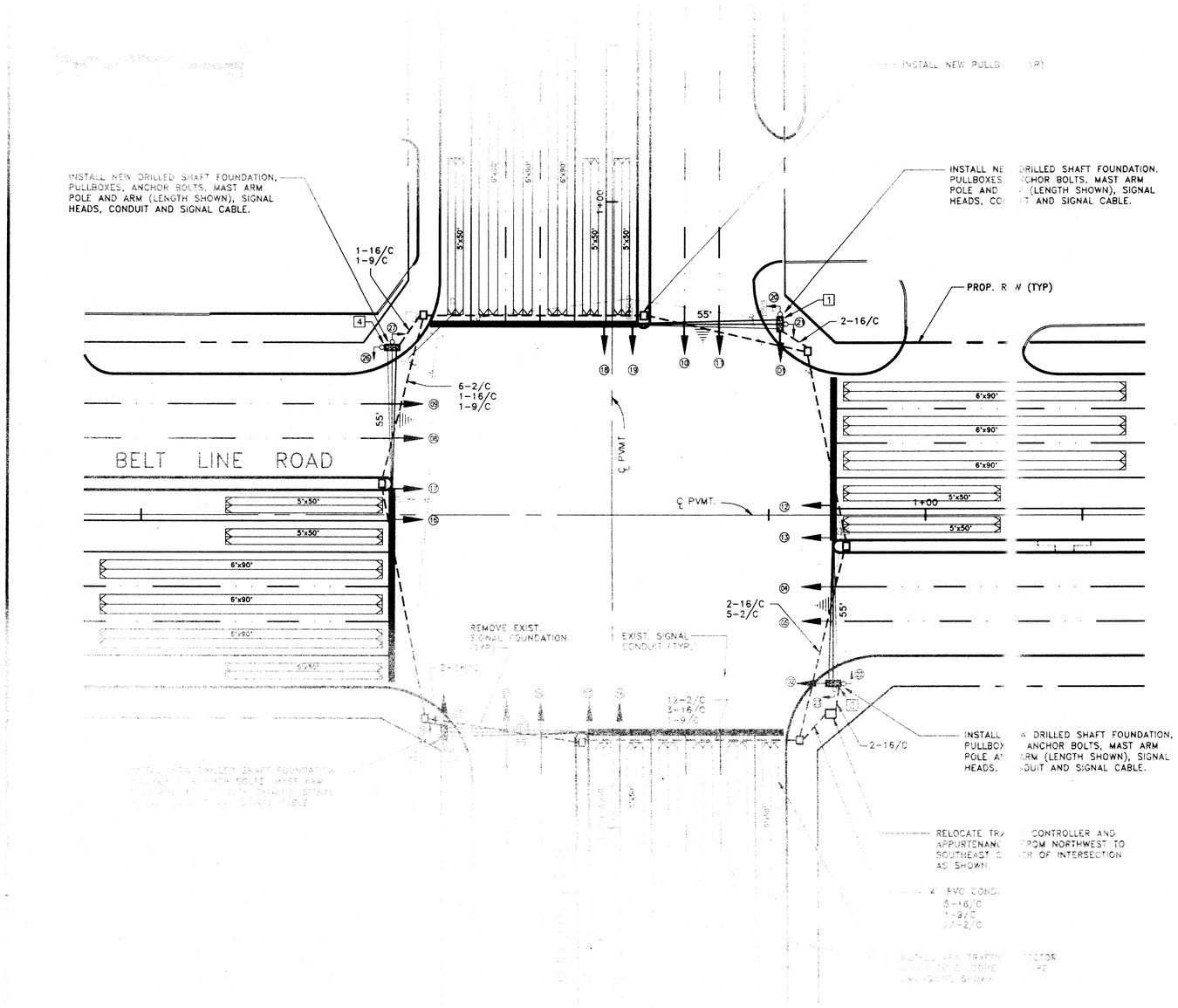
STATE OF TEXAS
BRUCE R. GRANTHAM
82659
REGISTERED PROFESSIONAL ENGINEER

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

PAVEMENT MARKING PLAN

PAVING AND DRAINAGE IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO. 8 OF 46 SHEETS
JOB NO. 13921



NOTES

1. THE CONTRACTOR SHALL MAINTAIN TRAFFIC SIGNAL OPERATION AT ALL TIMES UNLESS BRIEF SHUTDOWN IS APPROVED IN WRITING BY THE TOWN OF ADDISON. THE CONTRACTOR MAY INSTALL TEMPORARY SIGNALS AS APPROVED BY THE TOWN OF ADDISON.

2. THE CONTRACTOR SHALL RECONNECT ALL SIGNAL INTERCONNECT AND EMERGENCY VEHICLE CABLE TO THE RELOCATED CONTROLLER SO AS TO DUPLICATE EXISTING SIGNAL PHASING, DETECTOR OPERATION, PEDESTRIAN PHASING, INTERCONNECT AND EMERGENCY VEHICLE PHASING EXCEPT AS NOTED ON THE PLANS. NEW CONDUIT SHALL BE INSTALLED WHERE NECESSARY TO ACCOMODATE RELOCATED PULL BOXES AND CONTROLLERS. SAID CONDUIT SHALL BE INSTALLED IN SUCH A MANNER SO AS TO ALLOW EASY PULLING OF SIGNAL CABLE THROUGH THE NEW CONDUIT.

3. NEW MAST ARM POLES AND 55' MAST ARMS SHALL BE FURNISHED TO THE CONTRACTOR BY THE TOWN OF ADDISON. CONTRACTOR SHALL PICK UP SAID EQUIPMENT FROM THE TOWN OF ADDISON STORAGE YARD. CONTRACTOR SHALL FURNISH AND INSTALL NEW CONTROLLER, CABINET, SIGNAL HEADS AND APPURTENANCES REQUIRED AT BELT LINE/MARSH IN ACCORDANCE WITH THE COMPONENT REQUIREMENTS PROVIDED IN GENERAL NOTE 22 ON SHEET 2 OF 46.

4. TWO OF THE EXISTING MAST ARM POLES AND 36' MAST ARMS INCLUDING SIGNAL HEADS FROM THE BELT LINE/MARSH LANE INTERSECTION SHALL BE RELOCATED TO THE BELT LINE/BUSINESS INTERSECTION.

5. FURNISH AND INSTALL OPTICOM SENSORS AND CABLE AT BELT LINE/MARSH TO PROVIDE FOR SIMILAR OPERATION AS SHOWN FOR BELT LINE/BUSINESS (SEE SHEET 19 OF 46).

SIGNAL HEAD ARRAYS

HEAD NUMBERS	1,2,3	4–11	12–19	20–27
LENS SIZE	12"	12"	12"	12"
TYPE	Conv.	Conv.	Conv.	Ped.
LENS CONFIGURATION	R	R	R	DW
	Y	Y	Y	WALK
	G	G	G	X
	~~Y~~ →	X	← Y	X
	~~G~~ →	X	← G	X
TOTAL NO. OF UNITS	3	8	8	8

CABLE TERMINATION CHART

CONDUCTOR COLOR	CABLE 1 FROM POLE 1 TO CONTROLLER 16 CONDUCTOR	CABLE 2 FROM POLE 2 TO CONTROLLER 16 CONDUCTOR	CABLE 3 FROM POLE 3 TO CONTROLLER 16 CONDUCTOR	CABLE 4 FROM POLE 4 TO CONTROLLER 16 CONDUCTOR	CABLE 5 FROM POLE 1 TO CONTROLLER 16 CONDUCTOR	CABLE 6 FROM POLE 2 TO CONTROLLER 16 CONDUCTOR	CABLE 7 FROM POLE 3 TO CONTROLLER 16 CONDUCTOR	CABLE 8 FROM POLE 4 TO CONTROLLER 9 CONDUCTOR
WHITE/BLACK	S	S	S	S	S	S	S	S
WHITE	SC	SC	SC	SC	SC	SC	SC	SC
RED	SH 10,11 R	SH 4,5 R	SH 6,7 R	SH 8,9 R	SH 18,19 R	SH 12,13 R	SH 14,15 R	SH 16,17 R
GREEN	SH 10,11 G	SH 4,5 G	SH 6,7 G	SH 8,9 G	SH 18,19 G	SH 12,13 G	SH 14,15 G	SH 16,17 G
ORANGE	SH 10,11 Y	SH 4,5 Y	SH 6,7 Y	SH 8,9 Y	SH 18,19 Y	SH 12,13 Y	SH 14,15 Y	SH 16,17 Y
BLACK	S	S	S	S	SH 18,19 ~~R~~	SH 12,13 ~~R~~	SH 14,15 ~~R~~	SH 16,17 ~~R~~
BLUE	S	S	S	S	SH 18,19 ~~G~~	SH 12,13 ~~G~~	SH 14,15 ~~G~~	SH 16,17 ~~G~~
RED/BLACK	S	S	S	S	SH 1 R	SH 2 R	SH 3 R	S
GREEN/BLACK	S	S	S	S	SH 1 G	SH 2 G	SH 3 G	S
WHITE/BLACK	PB COMMON	PB COMMON	PB COMMON	PB COMMON	SH 1 Y	SH 2 Y	SH 3 Y	
BLACK/RED	PED CALL	PED CALL	PED CALL	PED CALL	SH 1 ~~R~~	SH 2 ~~R~~	SH 3 ~~R~~	
BLACK/WHITE	SH 21 W	SH 23 W	SH 21 W	SH 23 W	SH 1 ~~G~~	SH 2 ~~G~~	SH 3 ~~G~~	
BLACK/ORANGE	SH 21 DW	SH 23 DW	SH 21 DW	SH 23 DW	S	S	S	
BLACK/BLUE	PED CALL	PED CALL	PED CALL	PED CALL	S	S	S	
BLACK/RED	SH 21 W	SH 23 W	SH 21 W	SH 23 W	S	S	S	
BLACK/GREEN	SH 21 DW	SH 23 DW	SH 21 DW	SH 23 DW	S	S	S	

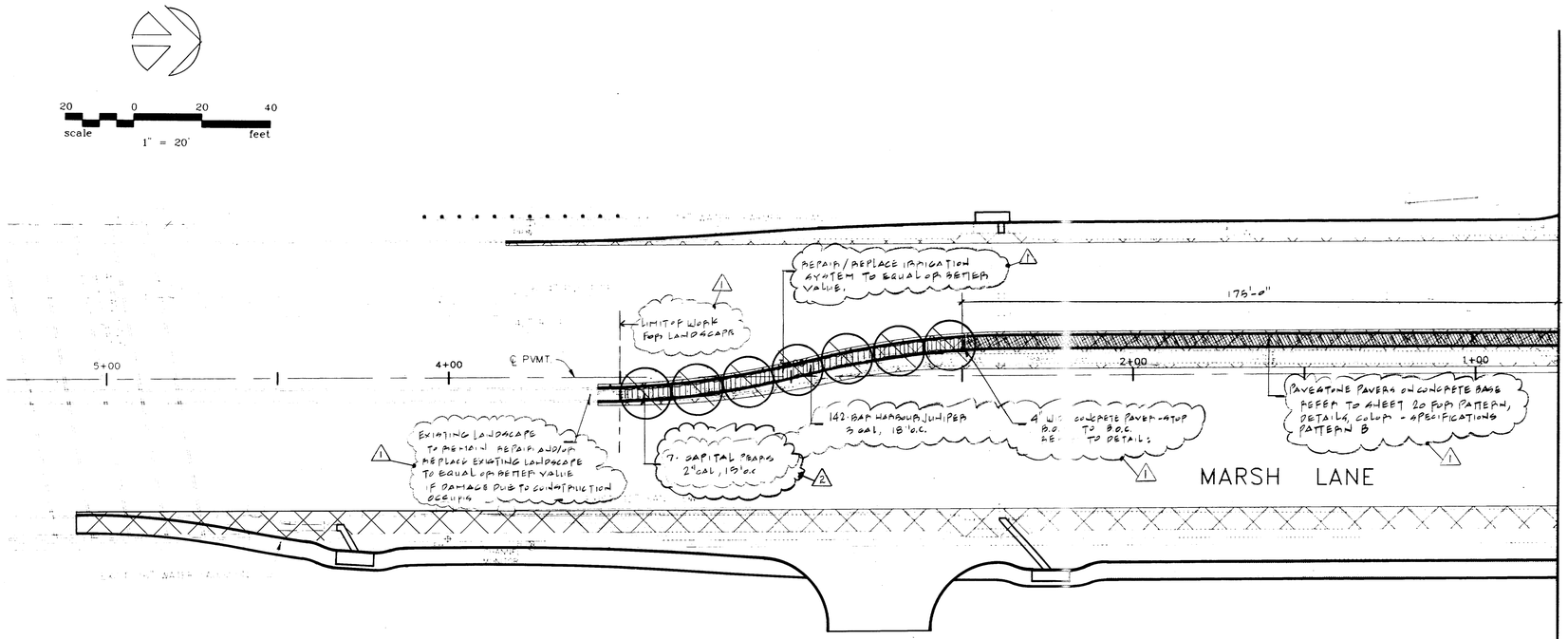
TRAFFIC SIGNAL PLAN

INTERSECTION IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE

TOWN OF ADDISON

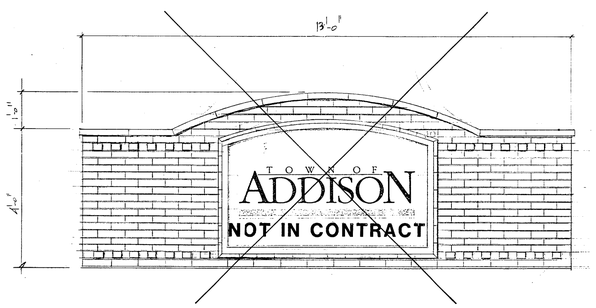
SHEET NO. 9 OF 46 SHEETS

JOB NO. 13921



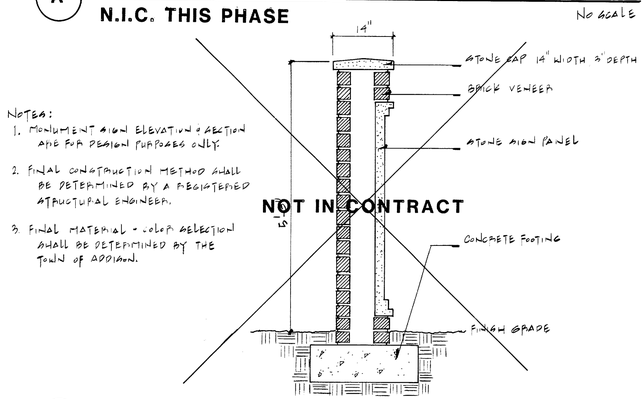
MATCH LINE STA. S 0+75.71

SEE SHEET 11



A **MONUMENT SIGN ELEVATION**
N.I.C. THIS PHASE

No SCALE



NOTES:
1. MONUMENT SIGN ELEVATION + SECTION ARE FOR DESIGN PURPOSES ONLY.
2. FINAL CONSTRUCTION METHOD SHALL BE DETERMINED BY A REGISTERED STRUCTURAL ENGINEER.
3. FINAL MATERIAL + COLOR SELECTION SHALL BE DETERMINED BY THE TOWN OF ADDISON.

B **MONUMENT SIGN SECTION**
N.I.C. THIS PHASE

No SCALE

PLANT LIST

MARSH LANE, NORTH OF BELT LINE ROAD & SOUTH OF BELT LINE ROAD

BOTANICAL NAME	COMMON NAME	QTY.	SIZE	REMARKS
Berberis thumbergii autropurpea 'Rose Glow'	Barberry 'Rose Glow'	45	5 gal.	cont. full 24" spread min.
Juniperus procumbens	Procumbens Juniper	568	3 gal.	cont. full 18" spread min.
Juniperus horizontalis 'Bar Harbor'	Bar Harbor Juniper	142	3 gal.	cont. " "
Pistachia chinensis	Chinese Pistachio	5	4" cal.	cont. grown 15'-16'ht. 6' spread
Pyrus caleryana 'Capital'	Capital Pear.	12	2" cal.	cont. grown 30gal. 12' ht 4'sprd

BELT LINE ROAD, EAST OF MARSH LANE TO BUSINESS AVENUE

BOTANICAL NAME	COMMON NAME	QTY.	SIZE	REMARKS
Berberis thumbergii autropurpea 'Rose Glow'	Barberry 'Rose Glow'	210	5 gal.	cont. full 24" spread min.
Juniperus procumbens	Procumbens Juniper	1200	3 gal.	cont. full 18" spread min.
Nandina domestica 'Gulf Stream'	Gulf Stream Nandina	565	3 gal.	cont. full 18" spread min.
Pistachia chinensis	Chinese Pistachio	15	4" cal.	cont. grown 15'-16'ht. 6'sprd.
Pyrus calleryana'Capital'	Capital Pear	19	2" cal.	cont. grown 30 gal. 12'ht 4'sprd

BELT LINE ROAD, EAST OF BUSINESS AVENUE TO CORPORATE DRIVE

BOTANICAL NAME	COMMON NAME	QTY.	SIZE	REMARKS
Berberis thumbergii autropurpea 'Rose Glow'	Barberry 'Rose Glow'	53	5 gal.	cont. full 24" spread min.
Juniperus procumbens	Procumbens Juniper	732	3 gal.	cont. full 18" spread min.
Pistachia chinensis	Chinese Pistachio	8	4" cal.	cont. grown 15'-16' ht. 6'sprd
Pyrus calleryana 'Capital'	Capital Pear	6	2" cal.	cont. grown 30 gal. 12'ht. 4'spr-

NOTE: Plant list is an aid to bidders only. Verify all quantities on plan.

GENERAL NOTES

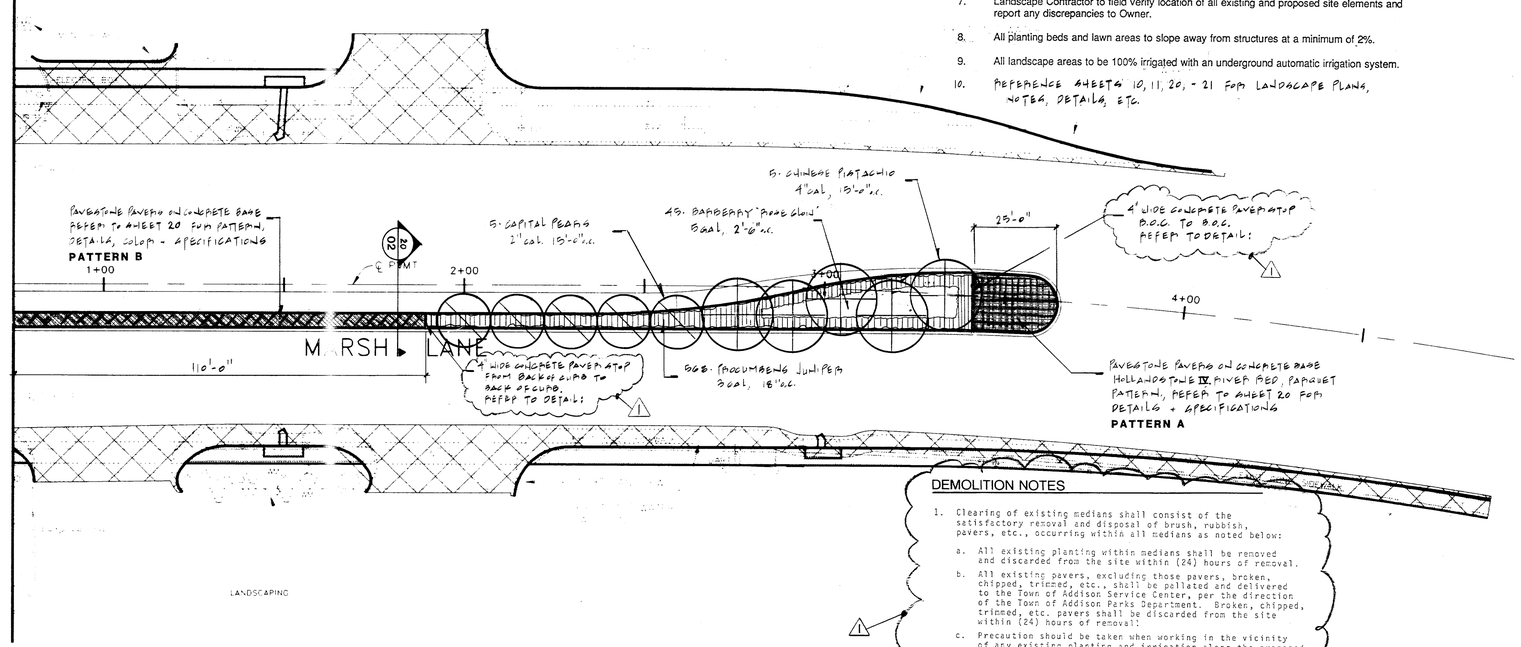
1. Contractor shall verify locations of all existing and proposed site elements and notify Architect of any discrepancies.
2. Contractor shall locate all existing underground utilities and notify the Architect of any conflicts.
3. Contractor is required to obtain all permits.
4. All lawn areas and planting beds are to be separated by steel edging.
5. Contractor is to provide a minimum 2% slope away from all structures.
6. ALL PROPOSED TREE LOCATIONS SHALL BE STAKED BY LANDSCAPE CONTRACTOR AND LOCATIONS APPROVED BY TOWNS ADDISON DIRECTOR PRIOR TO INSTALLATION.

LANDSCAPE NOTES

1. Landscape contractor shall submit 'as built' drawings at the completion of the project.
2. Landscape areas must be permanently maintained in a healthy growing condition at all times.
3. Property Owner is responsible for regular weeding, mowing of grass, irrigating, fertilizing, pruning and other permanent maintenance of all plantings as needed.
4. All trees shall be planted a minimum of 3'-0" away from curbs, walks, walls, structures, etc.
5. All planting beds and lawn areas to be separated by steel edging.
6. Landscape Contractor to locate all underground utilities before beginning construction and notify Owner of any subsequent conflicts.
7. Landscape Contractor to field verify location of all existing and proposed site elements and report any discrepancies to Owner.
8. All planting beds and lawn areas to slope away from structures at a minimum of 2%.
9. All landscape areas to be 100% irrigated with an underground automatic irrigation system.
10. REFERENCE SHEETS 10, 11, 20, - 21 FOR LANDSCAPE PLANS, NOTES, DETAILS, ETC.

SEE SHEET 11

MATCH LINE STA. N 0+75



DEMOLITION NOTES

1. Clearing of existing medians shall consist of the satisfactory removal and disposal of brush, rubbish, pavers, etc., occurring within all medians as noted below:
   a. All existing planting within medians shall be removed and discarded from the site within (24) hours of removal.
   b. All existing pavers, excluding those pavers, broken, chipped, trimmed, etc., shall be palleted and delivered to the Town of Addison Service Center, per the direction of the Town of Addison Parks Department. Broken, chipped, trimmed, etc. pavers shall be discarded from the site within (24) hours of removal.
   c. Precaution should be taken when working in the vicinity of any existing planting and irrigation along the proposed Pavestone wall(refer to Civil plans for extent) and the "Mobil"gas station. Any damage occurring to existing planting and irrigation shall be replaced and/or repaired to equal or better value.

NO.	REVISION	BY	DATE
2	CITY OF FARMERS BRANCH COMMENTS	BA	7.11.94
1	TOWN OF ADDISON COMMENTS	BA	5.9.94

DESIGNED BY: BA/AP
DRAWN BY: BA
CHECKED BY: AP
SCALE: 1" = 20'
DATE: MAR. 22, 1994
FILE:

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

SMR
Landscape Architects
703 McKinney, LB 107
Suite 403
Dallas, Texas 75202
(214) 871 0083
Steven M. Rahn, ASLA

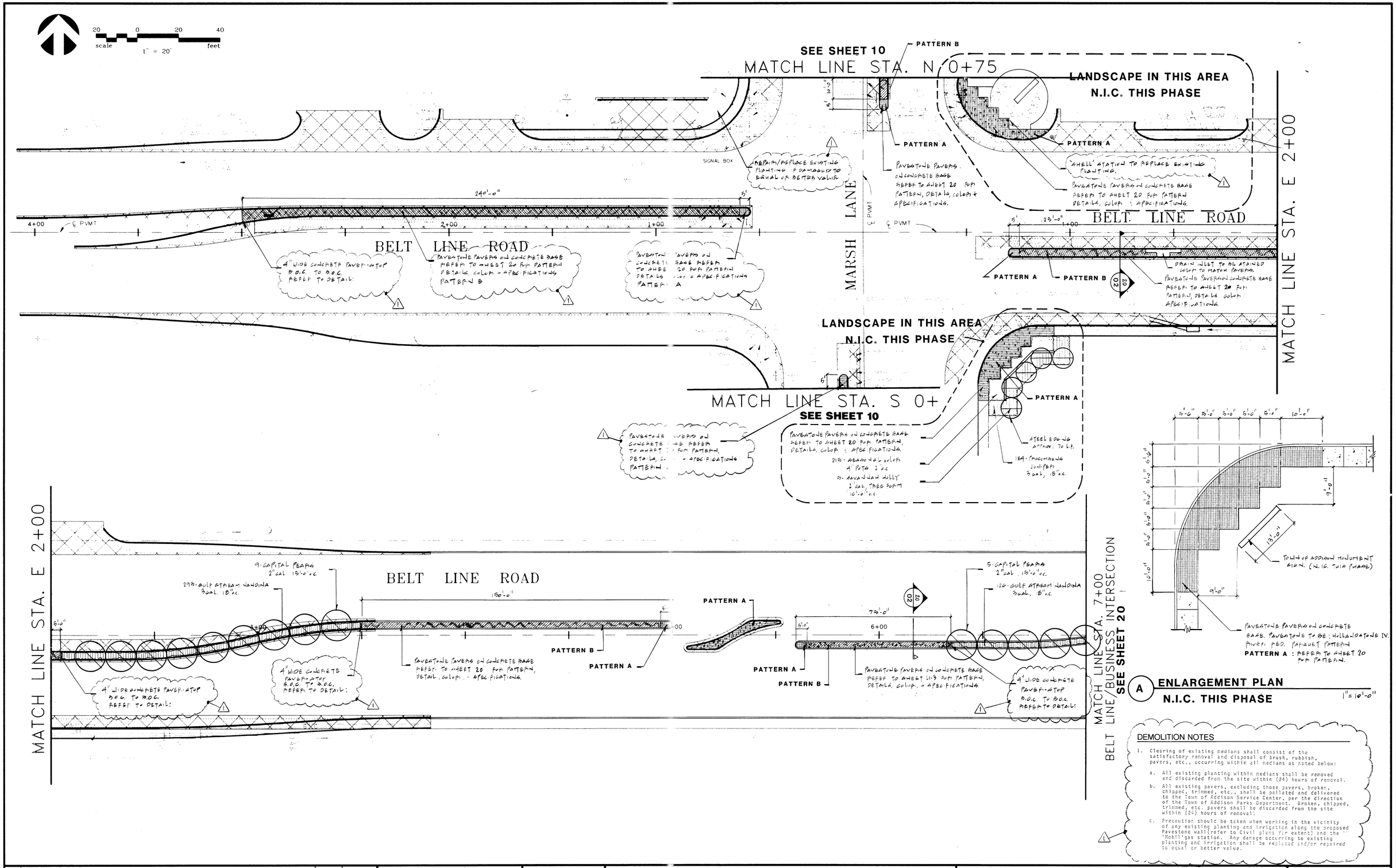
LANDSCAPE PLAN

MARSH LANE NORTH OF BELT LINE ROAD

PAVING AND DRAINAGE IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO 10 OF 46 SHEETS

JOB NO. 13921



A ENLARGEMENT PLAN
N.I.C. THIS PHASE 1"=10'-0"

DEMOLITION NOTES

1. Clearing of existing medians shall consist of the satisfactory removal and disposal of brush, rubbish, pavers, etc., occurring within all medians as noted below:
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   b. All existing pavers, excluding those pavers, broken, chipped, trimmed, etc., shall be palleted and delivered to the Town of Addison Service Center, per the direction of the Town of Addison Parks Department. Broken, chipped, trimmed, etc. pavers shall be discarded from the site within (24) hours of removal.
   c. Precaution should be taken when working in the vicinity of any existing planting and irrigation along the proposed Pavestone wall(refer to Civil plans for extent) and the "Mobil" gas station. Any damage occurring to existing planting and irrigation shall be replaced and/or repaired to equal or better value.

NO	REVISION	BY	DATE
1	TOWN OF ADDISON COMMENTS	BA	5.19.94

DESIGNED BY BA/GP
DRAWN BY BA
CHECKED BY GP
SCALE 1" = 20'
DATE MAR. 22, 1994
FILE

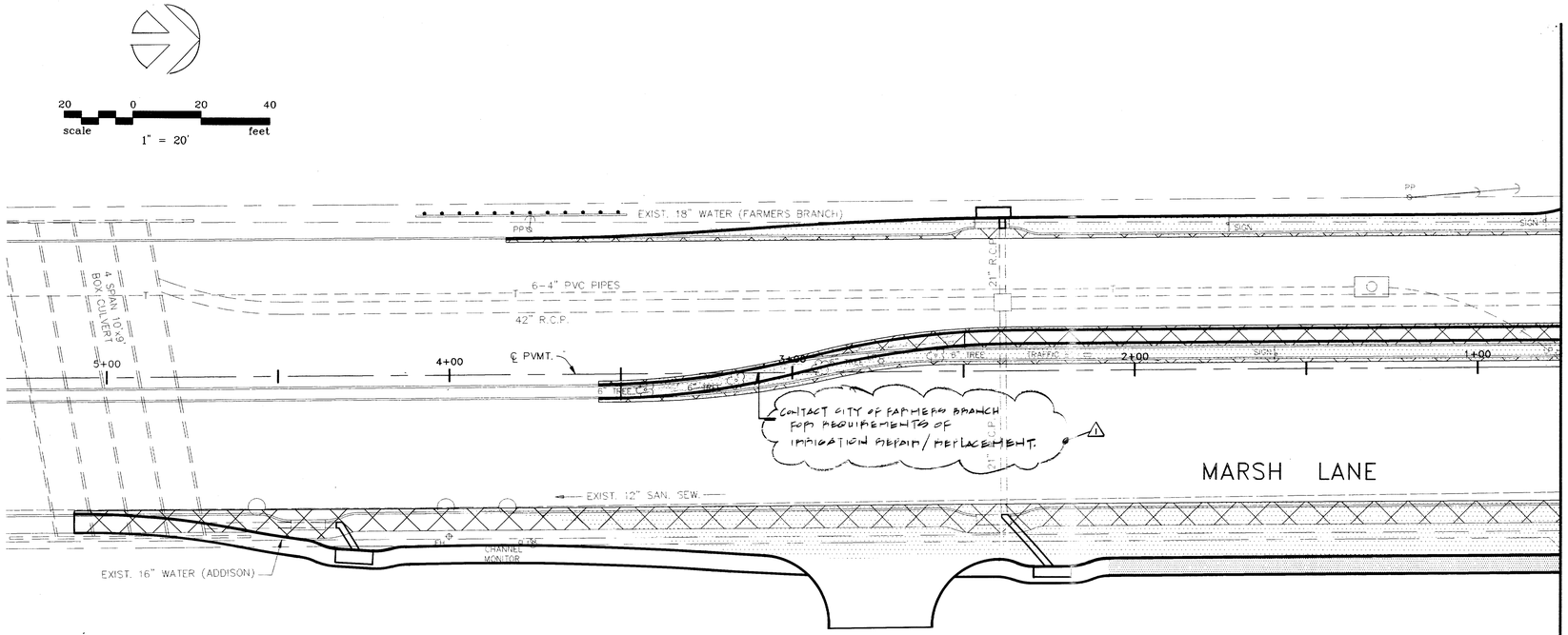
EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

SMR
Landscape Architects
703 McKinney, LB 107
Suite 403
Dallas, Texas 75202
(214) 871 0083
Steven M. Rahn, ASLA

LANDSCAPE PLAN
BELT LINE ROAD EAST OF MARSH LANE TO BUSINESS AVE

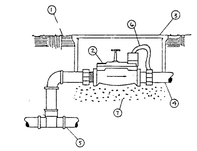
PAVING AND DRAINAGE IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO. 11 OF 46 SHEETS
JOB NO. 13921



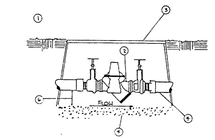
MATCH LINE STA. S 0+75.71
SEE SHEET 3

IRRIGATION DETAILS



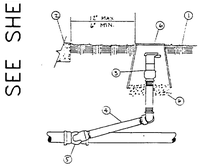
1. FINISH GRADE
2. ELECTRIC CONTROL VALVE
3. VALVE BOX
4. LATERAL PIPING
5. MAINLINE PIPING
6. CONTROL WIRES
7. GRAVEL

ELECTRIC CONTROL VALVE



1. FINISH GRADE
2. BACKFLOW PREVENTER PER CODE
3. LARGE BOX PER CODE
4. MAINLINE PIPING
5. GRAVEL DEPTH PER CODE
6. DISTANCE PER CODE

BACKFLOW PREVENTER



1. FINISH GRADE
2. SIDEWALK OR CURB
3. QUICK COUPLER
4. SWING JOINT
5. MAINLINE PIPING
6. GRAVEL

QUICK COUPLER

NOTES

TOWN OF ADDISON
IRRIGATION SPECIFICATIONS

Revision 5/5/93

1. All main line pipe to be Schedule 40 belled PVC. Put not more than two (2) pipes in any one trench. Class 200 lateral piping is subject to prior approval by the Town.
2. Fittings: No crosses are permitted. Separate tees and/or elbows be at least 12". Reduction tees are preferred over use of reducer bushings. Only Spears and/or Lasco are permitted. Allow 18" outside of sleeve before first fitting.
3. Wiring: 14 ga. UF. Red - Control wires. White - Ground. Anytime wiring changes direction, such as at an elbow or tee, allow a loop at least one hand width (10 inches) alongside the fitting at that location.
4. Use King connectors for all wire splices. Allow at least 36" of pigtailed wire at each splice. All splices are to be housed in standard (large) rectangular plastic valve boxes, including valves.
5. Only Weathermatic 11000 Series plastic valves are permitted. They are to be located within standard (large) rectangular plastic valve boxes with 4"-6" of pea gravel placed underneath the valve in such a manner as to prevent soil infiltration into the box.
6. Only Buckner Model 30A single lug 3/4" QCV's are permitted. They are to be connected to a threaded fitting. Teflon paste and appropriate length gray Schedule 80 nipples, and Schedule 40 fittings are to be used. House QCV in a 10" round plastic valve box.
7. All heads are to be attached to threaded fittings via 6" polyethylene nipples cut to the appropriate length. All nozzle sizes will be designated on the plans.

   Pop-ups: Only Toro 570C Series are permitted, unless otherwise noted. Install 3/4" above finished grade. Turf - 4" (includes tree bubblers within turf areas, use Toro SB-PC nozzles). Very low ground cover (<6" mature height) - 6". Ground cover and low growing shrubs - 12". HP. Funny pipe for 12" HP installations with owner approval is acceptable if conditions warrant.

   Bubblers: Bed areas only. Use Toro 500 Series stream or flood bubblers.

   Rotaries: Only Hunter PGP Series are permitted, unless otherwise noted. Install 3/4" above finished grade.
   Risers: Use Typo-M copper with soldered male ends for Toro 570-S shrub adaptors and female ends to attach to short polyethylene nipples screwed into threaded fittings. Owner reserves the right to determine placement of risers versus pop-ups.
8. Only Hersey MVR meters with (3) brass flanges are acceptable. Stainless steel bolts and nuts must be used in the installation along with neoprene gaskets. House in appropriate size, (to be determined by Owner), concrete box with lid. To bring box to ground level use bricks or pavers, and backfill inside below meter base with at least 6" of pea gravel. Connection to main must be done be the Town's Water Department and all tap materials must be approved by them.

NOTE: • REFERENCE SHEETS 12, 13, 22, + 23 FOR IRRIGATION PLANS, NOTES, DETAILS, ETC.

• INSTALL BUBBLER HEAD 4"-6" ABOVE FINISH GRADE, USING (2) OR MORE 1/2" x 6" POLY NIPPLES CONNECTED W/ THREADED COUPLES.

1

IRRIGATION NOTES

1. All sprinkler equipment numbers reference the Rainbird equipment catalog unless otherwise indicated.
2. BUBBLER HEADS are #1404 pressure compensating full circle umbella pattern. Installed as per detail.
3. ELECTRIC CONTROL VALVES shall be Weathermatic 11000 series installed per detail shown. Size valves as shown on plans. Valves shall be installed in valve boxes large enough to per-mit manual operation, removal of solenoid and/or valve cover without any earth excavation.
4. QUICK COUPLING VALVES shall be #3RC installed per detail shown. Swing joints shall be constructed using 3/4" schedule 80 elbows. Contractor shall supply owner with three (3) #33K couplers and three (3) #5H-0 swivel hose ells as part of this contract.
5. AUTOMATIC CONTROLLER shall be installed at location shown. Power (120V) shall be located in a junction box within five feet (5') of controller location by other trades.
6. All 24 volt valve wiring is to be UF 14 single conductor. All wire splices are to be permanent and waterproof.
7. SLEEVES shall be installed by General Contractor. Sleeve material shall be Sch. 40 PVC, sized as shown on plans.
8. Ten days prior to start of construction, Contractor shall verify static water pressure. If static pressure is less than 50 PSI, do not start work until notified to do so by owner.
9. All main line and lateral piping shall have a minimum of 12 inches of cover. All piping under paving shall have a minimum of 18 inches of cover.
10. The irrigation contractor shall coordinate installation of the system with the landscape contractor so that all plant material will be watered in accordance with the intent of the plans and specifications.
11. All bubbler heads shall be installed on a 1/2" st 90 ell and offset at least 1 foot from lateral feeder. See detail #1.
12. Pipe sizing guidelines:

size	gpm capacity
1/2"	5
3/4"	12
1"	18
1 1/4"	25
1 1/2"	45

    Contractor shall install the piping grid according to these guidelines.
13. Mainline and other equipment shown in pavement areas for clarity only.
14. Contractor shall install one extra white wire and one extra blue wire from controller to backflow preventer. Coil up approx. 20' extra and locate in 10" valve box.

IRRIGATION LEGEND

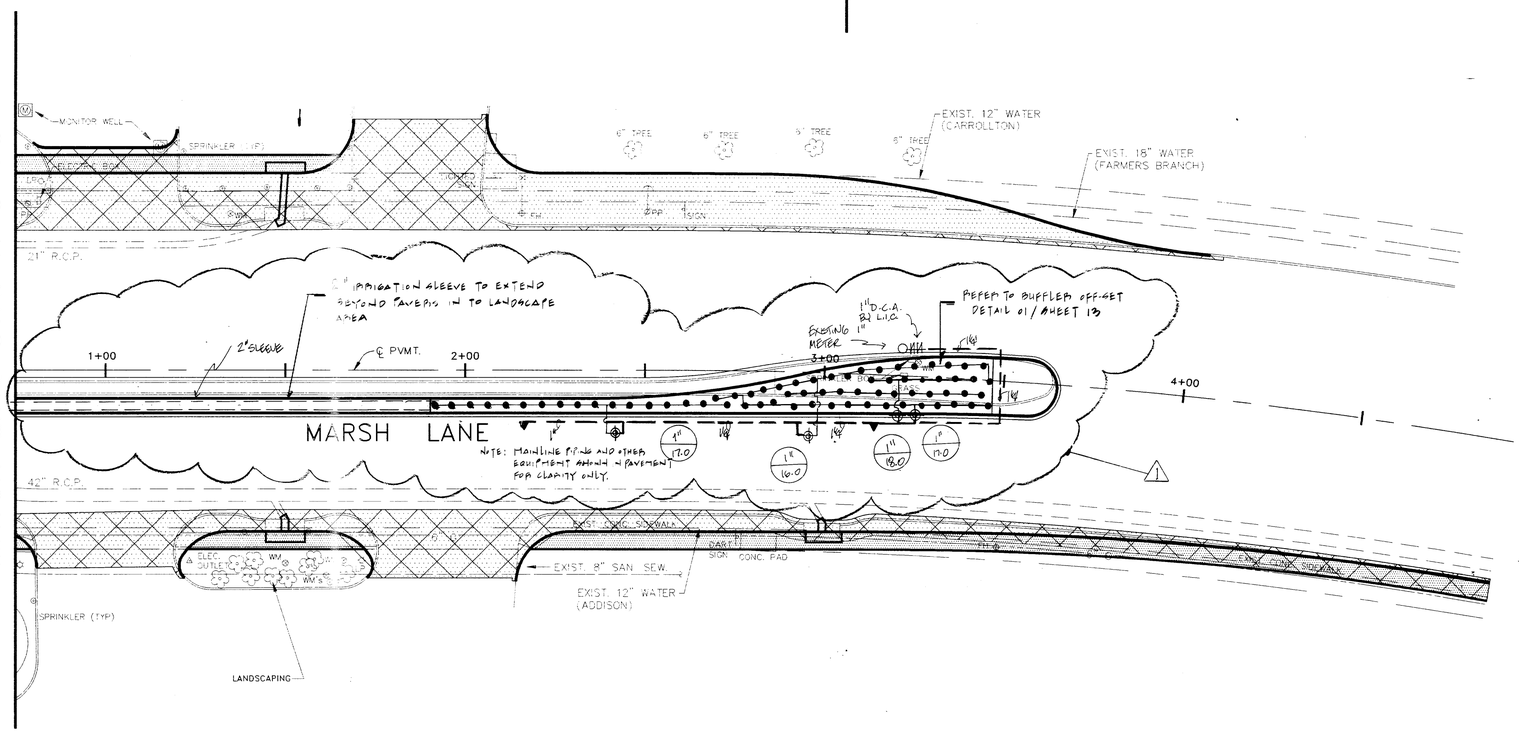
TORO 514-30 STREAM BUBBLER PRESSURE COMPENSATING UMBRELLA PATTERN 1 GPM

WEATHERMATIC #11000 SERIES ELECTRIC VALVE

RAINBIRD #3RC QUICK COUPLER

VALVE SIZE
GPM

SEE SHEET 13
MATCH LINE STA. N 0+75



NO.	REVISION	BY	DATE
1	TOWN OF ADDISON COMMENTS	J.W	5.9.94

DESIGNED BY: J.W
DRAWN BY: J.W
CHECKED BY: BA/GPI
SCALE: 1" = 20'
DATE: MAR. 22, 1994
FILE:

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

SMR
Landscape Architects
703 McKinney, LB 107
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Steven M. Rahn, ASLA

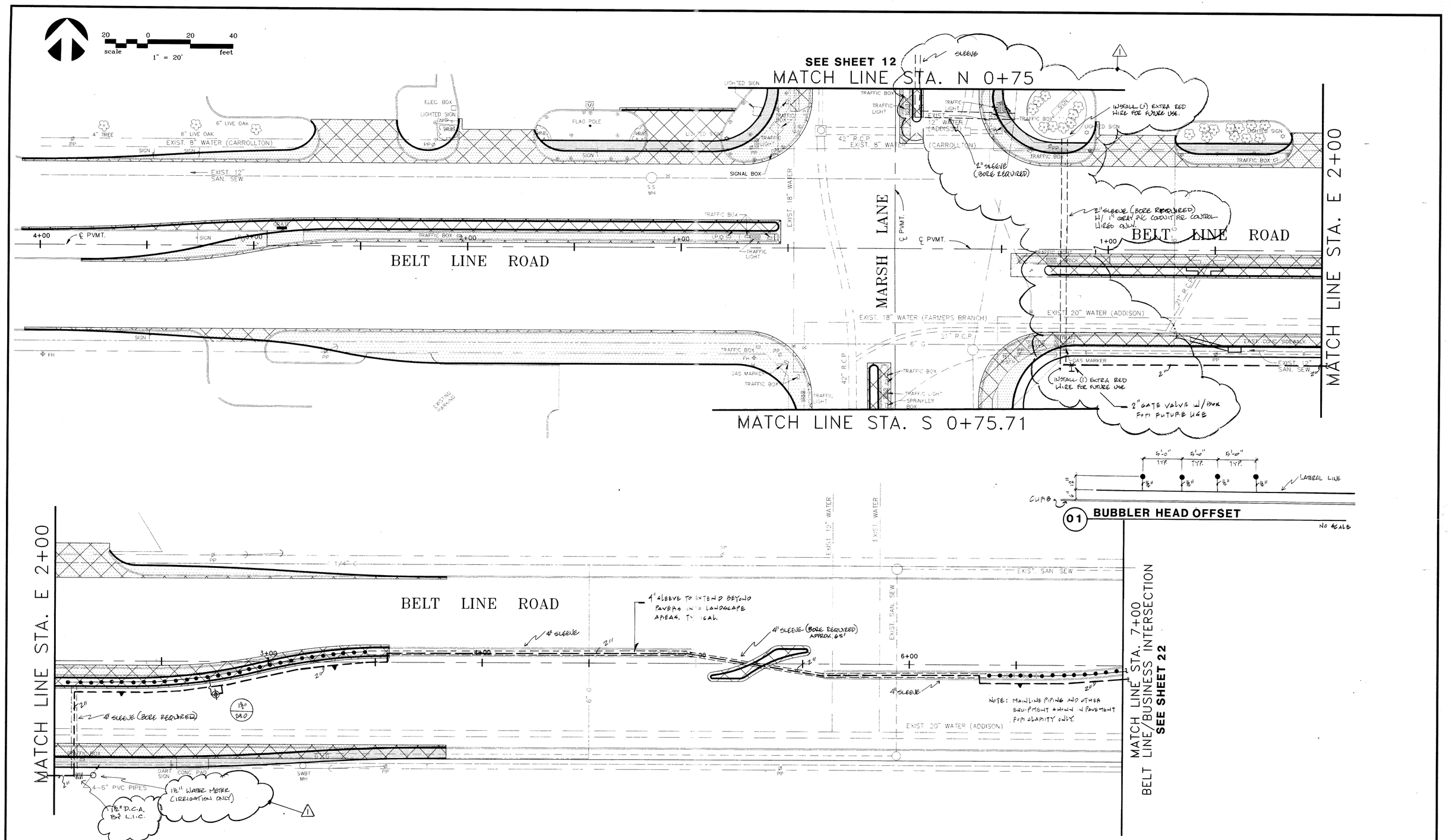
IRRIGATION PLAN

MARSH LANE NORTH OF BELT LINE ROAD

PAVING AND DRAINAGE IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO. 12 OF 46 SHEETS

JOB NO. 13921



NO.	REVISION	BY	DATE
1	TOWN OF ADDISON COMMENTS	J.W	5.9.94

DESIGNED BY: J.W
DRAWN BY: J.W
CHECKED BY: BA/EPA
SCALE: 1" = 20'
DATE: MAR. 22, 1994
FILE:

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

SMR
Landscape Architects
703 McKinney, LB 107
Suite 403
Dallas, Texas 75202
(214) 871 0083
Steven M. Rahn, ASLA

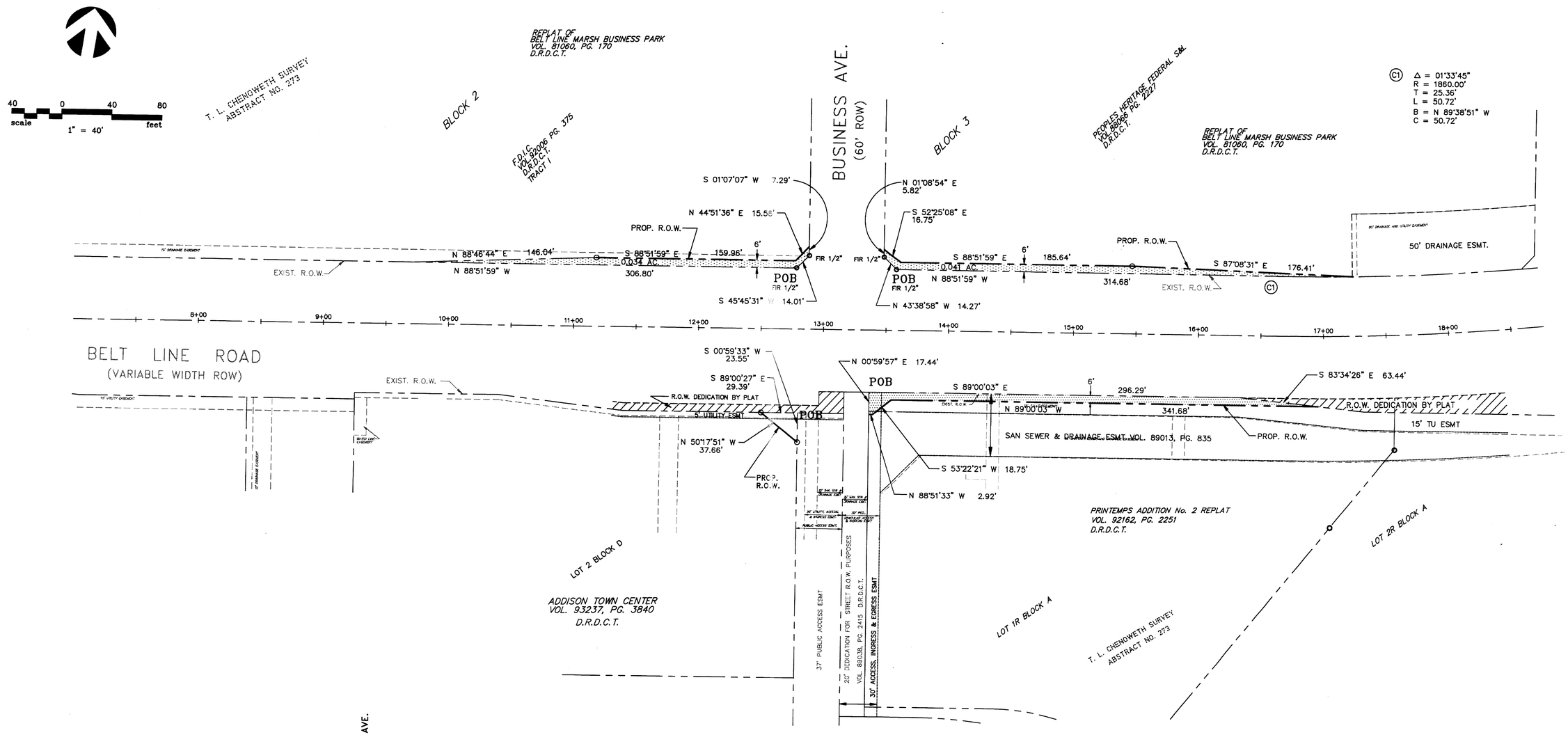
IRRIGATION PLAN

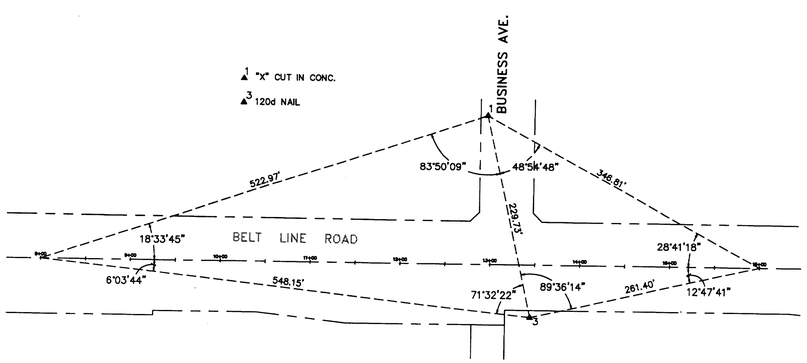
BELT LINE ROAD EAST OF MARSH LANE TO BUSINESS AVE.

PAVING AND DRAINAGE IMPROVEMENTS
BELT LINE ROAD AT MARSH LANE
for
THE TOWN OF ADDISON

SHEET NO. 13 OF 46 SHEETS

JOB NO. 13921





HORIZONTAL CONTROL

NO.	REVISION	BY	DATE

DESIGNED BY: B GRANTHAM
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 40'
DATE: JANUARY 1994
FILE: \ADDISON\BUSINESS\ROWBUS

STATE OF TEXAS — BRUCE R. GRANTHAM — 82659 — REGISTERED PROFESSIONAL ENGINEER

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

RIGHT-OF-WAY PLAN

INTERSECTION IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

SHEET NO. 14 OF 46 SHEETS
JOB NO. 15411

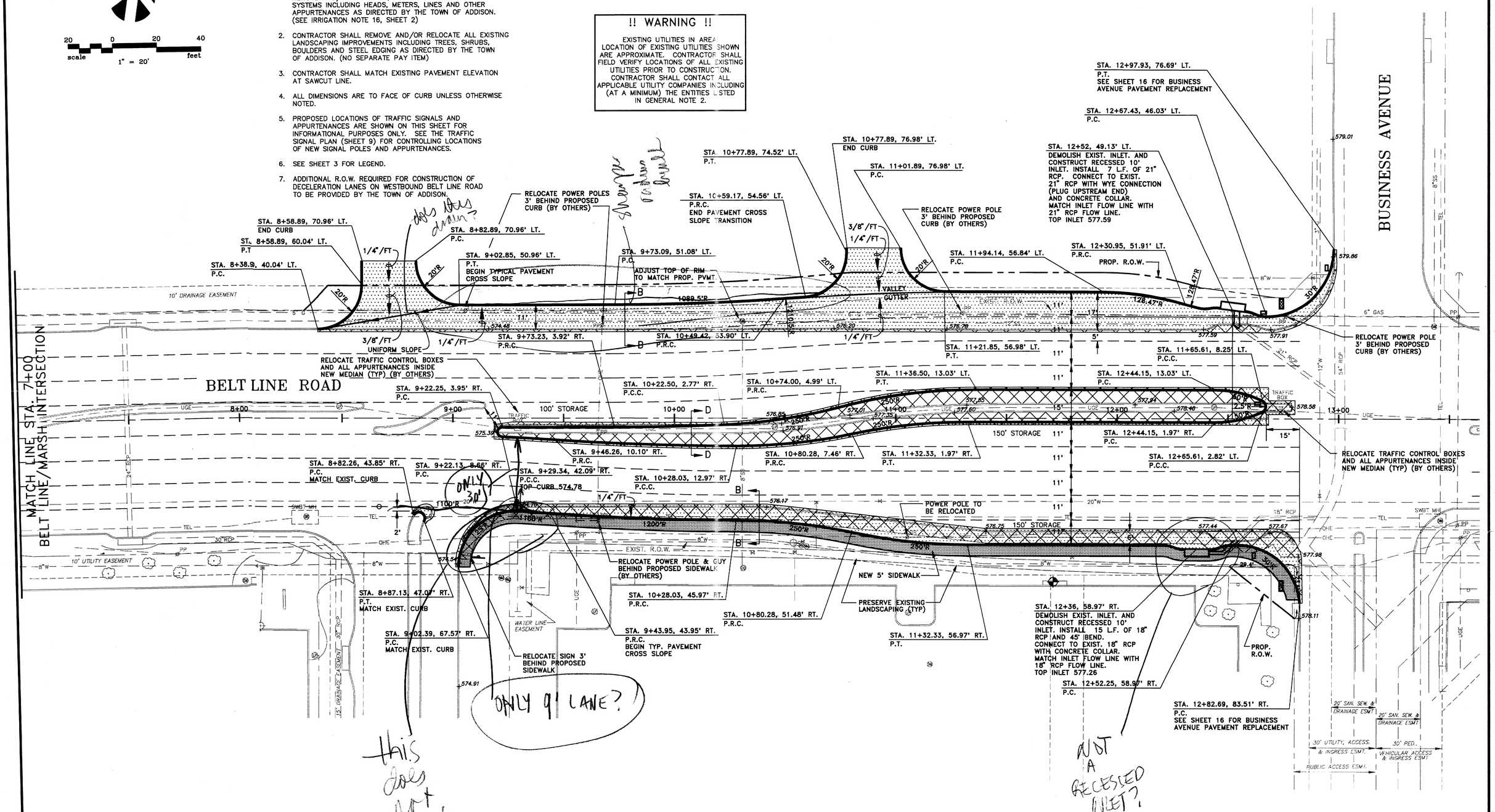
NOTES

1. CONTRACTOR SHALL DETERMINE THE LOCATION OF, AND REMOVE AND/OR RELOCATE, ALL AFFECTED SPRINKLER SYSTEMS INCLUDING HEADS, METERS, LINES AND OTHER APPURTENANCES AS DIRECTED BY THE TOWN OF ADDISON. (SEE IRRIGATION NOTE 16, SHEET 2)
2. CONTRACTOR SHALL REMOVE AND/OR RELOCATE ALL EXISTING LANDSCAPING IMPROVEMENTS INCLUDING TREES, SHRUBS, BOULDERS AND STEEL EDGING AS DIRECTED BY THE TOWN OF ADDISON. (NO SEPARATE PAY ITEM)
3. CONTRACTOR SHALL MATCH EXISTING PAVEMENT ELEVATION AT SAWCUT LINE.
4. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
5. PROPOSED LOCATIONS OF TRAFFIC SIGNALS AND APPURTENANCES ARE SHOWN ON THIS SHEET FOR INFORMATIONAL PURPOSES ONLY. SEE THE TRAFFIC SIGNAL PLAN (SHEET 9) FOR CONTROLLING LOCATIONS OF NEW SIGNAL POLES AND APPURTENANCES.
6. SEE SHEET 3 FOR LEGEND.
7. ADDITIONAL R.O.W. REQUIRED FOR CONSTRUCTION OF DECELERATION LANES ON WESTBOUND BELT LINE ROAD TO BE PROVIDED BY THE TOWN OF ADDISON.

20 0 20 40
scale 1" = 20' feet

!! WARNING !!

EXISTING UTILITIES IN AREA
LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL CONTACT ALL APPLICABLE UTILITY COMPANIES INCLUDING (AT A MINIMUM) THE ENTITIES LISTED IN GENERAL NOTE 2.



BENCHMARK

CUT "□" ON TOP OF CURB AT C/L INLET AT NORTHEASTERLY CORNER OF APPLEBEE'S PARKING LOT, 100'± WEST OF WEST CURB OF BUSINESS AVENUE.
ELEV. 605.65

NO.	REVISION	BY	DATE
1	ADD TWO DECELERATION LANES; REVISED INLET; ADDED CURB POC	B.G.	4/5/94
2	REVISE DECELERATION LANES	B.G.	4/14/94
3	REVISE DRIVEWAY LOCATIONS	B.G.	7/14/94

DESIGNED BY: B GRANTHAM
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 20'
DATE: JANUARY 1994
FILE: \ADDISON\BUSINESS\BUS1

STATE OF TEXAS — BRUCE R. GRANTHAM — 62659 — REGISTERED PROFESSIONAL ENGINEER

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

PAVING PLAN

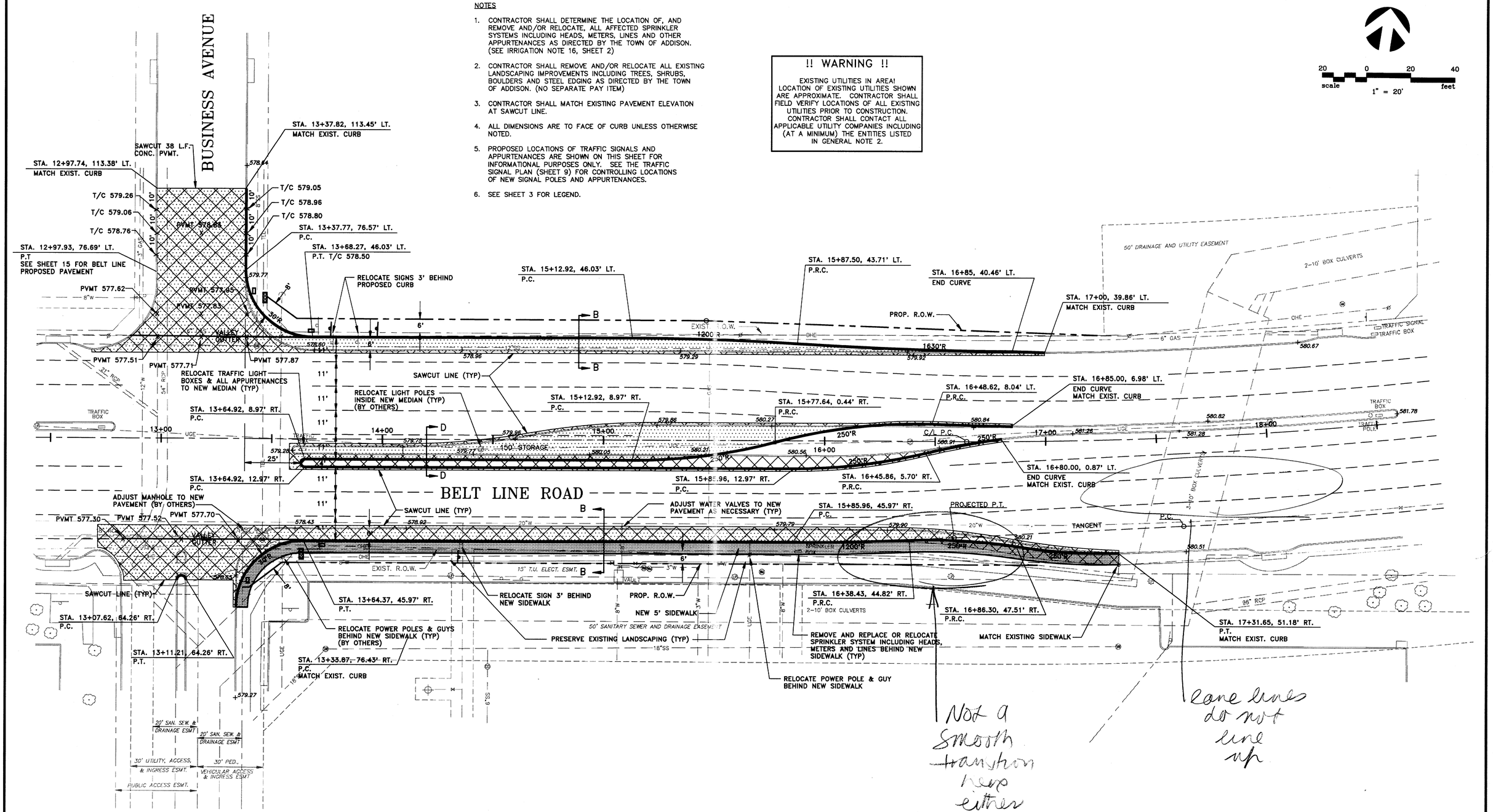
INTERSECTION IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

NOTES

1. CONTRACTOR SHALL DETERMINE THE LOCATION OF, AND REMOVE AND/OR RELOCATE, ALL AFFECTED SPRINKLER SYSTEMS INCLUDING HEADS, METERS, LINES AND OTHER APPURTENANCES AS DIRECTED BY THE TOWN OF ADDISON. (SEE IRRIGATION NOTE 16, SHEET 2)
2. CONTRACTOR SHALL REMOVE AND/OR RELOCATE ALL EXISTING LANDSCAPING IMPROVEMENTS INCLUDING TREES, SHRUBS, BOULDERS AND STEEL EDGING AS DIRECTED BY THE TOWN OF ADDISON. (NO SEPARATE PAY ITEM)
3. CONTRACTOR SHALL MATCH EXISTING PAVEMENT ELEVATION AT SAWCUT LINE.
4. ALL DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
5. PROPOSED LOCATIONS OF TRAFFIC SIGNALS AND APPURTENANCES ARE SHOWN ON THIS SHEET FOR INFORMATIONAL PURPOSES ONLY. SEE THE TRAFFIC SIGNAL PLAN (SHEET 9) FOR CONTROLLING LOCATIONS OF NEW SIGNAL POLES AND APPURTENANCES.
6. SEE SHEET 3 FOR LEGEND.

!! WARNING !!

EXISTING UTILITIES IN AREA! LOCATION OF EXISTING UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. CONTRACTOR SHALL CONTACT ALL APPLICABLE UTILITY COMPANIES INCLUDING (AT A MINIMUM) THE ENTITIES LISTED IN GENERAL NOTE 2.



NO.	REVISION	BY	DATE

DESIGNED BY: B GRANTHAM
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 20'
DATE: JANUARY 1994
FILE: \ADDISON\BUSINESS\BUS2

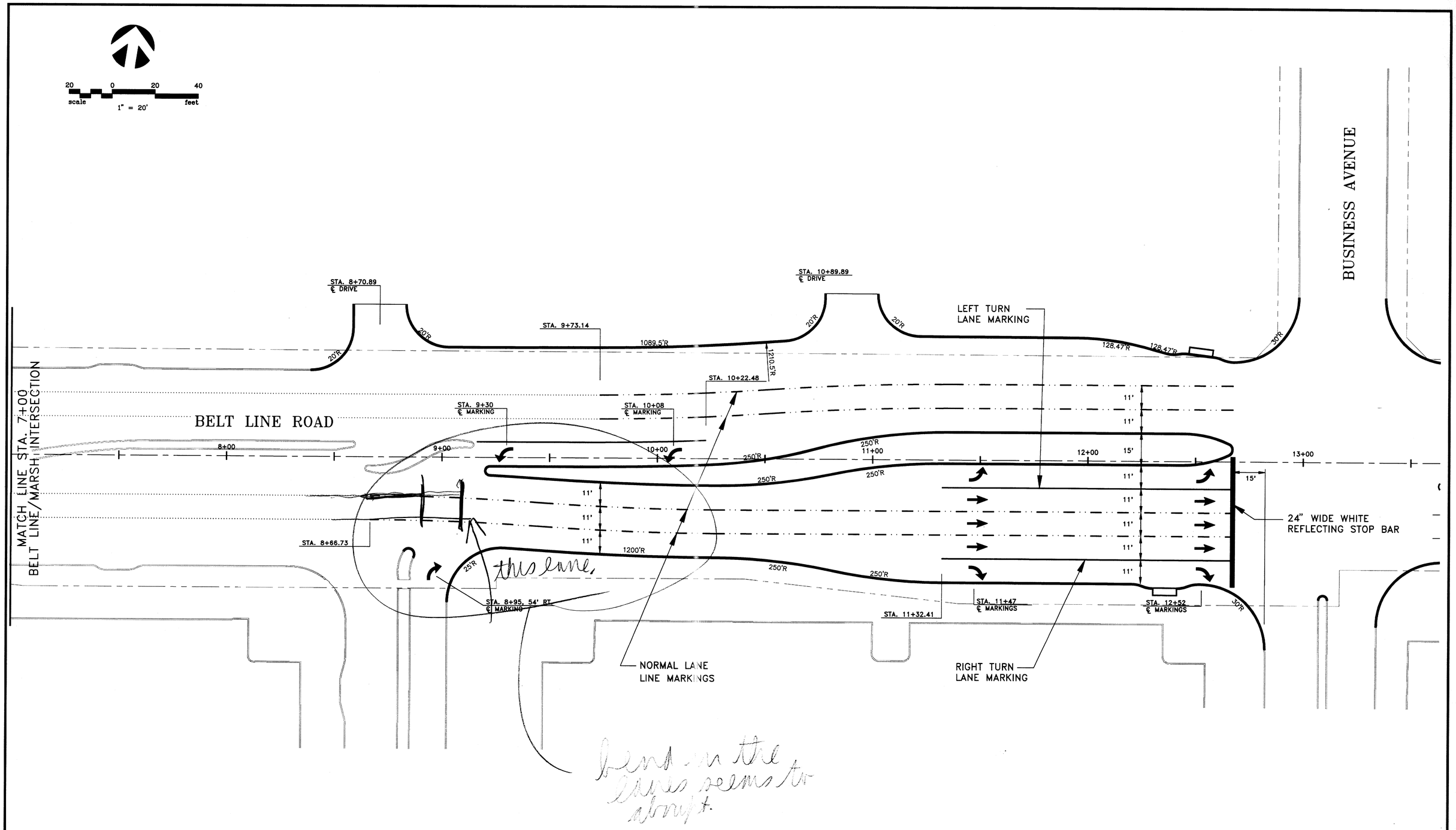
STATE OF TEXAS — BRUCE R. GRANTHAM — 62659 — REGISTERED PROFESSIONAL ENGINEER

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

PAVING PLAN

INTERSECTION IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

SHEET NO. 16 OF 46 SHEETS
JOB NO. 15411



NOTE

1. ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
2. SEE SHEET 3 FOR LEGEND.

NO.	REVISION	BY	DATE
1	ADDED TWO DECELERATION LANES;	B.G.	4/5/94

DESIGNED BY: J. WALDBAUER
DRAWN BY: EH&A
CHECKED BY: B. GRANTHAM
SCALE: 1" = 20'
DATE: JANUARY 1994
FILE: \ADDISON\BUSINESS\PMBUS1

STATE OF TEXAS
BRUCE R. GRANTHAM
62659
REGISTERED PROFESSIONAL ENGINEER

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Engineering & Environmental Consultants
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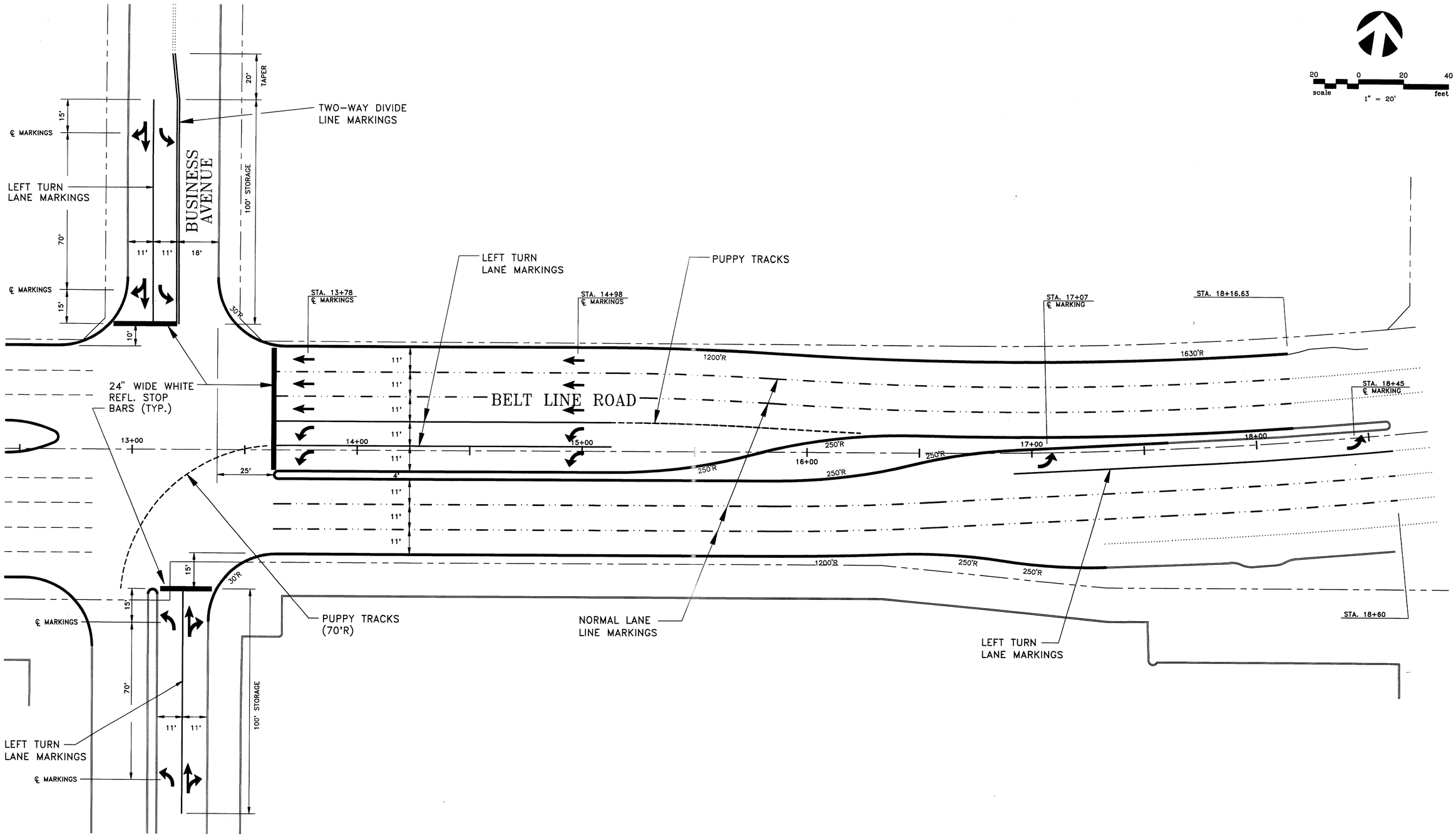
Dallas, Texas 75240 (214) 387-0771

PAVEMENT MARKING PLAN

INTERSECTION IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

SHEET NO. 17 OF 46 SHEETS
JOB NO. 15411



NOTE

1. ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN ACCORDANCE WITH THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
2. SEE SHEET 3 FOR LEGEND.

NO.	REVISION	BY	DATE

DESIGNED BY: J WALDBAUER
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 20'
DATE: JANUARY 1994
FILE: \ADDISON\BUSINESS\PMBUS2

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

PAVEMENT MARKING PLAN

INTERSECTION IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

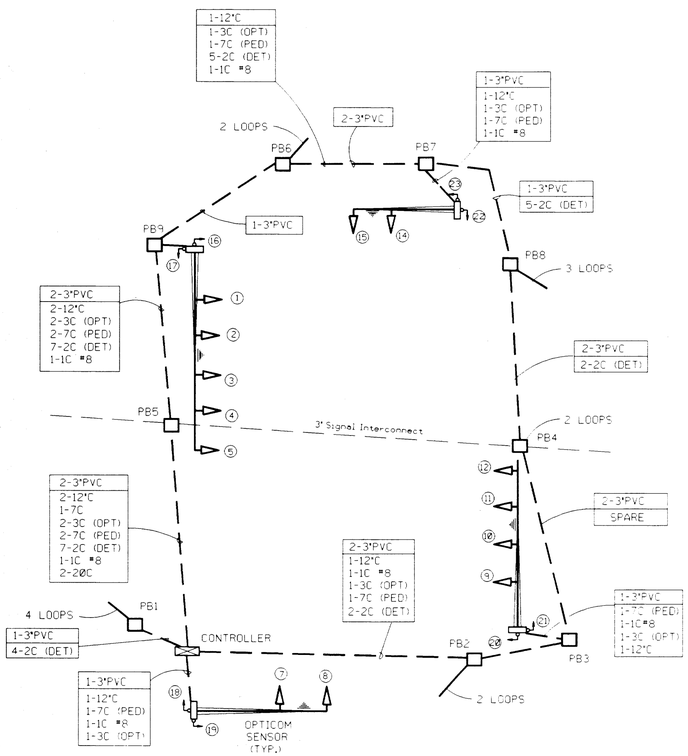
20 0 20 40
scale feet
1" = 20'

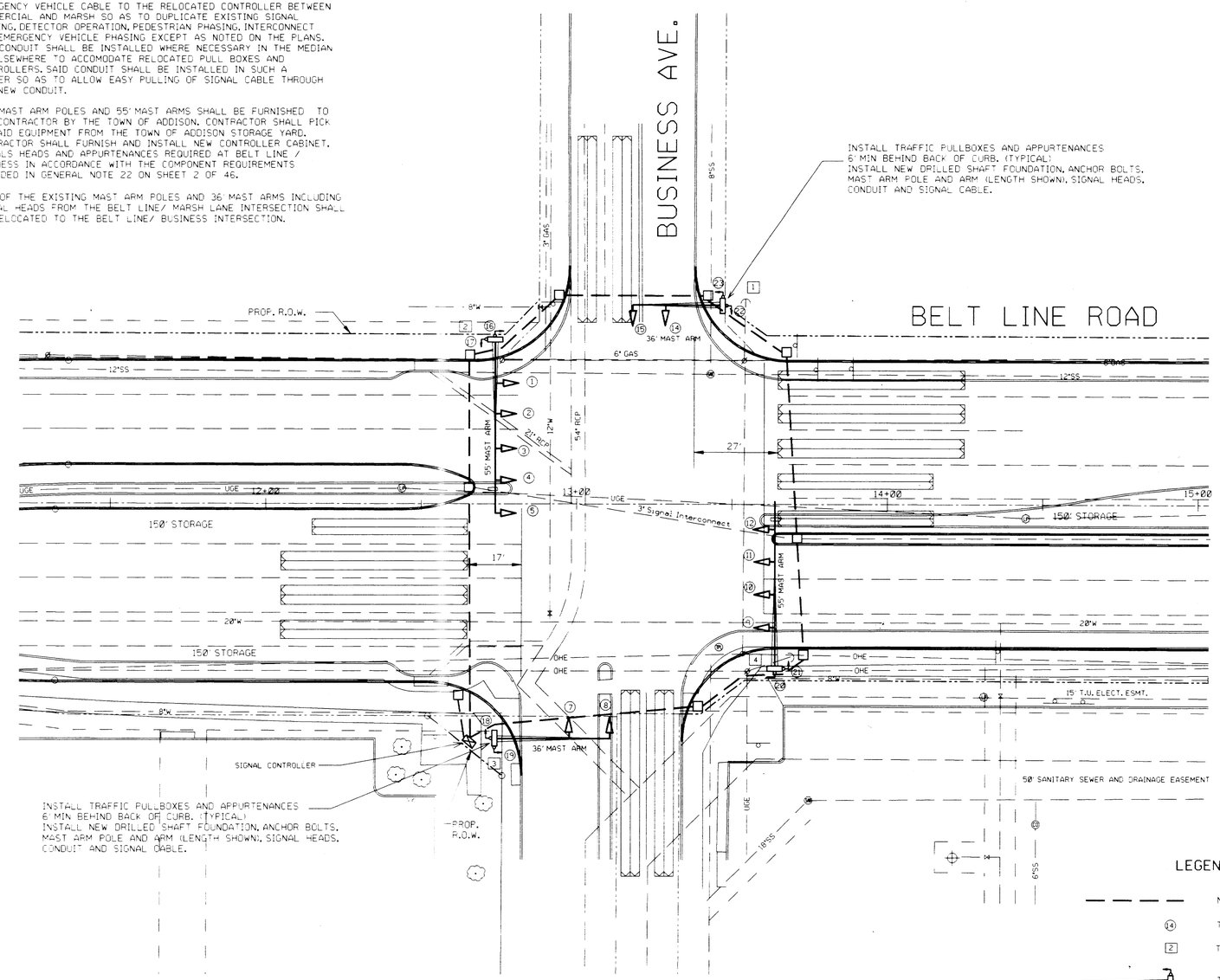
NOTES

1. EXCEPT AS NOTED ON THE PLANS. NEW CONDUIT SHALL BE INSTALLED WHERE NECESSARY TO ACCOMODATE PULL BOXES AND CONTROLLERS. SAID CONDUIT SHALL BE INSTALLED IN SUCH A MANNER SO AS TO ALLOW EASY PULLING OF SIGNAL CABLE.
2. CONTRACTOR SHALL MAINTAIN TRAFFIC SIGNAL OPERATION AT ALL TIMES UNLESS BRIEF SHUTDOWN IS APPROVED IN WRITING BY THE TOWN OF ADDISON. THE CONTRACTOR MAY INSTALL TEMPORARY SIGNALS AS APPROVED BY THE TOWN OF ADDISON.
3. THE CONTRACTOR SHALL RECONNECT ALL SIGNAL INTERCONNECT AND EMERGENCY VEHICLE CABLE TO THE RELOCATED CONTROLLER BETWEEN COMMERCIAL AND MARSH SO AS TO DUPLICATE EXISTING SIGNAL PHASING, DETECTOR OPERATION, PEDESTRIAN PHASING, INTERCONNECT AND EMERGENCY VEHICLE PHASING EXCEPT AS NOTED ON THE PLANS. NEW CONDUIT SHALL BE INSTALLED WHERE NECESSARY IN THE MEDIAN OR ELSEWHERE TO ACCOMODATE RELOCATED PULL BOXES AND CONTROLLERS. SAID CONDUIT SHALL BE INSTALLED IN SUCH A MANNER SO AS TO ALLOW EASY PULLING OF SIGNAL CABLE THROUGH THE NEW CONDUIT.
4. NEW MAST ARM POLES AND 55' MAST ARMS SHALL BE FURNISHED TO THE CONTRACTOR BY THE TOWN OF ADDISON. CONTRACTOR SHALL PICK UP SAID EQUIPMENT FROM THE TOWN OF ADDISON STORAGE YARD. CONTRACTOR SHALL FURNISH AND INSTALL NEW CONTROLLER CABINET, SIGNALS HEADS AND APPURTENANCES REQUIRED AT BELT LINE / BUSINESS IN ACCORDANCE WITH THE COMPONENT REQUIREMENTS PROVIDED IN GENERAL NOTE 22 ON SHEET 2 OF 46.
5. TWO OF THE EXISTING MAST ARM POLES AND 36' MAST ARMS INCLUDING SIGNAL HEADS FROM THE BELT LINE/ MARSH LANE INTERSECTION SHALL BE RELOCATED TO THE BELT LINE/ BUSINESS INTERSECTION.

HEAD NUMBERS	1,2,3,7,9 10,11,14		4,5,8, 12,15	16,17,18,19 20,21,22,23
LENS SIZE	12"		12"	
TYPE	CONV.		CONV.	CONV.
LENS CONFIGURATION	R		R	DW
	Y		Y	WALK
	G		G	
			Y G	

WIRING & P.V.C. DIAGRAM
(SCHEMATIC - NO SCALE)





LEGEND

- NEW 3" PVC CONDUIT
- (14) TRAFFIC SIGNAL HEAD NUMBER
- [2] TRAFFIC SIGNAL POLE NUMBER
- TRAFFIC SIGNAL POLE WITH MAST ARM AND CROSSWALK SIGNALS
- NEW PULL BOX

NO.	REVISION	BY	DATE
3	REVISED DETECTOR LOOP & SIGNAL HEAD TABLE	PSS	4-20-94
2	REVISED MAST ARM & COMMENTS	PSS	4-8-94
1	REVISED MAST ARM & ADD GENERAL NOTES	PSS	3-23-94

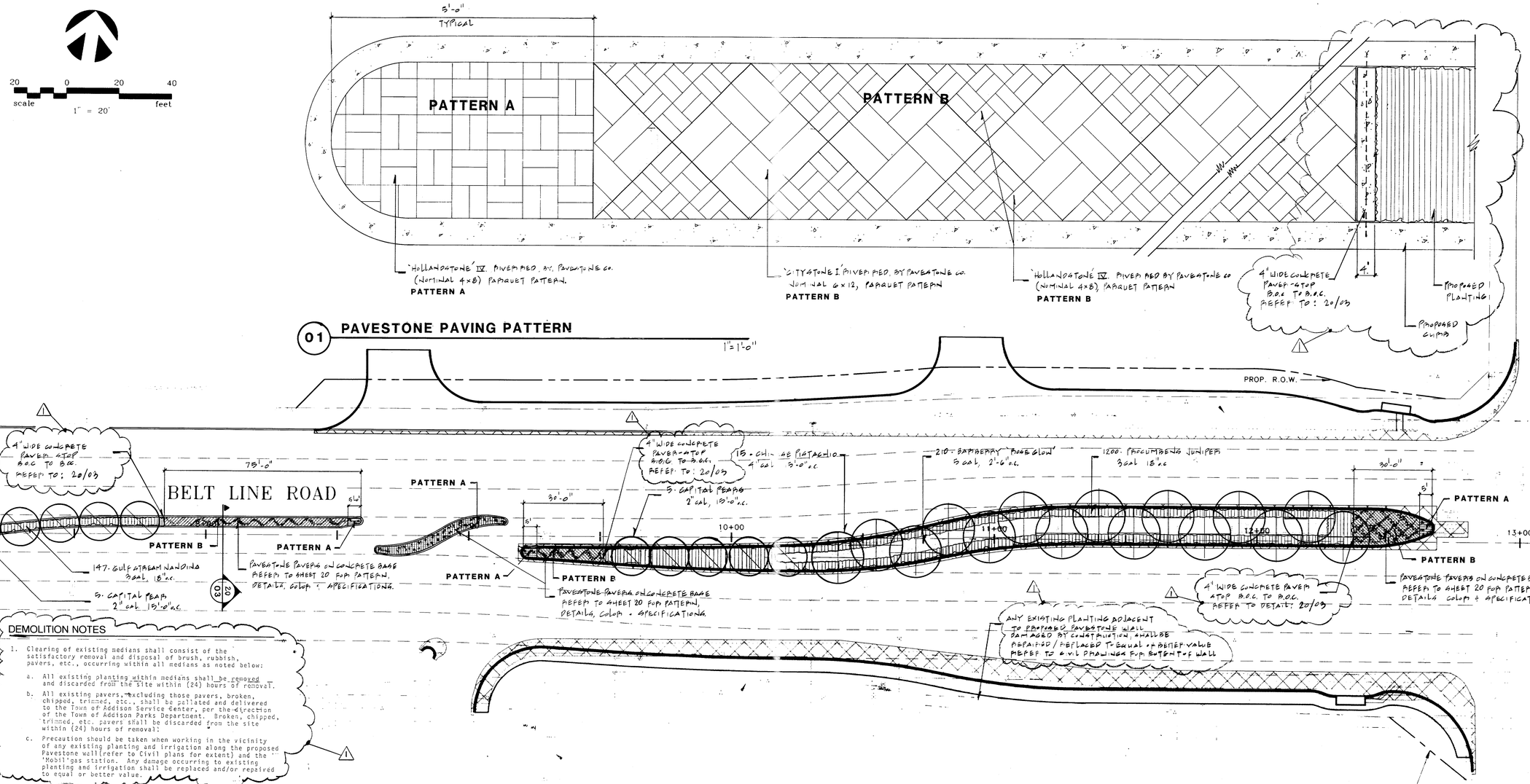
DESIGNED BY:
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: 1" = 20'
DATE: JANUARY 1994
FILE: \ADDISON\BUSINESS\SIGNAL

EH&A
Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

ASA ENGINEERING
13747 MONTFORT DRIVE, SUITE 204
P.O. BOX 802307 , DALLAS, TEXAS, 75380-2307
(214) 960-1137 FAX (214) 960-1139

TRAFFIC SIGNAL PLAN

PAVING IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

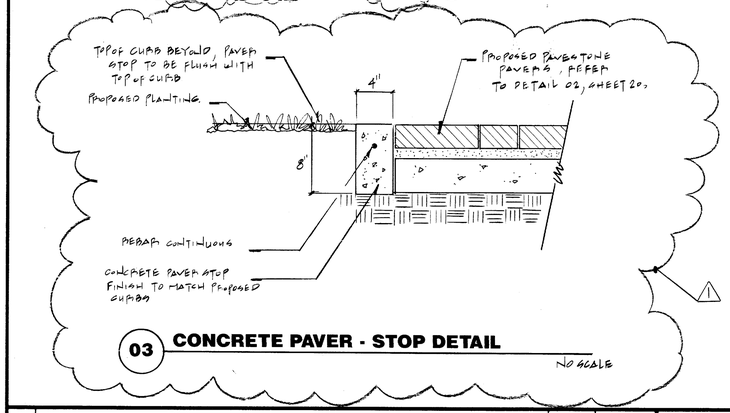


01 PAVESTONE PAVING PATTERN

1"=1'-0"

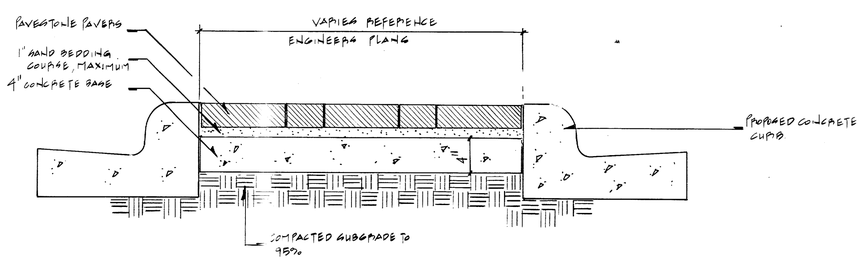
DEMOLITION NOTES

1. Clearing of existing medians shall consist of the satisfactory removal and disposal of brush, rubbish, pavers, etc., occurring within all medians as noted below:
   a. All existing planting within medians shall be removed and discarded from the site within (24) hours of removal.
   b. All existing pavers, excluding those pavers, broken, chipped, trimmed, etc., shall be palleted and delivered to the Town of Addison Service Center, per the direction of the Town of Addison Parks Department. Broken, chipped, trimmed, etc. pavers shall be discarded from the site within (24) hours of removal.
   c. Precaution should be taken when working in the vicinity of any existing planting and irrigation along the proposed Pavestone wall(refer to Civil plans for extent) and the 'Mobil'gas station. Any damage occurring to existing planting and irrigation shall be replaced and/or repaired to equal or better value.



03 CONCRETE PAVER - STOP DETAIL

NO SCALE



02 PAVESTONE MEDIAN CROSS-SECTION

NO SCALE

NOTES:

1. PAVESTONE PAVERS SHALL BE INSTALLED AS PER MANUFACTURERS RECOMMENDATIONS
2. DETAILS ARE TO BE USED AS A GUIDELINE ONLY. FINAL CROSS-SECTION DESIGN TO BE REVIEWED AND APPROVED BY A REGISTERED ENGINEER PRIOR TO INSTALLATION.
3. PAVESTONE PAVERS SHALL BE:
   - HOLLANDSTONE IV (4x8), RIVER RED
   - CITYSTONE I, RIVER RED,

   AS MANUFACTURED BY PAVESTONE CO. (817) 481-5802, CONTACT: STEVE RIBA

NO	REVISION	BY	DATE
1	TOWN OF ADDISON COMMENTS	BA	5-9-94

DESIGNED BY BA/GP
DRAWN BY BA
CHECKED BY GP
SCALE 1" = 20'
DATE MAR. 22, 1994
FILE

EH&A Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
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SMR
Landscape Architects
703 McKinney, LB 107
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Dallas, Texas 75202
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Steven M. Rahn, ASLA

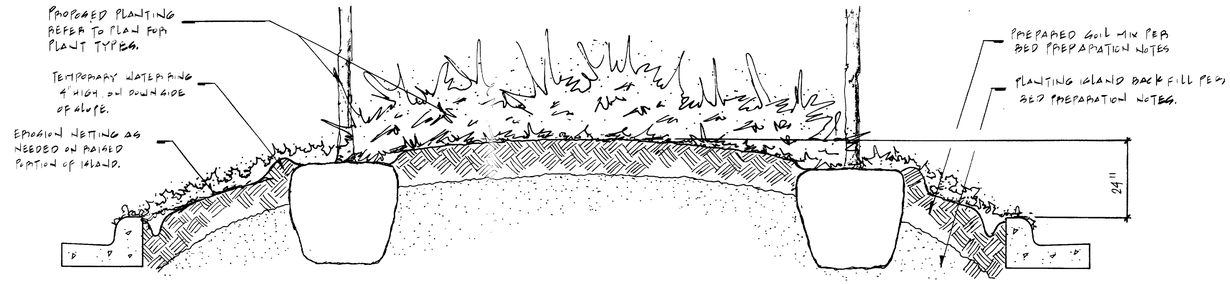
LANDSCAPE PLAN

BELT LINE ROAD EAST OF MARSH LANE TO BUSINESS AVE.

PAVING IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

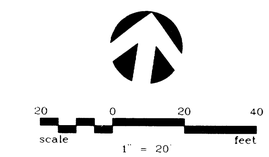
SHEET NO 20 OF 46 SHEETS

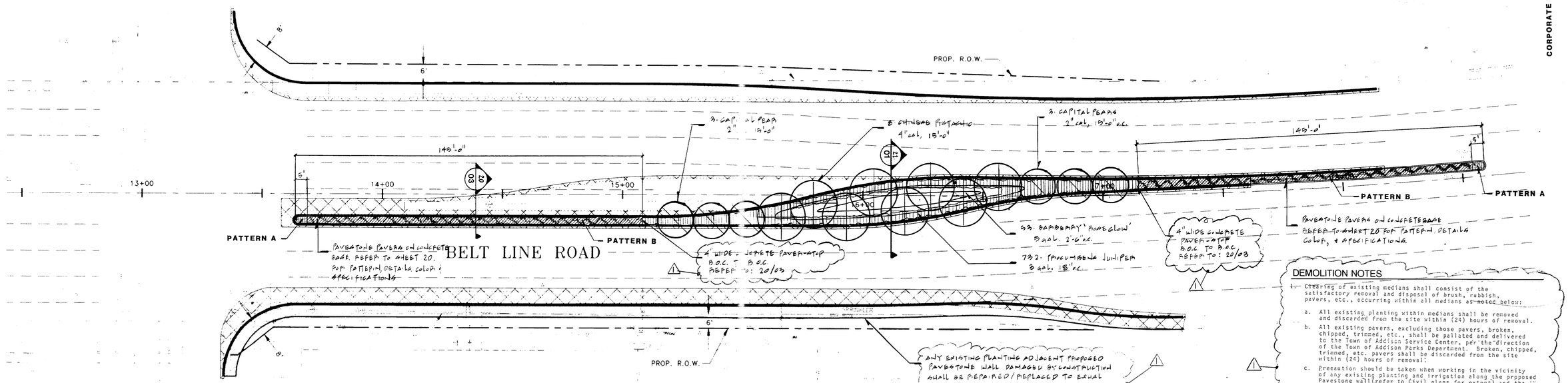
JOB NO. 15411

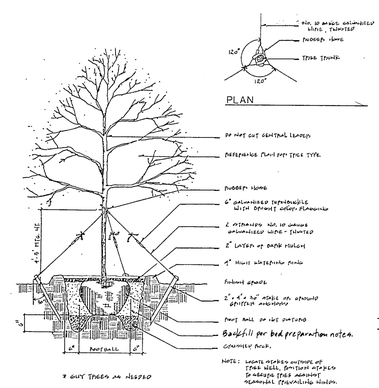


01 MEDIAN PLANTING CROSS-SECTION

NO SCALE

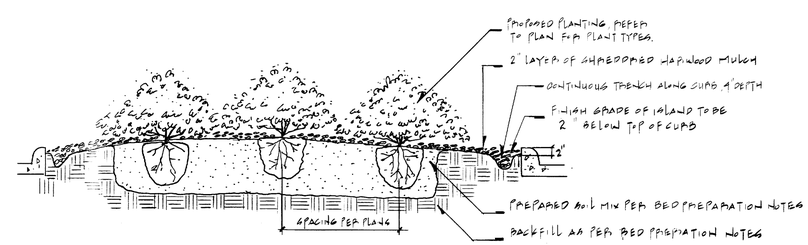






TREE PLANTING DETAIL

NO SCALE



SHRUB / GROUNDCOVER PLANTING DETAIL

NO SCALE

DEMOLITION NOTES

1. Clearing of existing medians shall consist of the satisfactory removal and disposal of brush, rubbish, pavers, etc., occurring within all medians as noted below:

   a. All existing planting within medians shall be removed and discarded from the site within (24) hours of removal.

   b. All existing pavers, excluding those pavers, broken, chipped, trimmed, etc., shall be palleted and delivered to the Town of Addison Service Center, per the direction of the Town of Addison Parks Department. Broken, chipped, trimmed, etc. pavers shall be discarded from the site within (24) hours of removal.

   c. Precaution should be taken when working in the vicinity of any existing planting and irrigation along the proposed Pavestone wall (refer to Civil plans for extent) and the "Mobil" gas station. Any damage occurring to existing planting and irrigation shall be replaced and/or repaired to equal or better value.

BED PREPARATION NOTES

1. Clearing of existing planting islands shall consist of the satisfactory removal and disposal of brush and rubbish occurring within all planting areas as noted below:
   a. All existing Sweet Gum and Cedar Elm shall be hand dug, balled and burlapped, and transplanted to another site as designated by the Town of Addison.
   b. All Wax Myrtle shall be removed and discarded from the site within (24) hours of removal.
   c. All hollies and existing groundcover shall be removed and discarded from the site within (24) hours of removal.
2. Backfill: All planting islands shall be backfilled with Sandy Loam. It shall be without admixture of subsoil or slag and shall be free of stones, lumps, sticks, plants, or their roots, toxic substances, or other extraneous matter that may be harmful to plant growth or would interfere with future maintenance. Refer to landscape specifications.
3. Prepared Soil Mix: Organic compost material shall be a mixture of 80% vegetative matter and 20% animal waste. Ingredients should be a mix of coarse and fine textured material. Living Earth Technologies or approved equal.
4. Mulch: Mulch shall be Shredded Hardwood Bark Mulch of a relative uniform particle size with a median size of one (1") inch and shall be free of sticks, stones, leaves, and any other debris.
5. Organic Fertilizer: Fertilizer shall be F rtilaid, Maestro-Gro, Manalfa, Sustain, Agrispon, bat guano or earthworm castings as recommended for required applications. Fertilizer shall be delivered to the site in its original unopened containers, each bearing the manufacturer's guaranteed statement of analysis.
6. Prepare new planting beds by backfilling planting islands with the specified backfill to a minimum depth of 18" and by adding 6" of prepared soil mix and tilling to depth of four (4") inches, such that the finish grade of the planting island is two (2") inches below top of curb.
7. Apply organic fertilizer such as Fertilaid, Maestro-Gro, Manalfa, or Sustain @ 20 lbs/ 1000 sq. ft. at the rate of 1 lb. of nitrogen per 1000 sq. ft.
8. All planting areas shall receive a two (2") inch layer of Shredded Hardwood Bark Mulch after plant material has been installed.

NO	REVISION	BY	DATE
1	TOWN OF ADDISON COMMENTS	BA	5·9·94

DESIGNED BY BA/GP
DRAWN BY BA
CHECKED BY GP
SCALE 1" = 20'
DATE MAR. 22, 1994
FILE

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

SMR
Landscape Architects
703 McKinney, LB 107
Suite 403
Dallas, Texas 75202
(214) 871 0083
Steven M. Rahn, ASLA

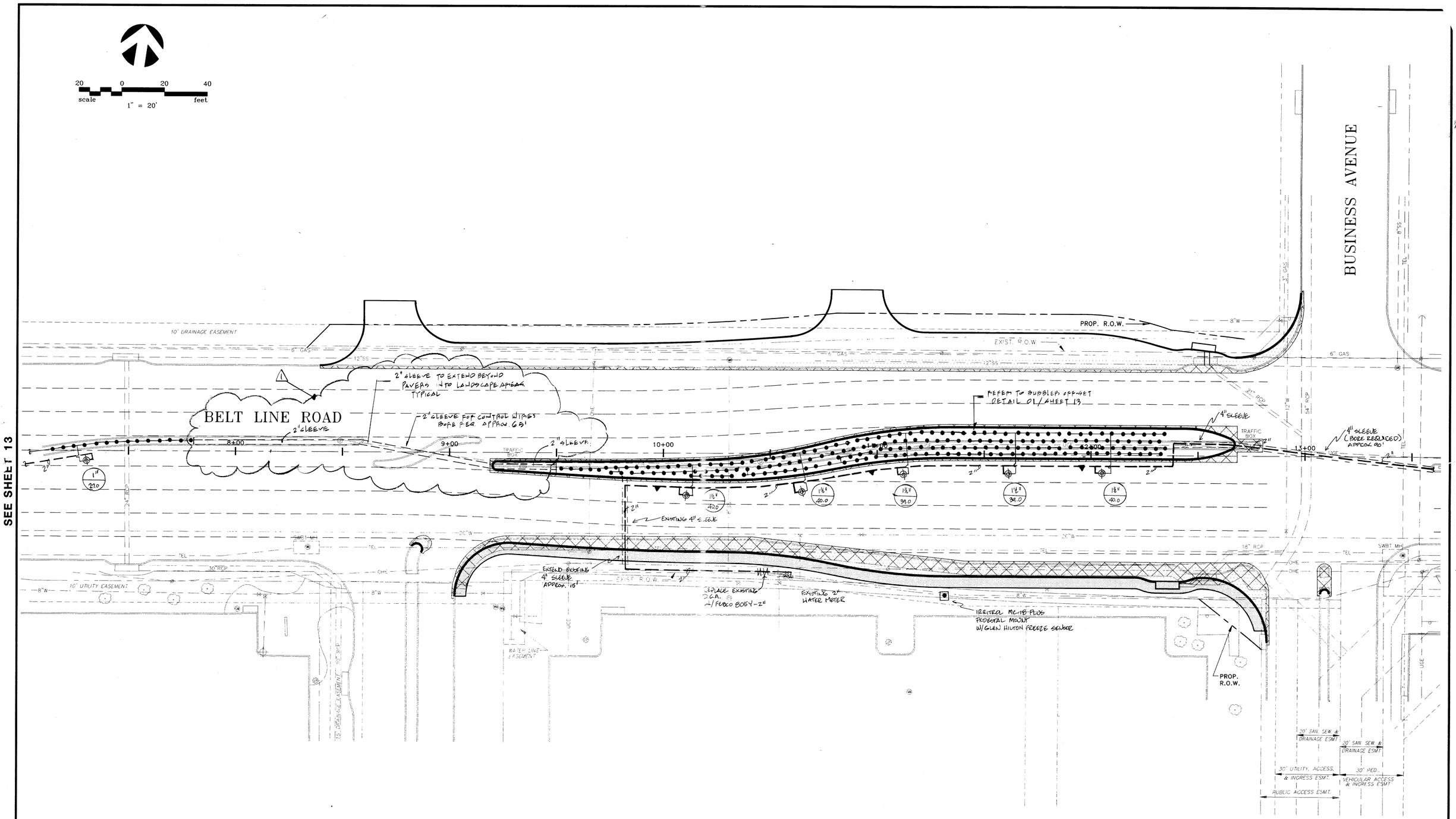
LANDSCAPE PLAN

BELT LINE ROAD EAST OF BUSINESS AVE. TO CORPORATE DRIVE

PAVING IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

SHEET NO 21 OF 46 SHEETS

JOB NO. 15411



NO.	REVISION	BY	DATE
1	TOWN OF ADDISON COMMENTS	J.W	6-9-94

DESIGNED BY: JW
DRAWN BY: JW
CHECKED BY: BA/SR
SCALE: 1" = 20'
DATE: MAR. 22, 1994
FILE:

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Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

SMR
Landscape Architects
703 McKinney, LB 107
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(214) 871 0083
Steven M. Rahn, ASLA

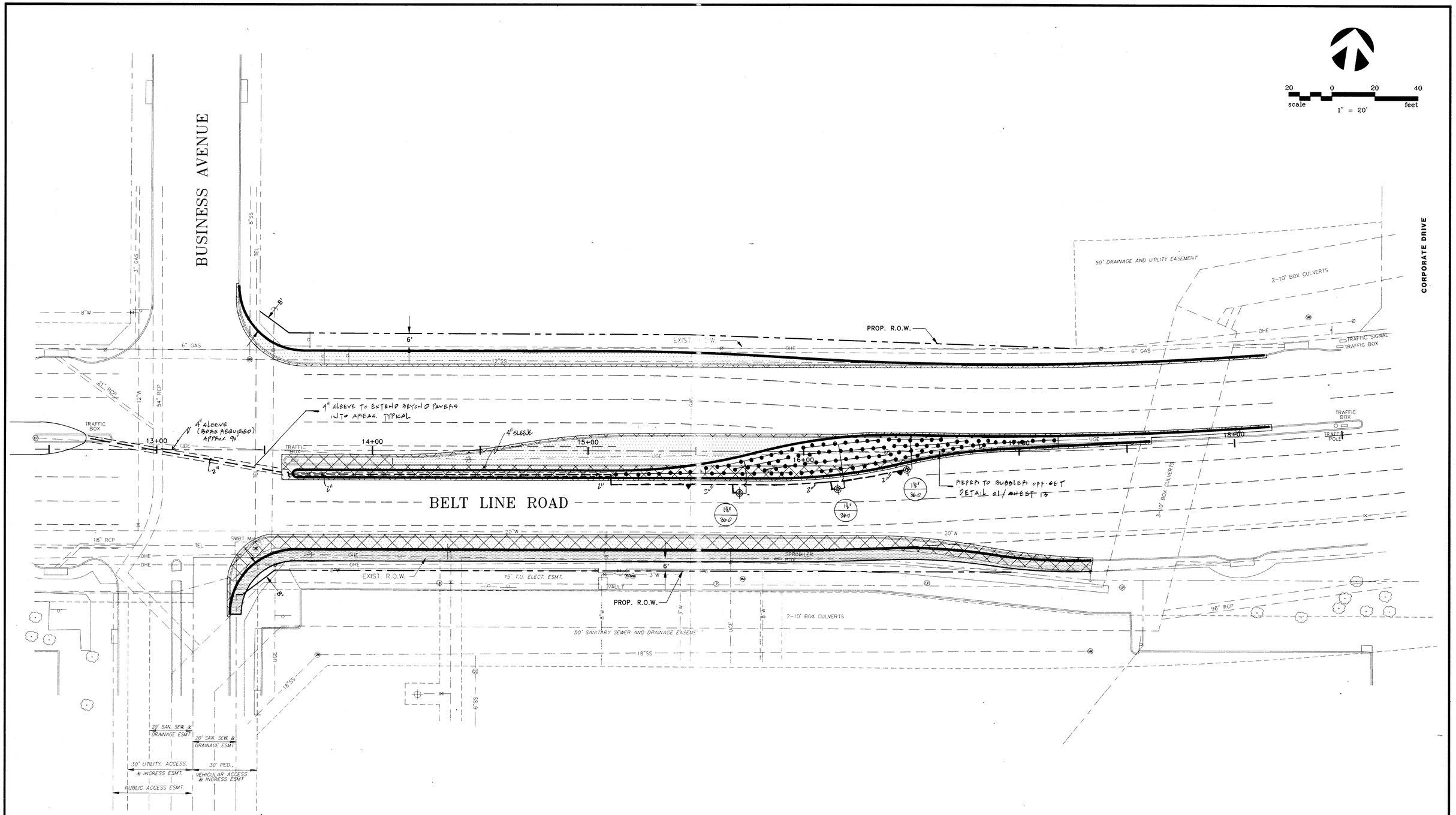
IRRIGATION PLAN

BELT LINE ROAD EAST OF MARSH LANE TO BUSINESS AVE.

PAVING IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

SHEET NO. 22 OF 46 SHEETS

JOB NO. 15411



NO.	REVISION	BY	DATE
1	TOWN OF ADDISON COMMENTS	JW	5-9-94

DESIGNED BY: JW
DRAWN BY: JW
CHECKED BY: BA/SR
SCALE: 1" = 20'
DATE: MAR. 22, 1994
FILE:

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

SMR
Landscape Architects
703 McKinney, LB 107
Suite 403
Dallas, Texas 75202
(214) 871 0083
Steven M. Rahn, ASLA

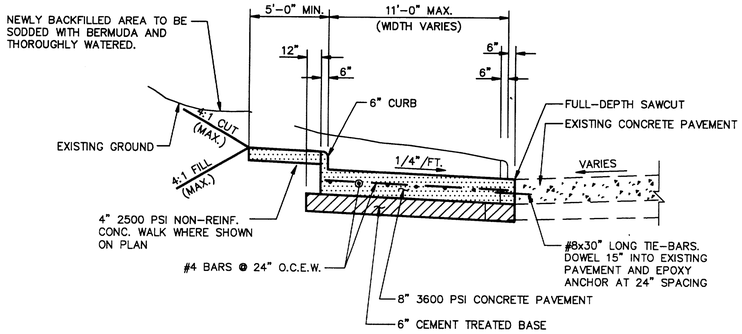
IRRIGATION PLAN

BELT LINE ROAD EAST OF BUSINESS AVE. TO CORPORATE DRIVE

PAVING IMPROVEMENTS
BELT LINE ROAD AT BUSINESS AVENUE
for
THE TOWN OF ADDISON

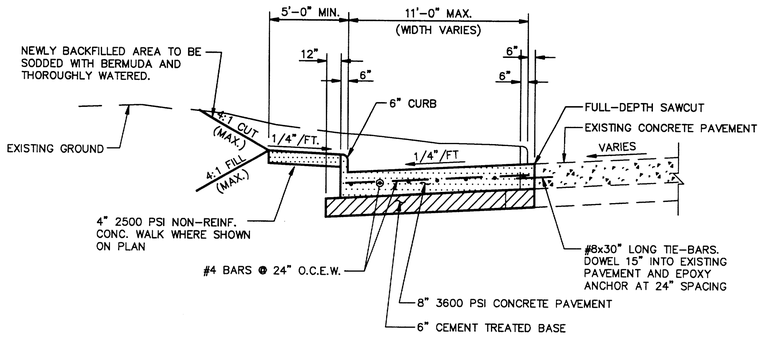
SHEET NO. 23 OF 46 SHEETS

JOB NO. 15411



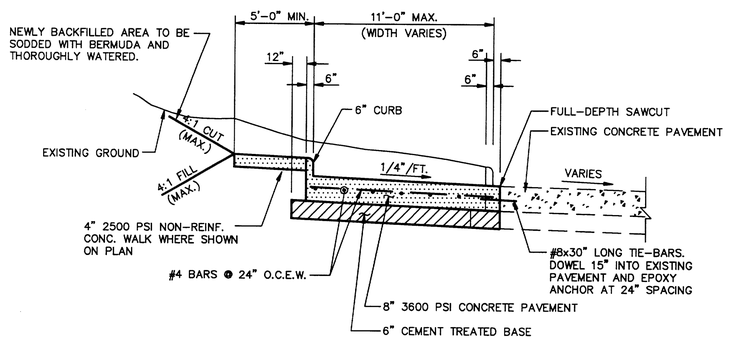
PAVEMENT WIDENING SECTION A–A

NOT TO SCALE



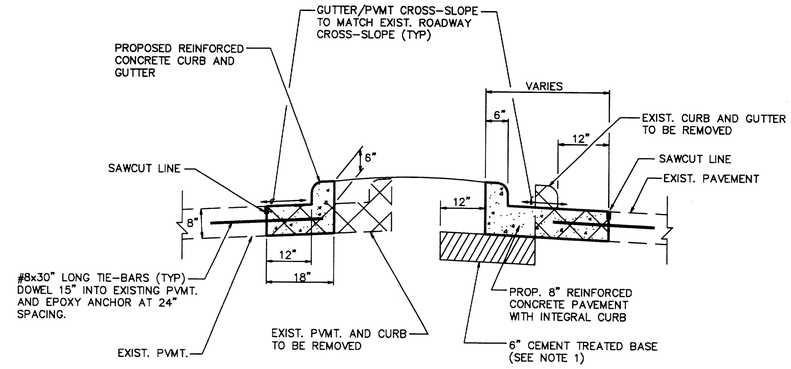
PAVEMENT WIDENING SECTION B–B

NOT TO SCALE



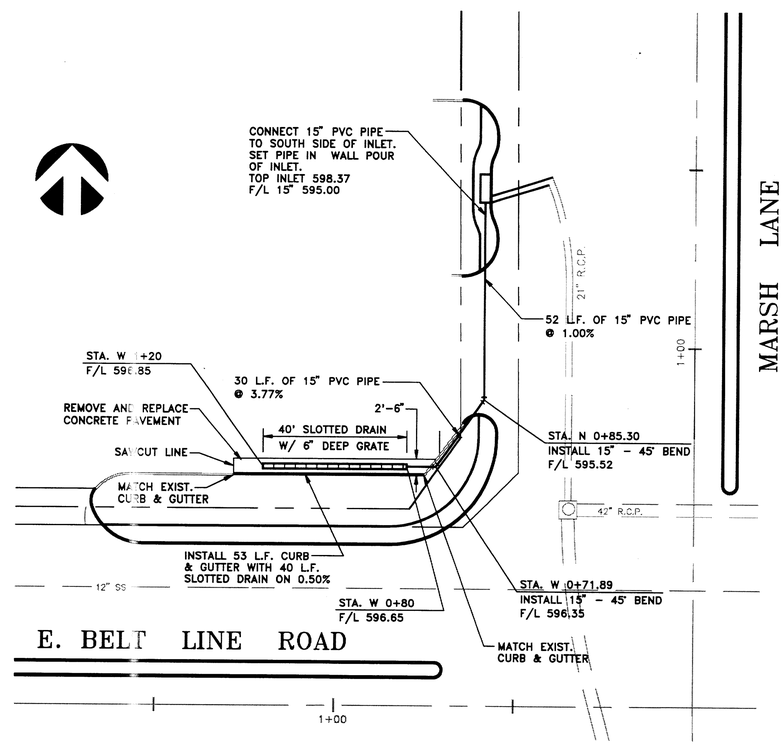
PAVEMENT WIDENING SECTION C–C

NOT TO SCALE



MEDIAN SECTION D–D

NOT TO SCALE



SLOTTED DRAINS DETAIL

1" = 20'

NOTE: REFER TO C.O.D. STD. 251D-1-2005 FOR PAVING AND GRADING REQUIREMENTS.

NOTES

1. BLOCK OUT A 3' LENGTH OF CEMENT TREATED BASE AT THE BACK OF CURB WHERE TREES ARE PLANTED IN A 3' WIDE MEDIAN. REFER TO LANDSCAPE PLANS FOR TREE LOCATIONS.

NO.	REVISION	BY	DATE

DESIGNED BY: J WALDBAUER
DRAWN BY: EH&A
CHECKED BY: B GRANTHAM
SCALE: AS SHOWN
DATE: DECEMBER 1993
FILE: \ADDISON\PROJECT2\DETAILS

STATE OF TEXAS — BRUCE R. GRANTHAM — 82659 — REGISTERED PROFESSIONAL ENGINEER

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

CONSTRUCTION DETAILS

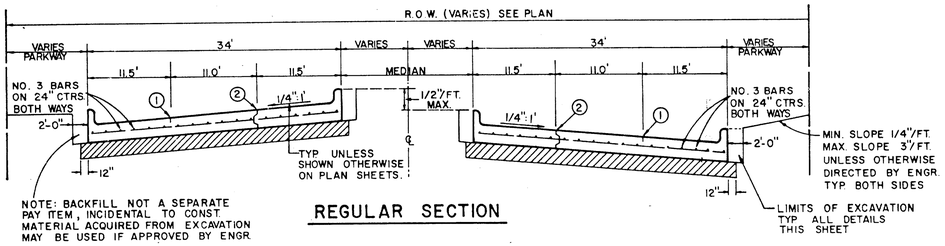
INTERSECTION IMPROVEMENTS

for

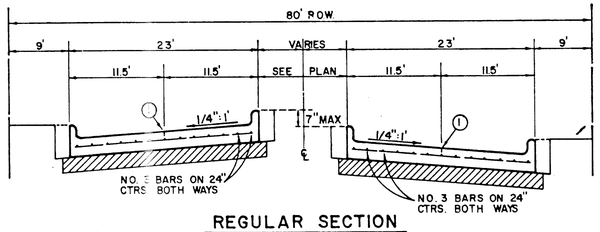
THE TOWN OF ADDISON

SHEET NO. 24 OF 46 SHEETS

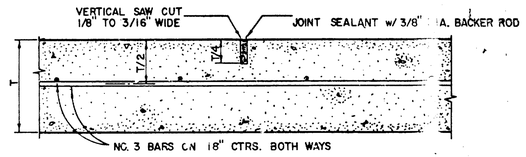
JOB NO. 13921



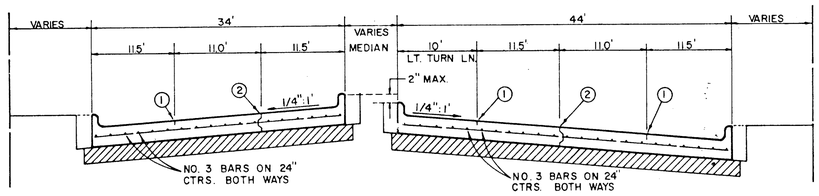
REGULAR SECTION



REGULAR SECTION

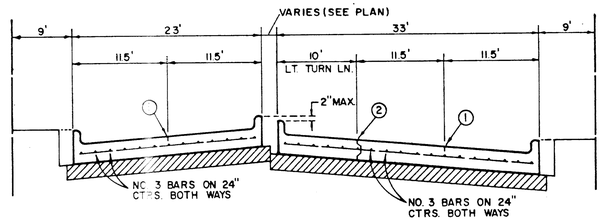


SAWED DUMMY JOINT



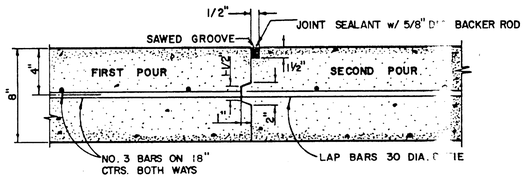
LEFT TURN SECTION

MAJOR ARTERIAL

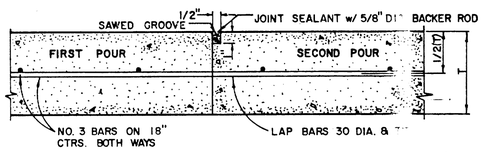


LEFT TURN SECTION

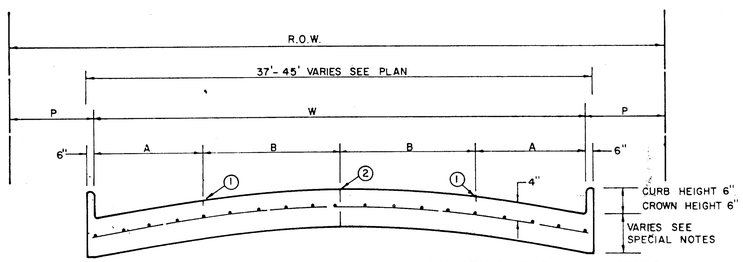
MINOR ARTERIAL



CONSTRUCTION JOINT FOR 8 INCH PAVEMENT



CONSTRUCTION JOINT FOR 6 INCH PAVEMENT

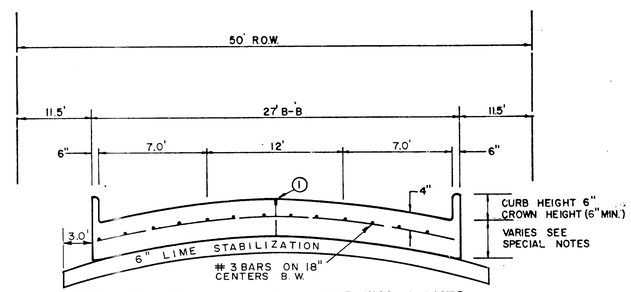


FOUR MOVING LANES OR TWO MOVING LANES/TWO PARKING LANES

STREET TYPE	STREET WIDTH (W)	A	B	R.O.W. WIDTH	P
COLLECTOR	36'	8'	10'	60'	11.5'
COLLECTOR	40'	8' OR 10'	10' OR 12	60'	9.5'
COLLECTOR	44'	11'	11'	65'	10.0'

* FULL WIDTH PAVEMENT OF 36' WIDTH STREETS IS ALLOWED WHERE APPROVED BY THE ENGINEER.

COLLECTOR STREET



ONE MOVING LANE / TWO PARKING LANES

LOCAL STREET

REINFORCED CONCRETE PAVEMENT

ALL REINFORCING BARS SHALL BE NO. 3 TRANSVERSE BARS TO BE SPACED ON 1'-6" CENTERS; LONGITUDINAL BARS TO BE SPACED ON 1'-6" EXCEPT WHERE NOTED.
UNDIVIDED STREETS-PROVIDE 4" DBL.-REF YELLOW ℄ BUTTON P-117-Y PATTERNS TO BE ESTABLISHED BY ENGINEER. SEE DETAIL SHEET

1. SAWED LONGITUDINAL DUMMY JOINT.
2. CONSTRUCTION JOINT (FULL WIDTH PVM'T IS ALLOWED WHERE APPROVED BY ENGINEER.
3. FINISH SHALL BE TRANSVERSE WITH TRAFFIC LANES AND SHALL BE STEEL TINED BROOM FINISH.

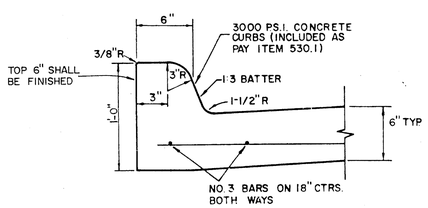
GENERAL NOTES

A. GENERAL
PAVEMENT THICKNESS FOR STREETS SHALL BE AS SPECIFIED BELOW IN SPECIAL NOTES.

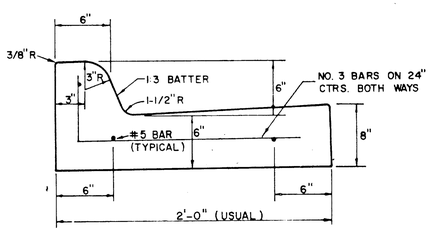
STANDARD SPECIFICATIONS

B. REINFORCED CONCRETE PAVEMENTS
1. ALL CURBS SHALL BE PLACED INTEGRAL WITH PAVEMENT
2. CURBS SHALL MEET THE SAME COMPRESSIVE STRENGTH AS SPECIFIED FOR THE CONCRETE PAVEMENT.
3. DETAIL AND ARRANGEMENT OF JOINTS, ALL TYPES, SHALL BE AS SHOWN ON THE STANDARD CONSTRUCTION DETAILS, OR AS APPROVED BY ENGINEER.
4. BAR LAPS SHALL BE 30 DIAMETERS.

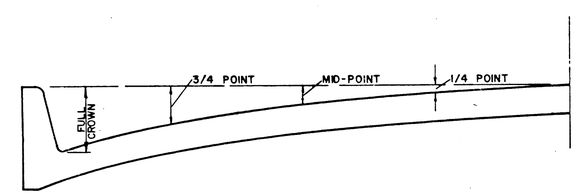
C. BAR CHAIRS OR AN APPROVED SUPPORTING DEVICE SHALL BE FURNISHED.



STANDARD CURB

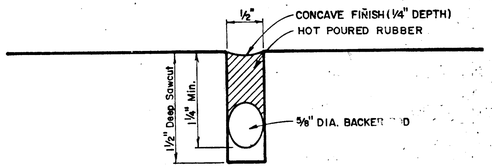


SEPARATE CURB AND GUTTER



ROADWAY WIDTH (W)	TOTAL CROWN HEIGHT	3/4 POINT	MID-POINT	1/4 POINT
26'	6"	3-3/8"	1-1/2"	3/8"
36'	6"	3-3/8"	1-1/2"	3/8"
44'	6"	3-3/8"	1-1/2"	3/8"
48'	6"	3-3/8"	1-1/2"	3/8"

TABLE OF CROWN HEIGHTS AND ORDINATES FOR VARIOUS PARABOLIC SECTIONS



TYPICAL JOINT DETAIL

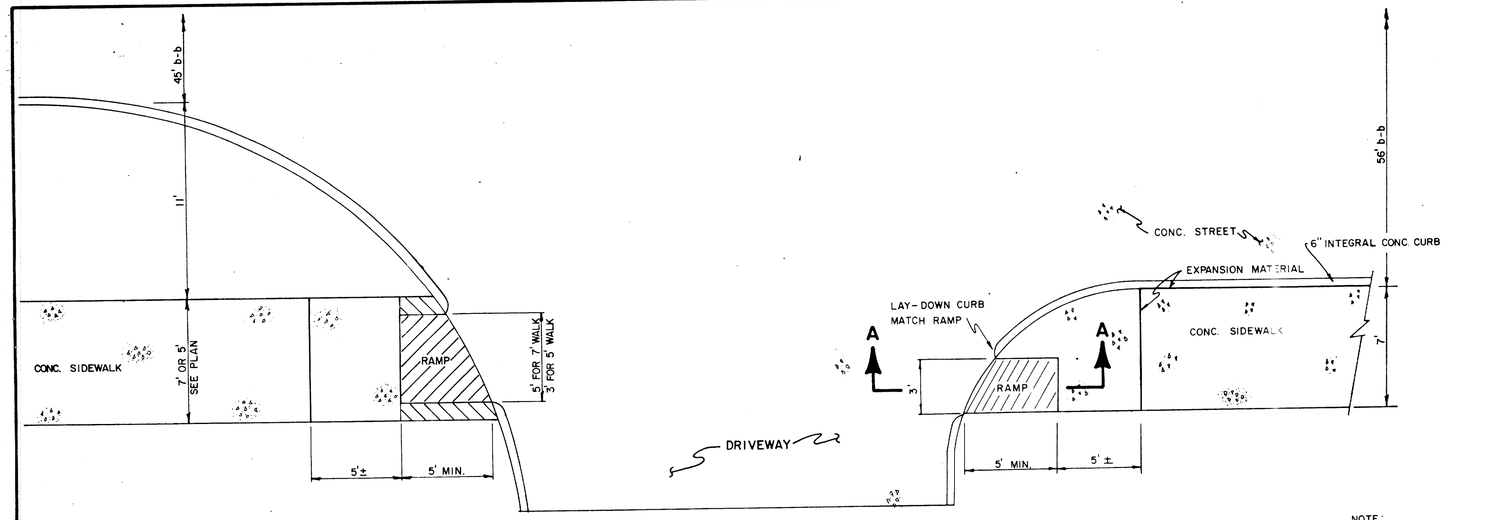
TOWN OF ADDISON, TEXAS
DEPARTMENT OF ENGINEERING

STANDARD CONSTRUCTION DETAILS
PAVING

STREET CROWNS & JOINTS

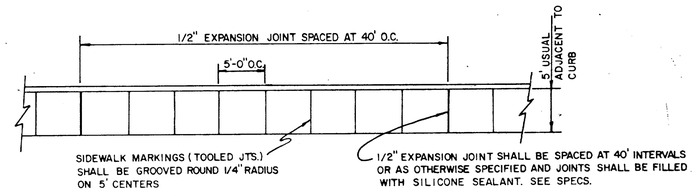
Designed -	Drawn -	Date - AUGUST, 1991	Job No. - 90025-5
Approved -	Checked -	Scale -	Sheet D-1 Of

SHT. OF

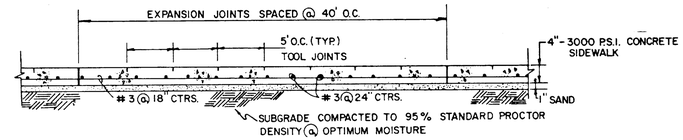


PLAN

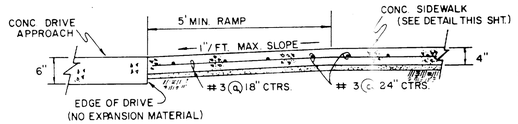
NOTE:
MODIFY RAMP TO FIT DIFFERENT RADIUS



PLAN

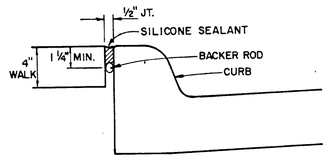


SIDE ELEVATION

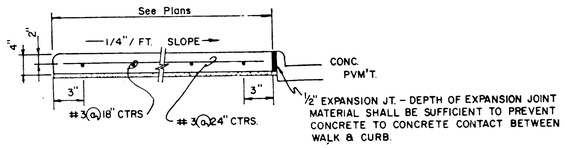


SECTION A-A

BARRIER FREE RAMP DETAIL WITH WALK ADJACENT TO CURB

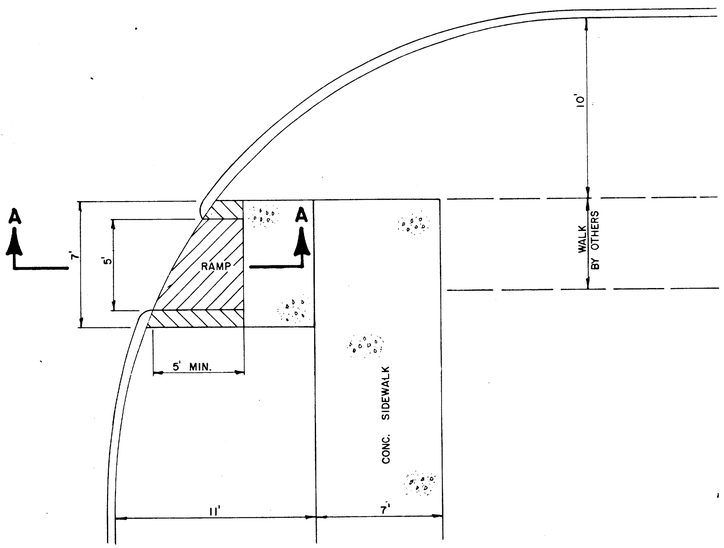


EXPANSION JOINT DETAIL

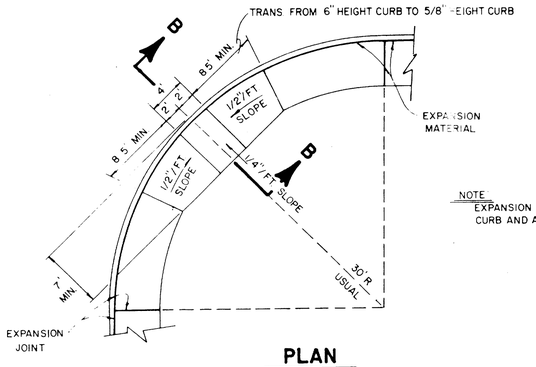


SECTION

CONCRETE SIDEWALK DETAIL

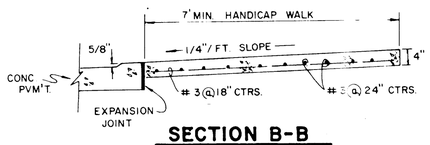


BARRIER FREE RAMP DETAIL WITH WALK SEPARATE FROM CURB



NOTE
EXPANSION MATERIAL ALONG CURB AND AT CURB RETURNS

PLAN



SECTION B-B

HANDICAP ROLL-DOWN CURB DETAIL

GENERAL NOTES

1. Reinforced concrete sidewalk shall be 5 or 7 feet wide, a minimum of four (4) inches thick and shall be 3000 psi at 28 days (5 sack mix). Unless noted otherwise.
2. Chamfer all exposed edges of concrete (1/4) inch.
3. All bar dimensions are given as center to center of bars and are located as shown.
4. All reinforcing steel shall be No. 3 on 18 inch centers logitudinally, 24 inch centers transversely and shall conform to the requirements of ASTM A-615, Grade 60.
5. 1" thick min. fine, washed sand cushion shall be free from organic materials or clays and shall be used for grade adjustment.
6. Subgrade shall be compacted to a density not less than 95% at optimum moisture.
7. Tooled joints (contraction joints) shall be on five (5) foot centers and shall be round one-fourth (1/4) inch radius.
8. A one-half (1/2) inch expansion joint shall be placed every eight (8) tooled joints, and where works abut old work, or where new work is constructed adjacent to other concrete, a one-half inch expansion joint shall be used where sidewalk is adjacent to curb, the expansion joint shall be made of pre-molded bituminous expansion joint filler or redwood with silicone sealant. See Specs.
9. Sidewalks shall be finished by lightly brooming surface transversely to direction of main traffic or where adjacent sidewalks differ from this standard, new sidewalks shall conform to adjacent sidewalk (e.g. exposed aggregate).
10. Cross slope walk one-fourth (1/4) inch per foot towards curb or as shown on the drawings to provide drainage.

NO.	REVISION	BY	DATE

TOWN OF ADDISON, TEXAS
DEPARTMENT OF ENGINEERING

STANDARD CONSTRUCTION DETAILS
PAVING

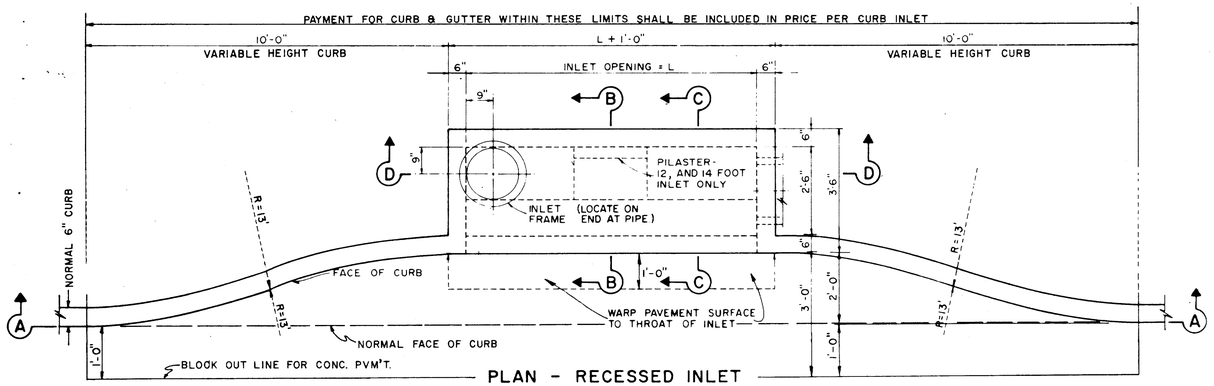
SIDEWALKS & RAMPS

APPROVED _____

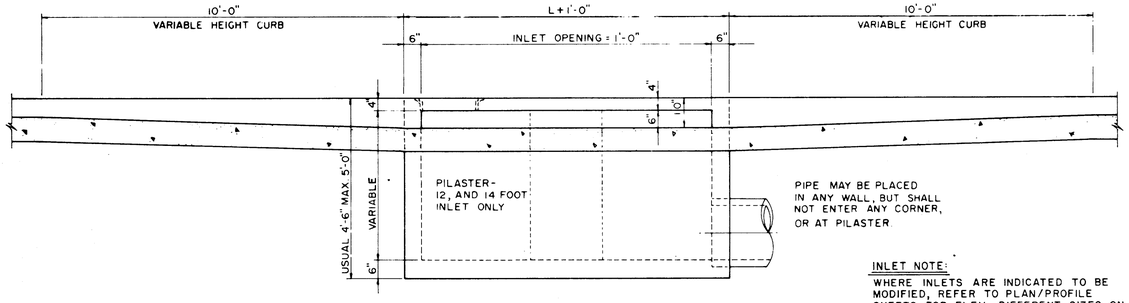
DATE AUGUST, 1991 | SHEET D-3

90025-5

SHT. OF



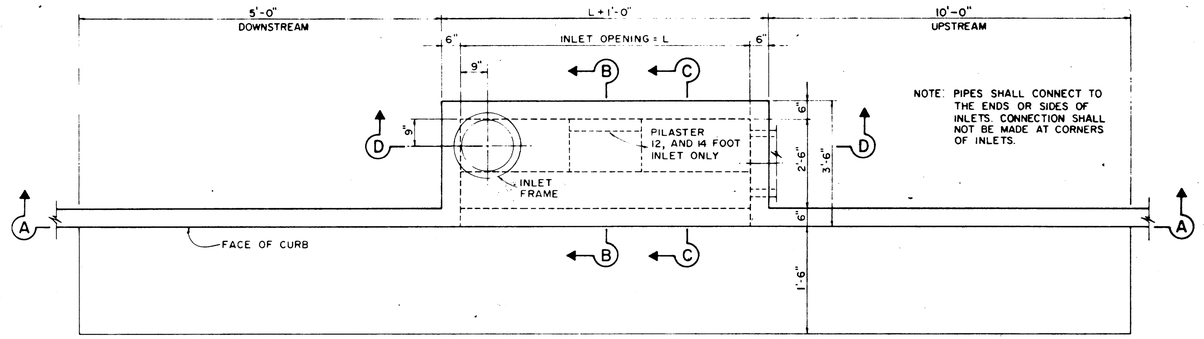
PLAN - RECESSED INLET



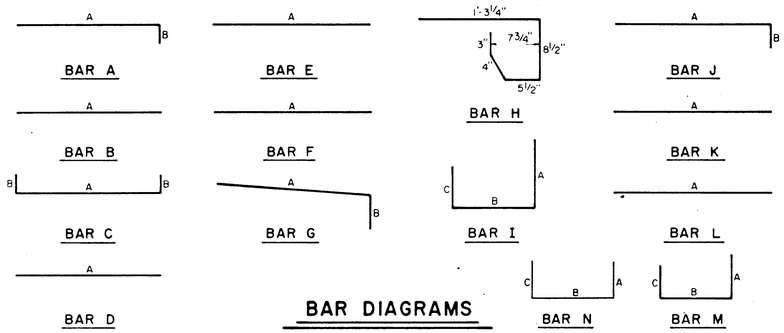
INLET NOTE:
WHERE INLETS ARE INDICATED TO BE MODIFIED, REFER TO PLAN/PROFILE SHEETS FOR ELEV., DIFFERENT SIZES ON MODIFICATIONS. ALL OTHER ITEMS SHALL REMAIN AS SHOWN ON THIS STANDARD DETAIL SHEET.

SECTION A-A-RECESSED AND STANDARD INLETS

4, 6, 8, 10, 12, AND 14 FOOT INLETS



PLAN - STANDARD INLET



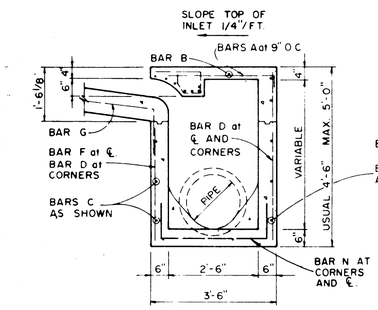
BAR DIAGRAMS

REINFORCING STEEL SCHEDULE

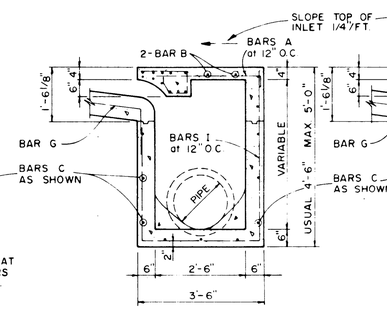
DIMENSIONS SHOWN ARE FOR MAXIMUM SIZE INLETS

INLET LENGTH	BAR TYPE	BAR DIA. (1/8 IN.)	NO. REQ'D	BAR DIMENSIONS A	B	C
4	A	3	6	3'-2"	0'-3"	-
	B	3	1	2'-10"	-	-
	C	4	15	4'-8"	0'-6"	-
	D	4	5	4'-8"	-	-
	F	4	1	3'-2"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	4	*	*	*
	N	3	3	3'-2"	3'-2"	3'-2"
6	A	3	9	3'-2"	0'-3"	-
	B	3	1	4'-10"	-	-
	C	4	15	6'-8"	0'-6"	-
	D	4	5	4'-8"	-	-
	F	4	1	3'-2"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	6	*	*	*
	N	3	3	3'-2"	3'-2"	3'-2"
8	A	3	12	3'-2"	0'-3"	-
	B	3	1	6'-10"	-	-
	C	4	15	8'-8"	0'-6"	-
	D	4	5	4'-8"	-	-
	F	4	1	3'-2"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	8	*	*	*
	N	3	3	3'-2"	3'-2"	3'-2"
10	A	3	10	3'-2"	0'-3"	-
	B	3	2	8'-10"	-	-
	C	4	16	10'-8"	0'-6"	-
	D	4	4	4'-8"	-	-
	E	5	6	10'-8"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	15	*	*	*
	I	4	8	4'-8"	3'-2"	3'-2"
	L	4	5	4'-3"		-
12	A	3	12	3'-2"	0'-3"	-
	B	3	2	10'-10"	-	-
	C	4	16	12'-8"	0'-6"	-
	D	4	4	4'-8"	-	-
	E	5	6	12'-8"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	18	*	*	*
	I	4	10	4'-8"	3'-2"	3'-2"
	J	5	9	3'-2"	1'-3"	-
	K	4	5	2'-3"	-	-
	L	4	5	4'-3"	-	-
	M	5	9	4'-3"	3'-2"	3'-9"
14	A	3	14	3'-2"	0'-3"	-
	B	3	2	10'-10"	-	-
	C	4	16	14'-8"	0'-6"	-
	D	4	4	4'-8"	-	-
	E	5	6	14'-8"	-	-
	G	3	5	2'-0"	1'-3"	-
	H	3	21	*	*	*
	I	4	12	4'-8"	3'-2"	3'-2"
	J	5	9	3'-2"	1'-3"	-
	K	4	5	2'-3"	-	-
	L	4	5	4'-3"	-	-
	M	5	9	4'-3"	3'-2"	3'-9"

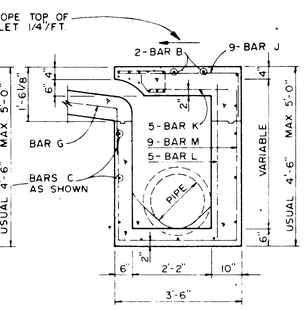
* SEE DIAGRAM FOR DIMENSIONS



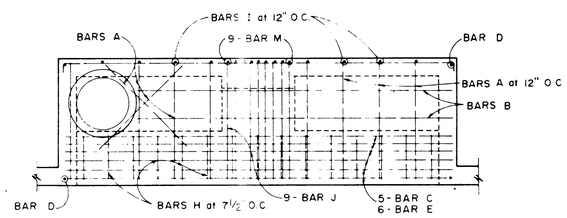
SECTION B-B



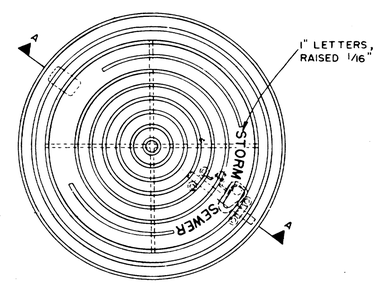
SECTION C-C



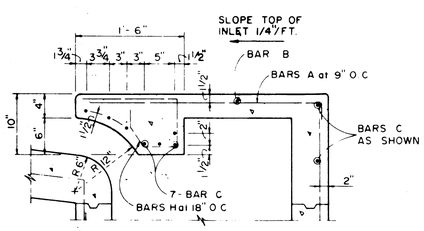
SECTION B-B



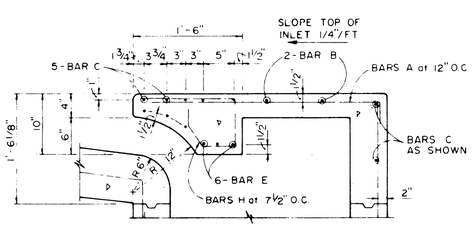
PLAN



PLAN OF FRAME

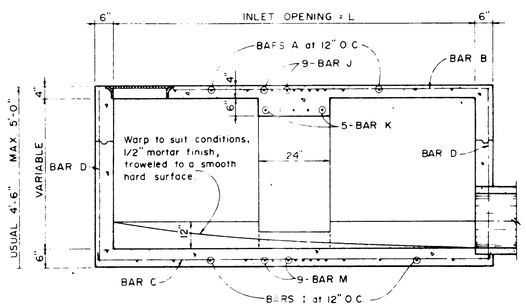


SECTION C-C



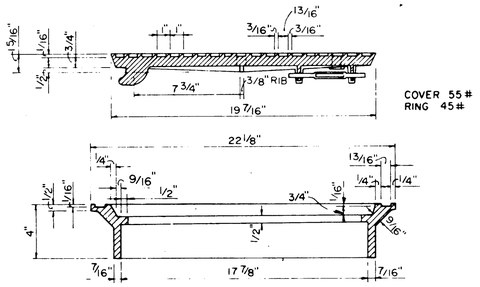
SECTION C-C

4, 6, AND 8 FOOT INLETS



SECTION D-D
FOR 12' & 14' ONLY

10, 12, AND 14 FOOT INLETS



SECTION OF FRAME AND COVER

INLET FRAME AND COVER

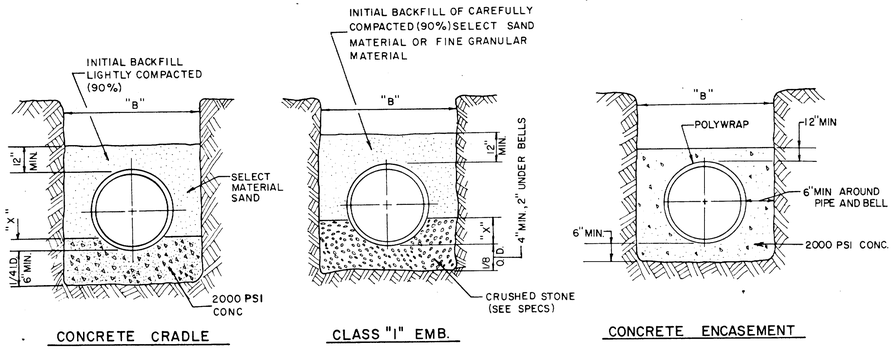
TOWN OF ADDISON, TEXAS
DEPARTMENT OF ENGINEERING

STANDARD CONSTRUCTION DETAILS
STORM DRAINAGE

CURB INLETS

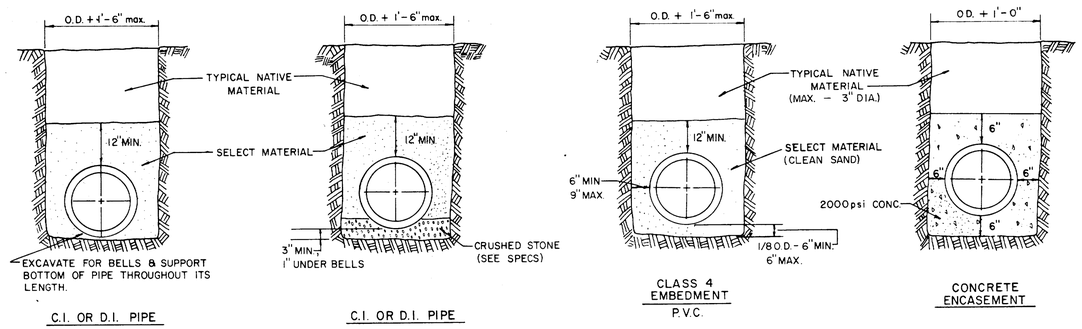
Designed -	Drawn -	Date - AUGUST, 1991	Job No. - 90025-5
Approved -	Checked -	Scale -	Sheet D-4 Of

SHT. OF

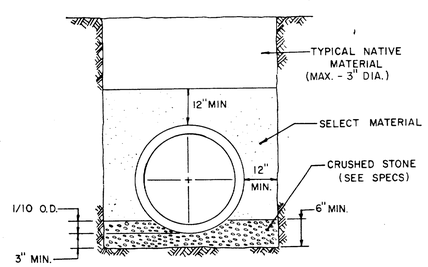


EMBEDMENT DETAILS FOR RCCP WATERLINE

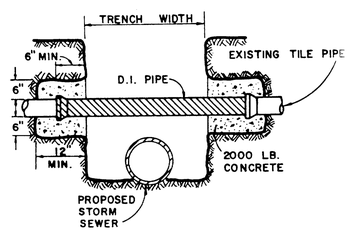
TABLE OF QUANTITIES OF MATERIALS IN CUBIC YARDS PER 100 LINEAR FEET						
INSIDE DIAMETER OF PIPE	APPROX. OUTSIDE DIAMETER OF PIPE	"X" IS A MINIMUM DEPTH	"B" TRENCH WIDTH FOR COMPUTATION OF QUANTITIES	CONCRETE FOR EMBEDMENT	CONCRETE FOR ENCASEMENT	CRUSHED STONE FOR CL."I" EMBEDMENT
REINFORCED CONCRETE CYLINDER PIPE						
14"	17.25"	2.53"	3.4"	6.91	16.07	5.16
16"	19.38"	2.84"	3.6"	7.50	17.76	5.64
18"	21.78"	3.19"	3.8"	8.11	19.52	6.16
24"	27.75"	4.06"	4.4"	9.97	24.90	9.28



EMBEDMENT DETAILS FOR WATER MAIN

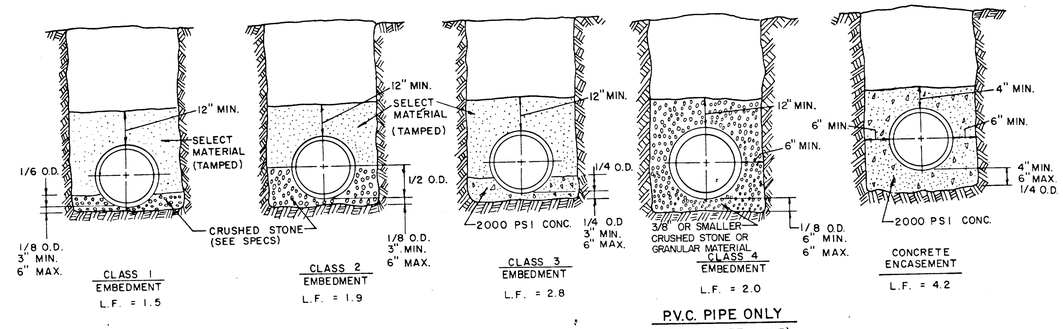


EMBEDMENT DETAIL FOR STORM SEWER



DETAIL OF UTILITY SUPPORT

TYPICAL NATIVE MATERIAL COMPACTED TO:
95% OPTIMUM MOISTURE 0 TO +3% UNDER PAVEMENT
95% OPTIMUM MOISTURE 0 TO +3% OUTSIDE CURB LINES
JETTING IS NOT ALLOWED
BACKFILL TO BE COMPACTED IN 6"± LIFTS
TYPICAL NATIVE MATERIAL (MAX. 3" DIA.)



P.V.C. PIPE ONLY
SDR 35 (GREEN PIPE)

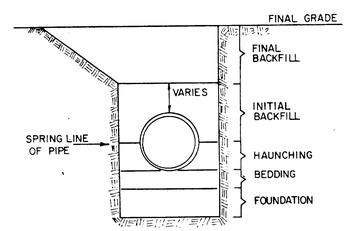
EMBEDMENT DETAILS FOR SANITARY SEWER

TABLE OF QUANTITIES OF 2000 PSI CONCRETE, GRAVEL OR CRUSHED STONE IN CUBIC YARDS PER 100 LINEAR FEET FOR EACH CLASS EMBEDMENT

TABLE OF QUANTITIES PER 100 LINEAR FEET REINFORCED CONCRETE PIPE							
SIZE OF PIPE IN INCHES I.D.	O.D. OF PIPE IN INCHES	TRENCH WIDTH IN INCHES	TRENCH WIDTH IN FEET	CLASS 1 EMBEDMENT CRUSHED STONE	CLASS 2 EMBEDMENT CRUSHED STONE	CLASS 3 EMBEDMENT CONCRETE	CONCRETE ENCASEMENT
12	16.00	32	2.67	4.1	6.5	4.8	15.8
15	19.50	36	3.00	4.8	7.8	6.4	19.2
18	23.00	39	3.25	5.7	9.2	8.2	21.2
21	26.50	43	3.58	6.9	11.0	10.2	24.9
24	30.00	46	3.83	8.3	13.1	12.4	28.7
27	33.50	51	4.25	10.3	16.1	14.4	32.8
30	37.00	57	4.75	12.7	20.1	17.0	34.8
33	40.50	62	5.17	15.1	23.8	19.3	39.2
36	44.00	67	5.58	18.0	28.6	22.1	43.8

TABLE OF QUANTITIES PER 100 LINEAR FEET-PVC PIPE (IN CUBIC YARDS)					
SIZE OF PIPE IN INCHES	O.D. OF PIPE IN INCHES	TRENCH WIDTH IN INCHES	TRENCH WIDTH IN FEET	CLASS 4 EMBEDMENT CRUSHED STONE	CONCRETE ENCASEMENT
6	6.28	24	2.00	8.0	11.7
8	8.16	24	2.00	8.7	12.4
10	10.20	26	2.18	10.2	14.2
12	12.24	28	2.35	11.7	15.9
16	15.30	31	2.61	14.0	18.8
24		36	3.0		
30		42	3.5		

NOTE: ALL SANITARY SEWER LINES THIS PROJECT SHALL HAVE CLASS 4 EMBEDMENT UNLESS OTHERWIS NOTED.



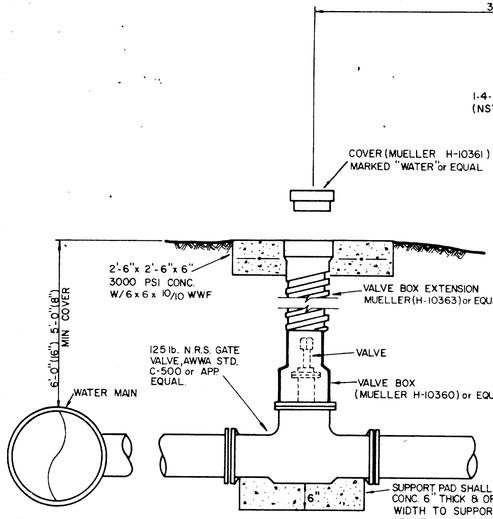
EMBEDMENT ZONES

TOWN OF ADDISON, TEXAS
DEPARTMENT OF ENGINEERING

STANDARD CONSTRUCTION DETAILS

EMBEDMENT DETAILS

Designed -	Drawn -	Date - AUGUST, 1991	Job No. - 90025-5
Approved -	Checked -	Scale -	Sheet D-5 Of

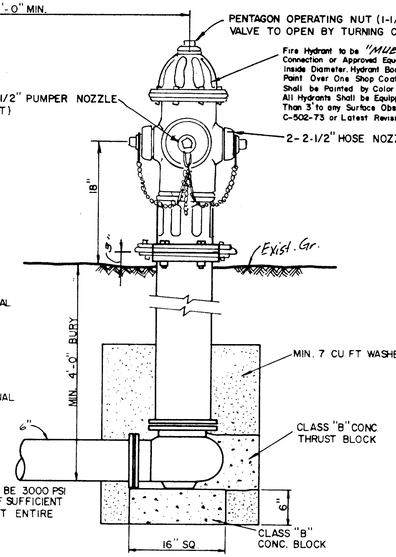


VALVE BOX DETAIL

(SEE PLANS FOR "MAIN SIZE")

GATE VALVES AND VALVE BOXES.

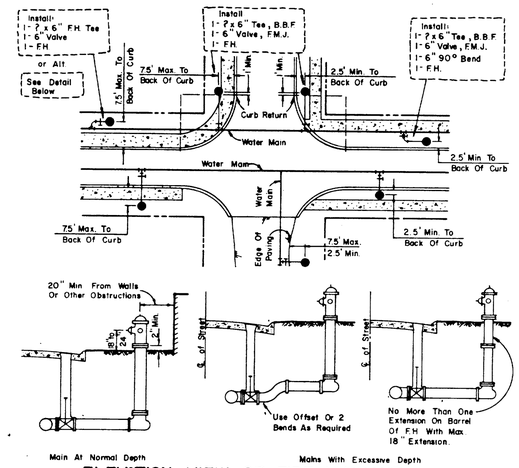
1. GATE VALVES SHALL BE IRON BODY, BRONZE OR BRASS MOUNTED, NON-RISING STEM, PARALLEL SEAT TYPE. VALVES SHALL BE OF EQUAL OR GREATER PRESSURE CLASS THAN THE PIPING IN WHICH THEY ARE TO BE INSTALLED.
2. VALVE BOXES SHALL BE CAST IRON AND SHALL BE OF SUFFICIENT LENGTH AND DIAMETER TO OPERATE ALL VALVES BURIED IN THE GROUND. COVERS SHALL BE MARKED "WATER." THE BOXES SHALL REST ON THE VALVE AND BE ADJUSTED SO THAT THE COVER MAY BE SET FLUSH WITH THE FINISHED GRADE.



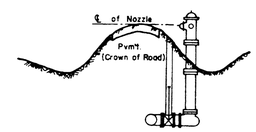
FIRE HYDRANT INSTALLATION

(INCLUDES 6" VALVE)

No Scale



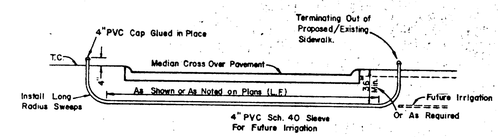
ELEVATION VIEW OF FIRE HYDRANT



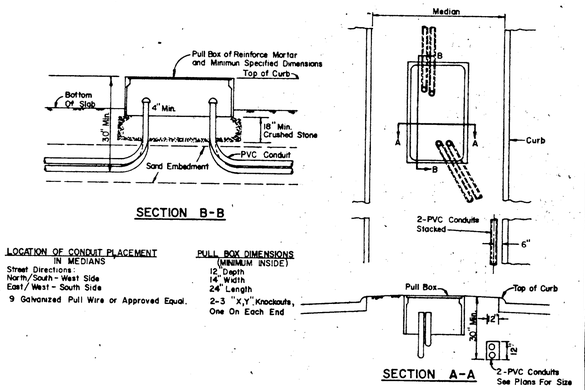
When No Curb Or Gutter Exists, Set F.H. On Front Slope Of Ditch With ℄ Of Nozzle Equal To The Crown Of The Road.

GENERAL NOTES

1. ℄ Of F.H. Barrel Shall Be Not Less Than 6.0' Or More Than 9.0' From Back Of Curb Or Edge Of Pavement.
2. Do Not Set F.H. In An Existng Or Proposed Sidewalk, Unless Otherwise Noted.
3. All F.H. Tees Shall Be M.J. With Anchoring On The Branch With M.J., M.J. 6" Valve.
4. Set F.H. On The Lot Line Extended When Possible.
5. On Private Contracts, The Developers Engineer Will Stake Location & Grade.
6. Never Place F.H. Where Fire Truck Could Not Park Beside It.



PVC SLEEVE FOR FUTURE IRRIGATION

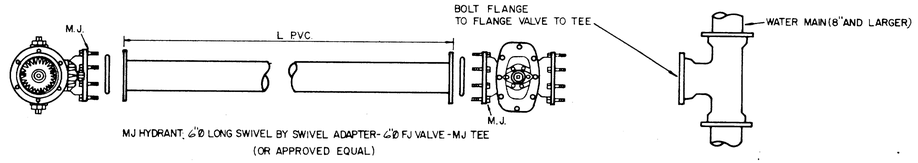


LOCATION OF CONDUIT PLACEMENT IN MEDIANS
Street Directions:
North/South - West Side
East/West - South Side

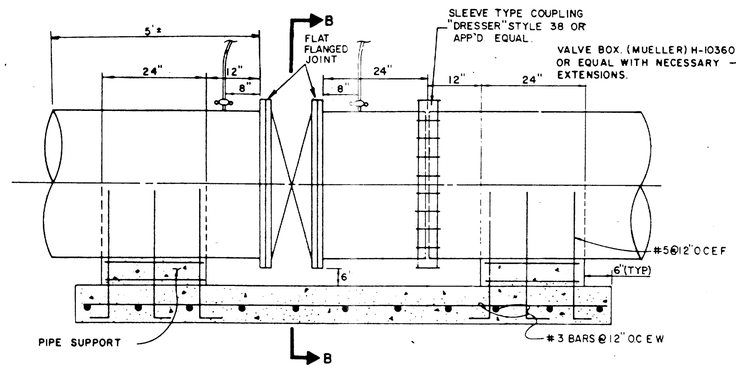
9 Galvanized Pull Wire or Approved Equal.

PULL BOX DIMENSIONS (MINIMUM INSIDE)
12" Depth
14" Width
24" Length
2-3 "X,Y" Knockouts, One On Each End

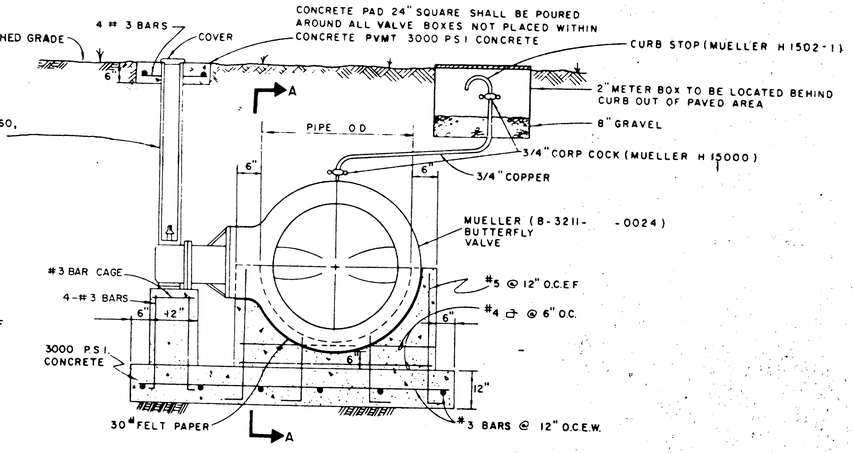
PULL BOX & CONDUIT DETAIL



TYPICAL FIRE HYDRANT INSTALLATION

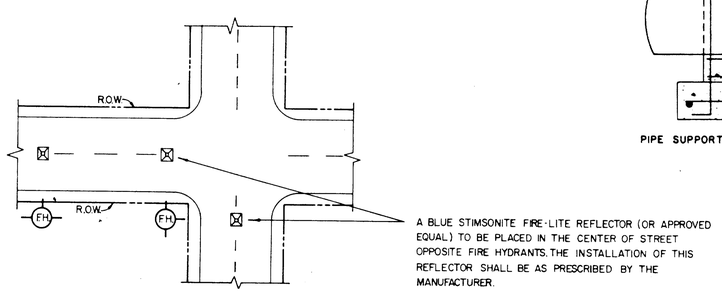


SECTION A-A

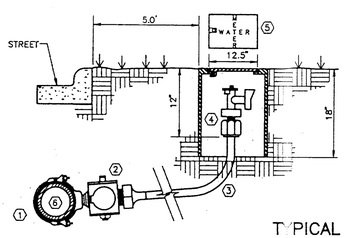


SECTION B-B

BUTTERFLY VALVE DETAIL



TYPICAL FIRE HYDRANT REFLECTOR INSTALLATION



1. DOUBLE STRAP BRONZE SADDLE W/CCW THREADS. MUELLER.
2. CORPORATION STOP W/CCW THREADS. MUELLER. H-15008 COMPRESSION OR H-15000 FLARED.
3. 3/4" TYPE "K" SOFT COPPER W/NO SPLICES
4. ANGLE STOP W/LOCK WING. MUELLER H-14258 COMPRESSION OR H-14255 FLARED.
5. WATER METER BOX (RECTANGULAR SHAPE ONLY) CONCRETE OR METAL SHELL CONSTRUCTION
6. WATER MAIN PVC AWWA C900 SDR 14/18 INTEGRAL WALL BELL

TYPICAL WATER SERVICE DETAIL

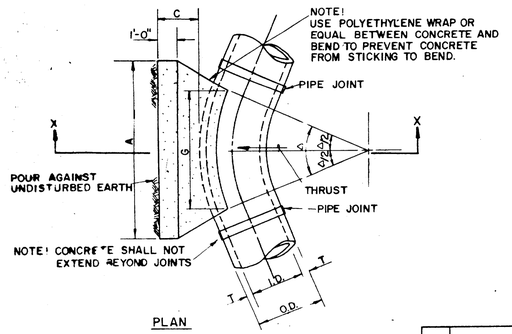
TOWN OF ADDISON, TEXAS
DEPARTMENT OF ENGINEERING

STANDARD CONSTRUCTION DETAILS
WATER

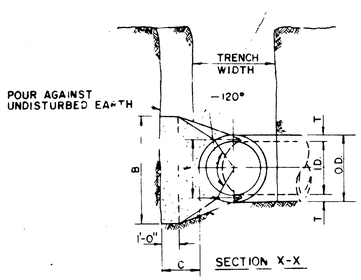
FIRE HYDRANTS, PULL BOXES AND VALVES

Designed -	Drawn -	Date - AUGUST, 1991	Job No. - 90025-5
Approved -	Checked -	Scale -	Sheet D-8 Of

SHT. OF



PLAN



SECTION X-X

I.D. (IN.)	T IN.	C 11.25° FT.	C 22.50°+ 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

	Δ = 30°										Δ = 45°								
			EARTH			ROCK							EARTH			ROCK			
I.D. (IN.)	G FT.	THRUST TONS	A FT.	B FT.	VOL. C.Y.	A FT.	B FT.	VOL. C.Y.	I.D. (IN.)	G FT.	THRUST TONS	A FT.	B FT.	VOL. C.Y.	A FT.	B FT.	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	5.5	5.0	1.9	3.5	4.0	0.8	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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	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.[illegible]	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.[illegible]	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.[illegible]	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5

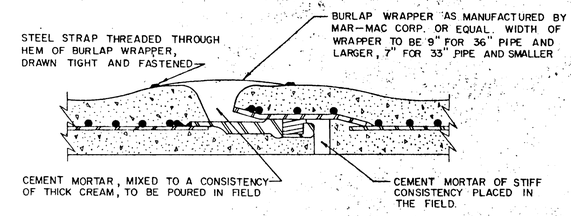
	Δ = 11.25°										Δ = 22.50°								
			EARTH			ROCK							EARTH			ROCK			
I.D. (IN.)	G FT	THRUST TONS	A FT.	B FT.	VOL. C.Y.	A FT	B FT.	VOL. C.Y.	I.D. (IN.)	G FT.	THRUST TONS	A FT.	B FT.	VOL. C.Y.	A FT.	B FT.	VOL. C.Y.
4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1
10,12	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	3.5	0.4
24	1.1	8.9	3.0	3.0	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.0	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	4.8	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	6.3	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

	Δ = 67.50°										Δ = 90°								
			EARTH			ROCK							EARTH			ROCK			
I.D. (IN.)	G FT	THRUST TONS	A FT.	B FT.	VOL. C.Y.	A FT.	B FT.	VOL. C.Y.	I.D. (IN.)	G FT.	THRUST TONS	A FT.	B FT.	VOL. C.Y.	A FT	B FT.	VOL. C.Y.
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.[illegible]	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.[illegible]	10,12	4.0	16.0	6.5	2.5	1.0	3.0	2.5	0.5
16,18	4.7	28.3	7.5	4.0	1.9	5.0	3.0	0.[illegible]	16,18	6.0	36.0	9.0	4.0	2.4	4.0	4.0	1.0
20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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.[illegible]	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	56.[illegible]	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	136.9	25.5	12.0	70.[illegible]	96	31.6	767.5	48.0	16.0	199.0	32.0	12.0	95.1

HORIZONTAL BEND THRUST BLOCK

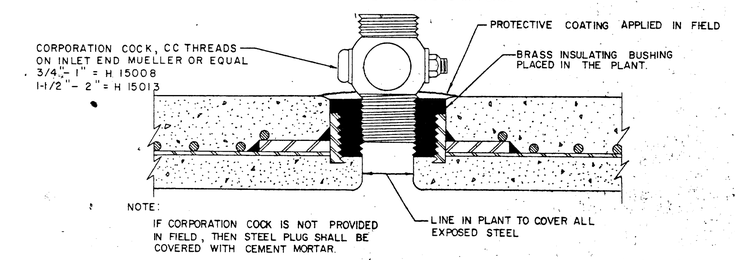
NOTE:

PROVIDE 1" MINIMUM THICKNESS CONCRETE OR CEMENT MORTAR COATING IN THE FIELD FOR THE PROTECTION OF ALL EXPOSED STEEL SUCH AS FLANGES, CAULKED-JOINTS, THREADED OUTLETS, CLOSURES, ETC. THE CEMENT MORTAR USED SHALL CONSIST OF ONE PART PORTLAND CEMENT TO TWO AND ONE-HALF PARTS OF FINE, SHARP (PLASTER) SAND. WHERE SHOWN, COATING IS TO BE REINFORCED WITH WIRE MESH.

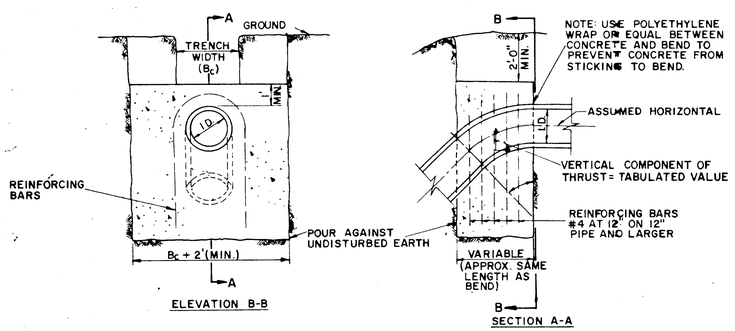


STANDARD RUBBER GASKET JOINT

NOTE: ALL CLOSURE SECTIONS SHALL BE FABRICATED WITH HAND HOLES TO ALLOW WIPING INSIDE OF JOINTS AFTER CLOSURE IS IN PLACE



THREADED CONNECTION



ELEVATION B-B

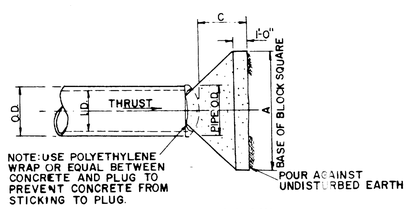
SECTION A-A

Δ	11.25°		22.50°		30°		45°		67.50°		90°		Δ
I.D. (IN.)	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	THRUST TONS	VOL. C.Y.	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

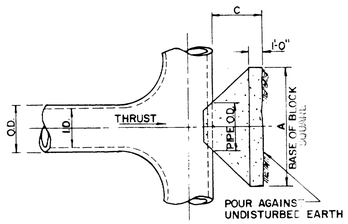
GENERAL NOTES- FOR ALL THRUST BLOCKS

1. All Calculations Are Based On Internal Pressure Of 200 P.S.I. For 24" I.D. Pipe And Smaller And 150 P.S.I. On 30" I.D. And Larger.
2. Volumes Of Vertical Bend Thrust Blocks Are Net Volumes Of Concrete To Be Furnished. The Corresponding Weight Of The Concrete (Class F) Is Equal To Or Greater Than The Vertical Component Of Thrust On The Vertical Bend.
3. Wall Thickness (T) Assumed Here For Estimating Purposes Only.
4. Concrete For Blocking Shall Be Class B Concrete.
5. 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.

VERTICAL BEND THRUST BLOCK



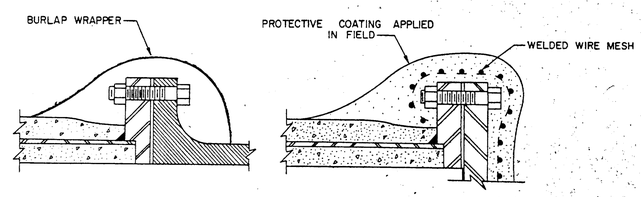
PLAN OF PLUG THRUST BLOCK



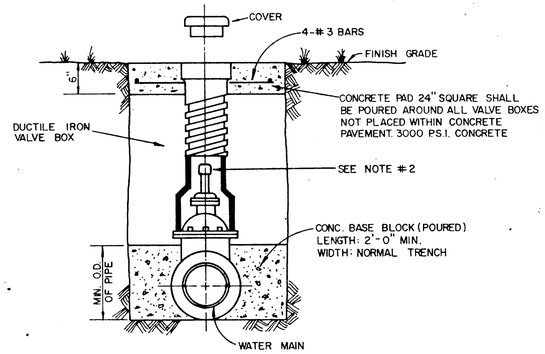
PLAN OF TEE THRUST BLOCK

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	23.5	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	356.0	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

PLUG & TEE THRUST BLOCK



FLANGED CONNECTIONS



NOTE:

1. GATE VALVES SHALL BE IN ACCORDANCE WITH AWWA STANDARD C-509-80 OR LATEST THEREOF. ALL VALVES SHALL BE *"MUELLER"* OR APPROVED EQUAL.
2. A PERMANENTLY ATTACHED VALVE EXTENSION STEM SHALL BE REQUIRED FOR ANY VALVE THATS OPERATING NUT IS LOCATED IN EXCESS OF 4 FEET BELOW THE TOP OF VALVE BOX. THIS EXTENSION SHALL BE OF SUFFICIENT LENGTH TO INSURE THAT ITS TOP IS WITHIN 4' OF VALVE BOX LID. MANUFACTURED VALVE STACK DUCTILE IRON PIPE TO BE USED FOR EXTENSION GREATER THAN 4'-0. BELL END OF STACK TO BE FITTED OVER VALVE. VALVE AND VALVE STACK IS TO BE POLY WRAPED.
3. VALVES SHALL BE OF DUCTILE IRON W/RUBBER ENCAPSULATED DISK. BODY BOLTS SHALL BE STAINLESS STEEL OF SAME SIZE ON EACH VALVE.

TYPICAL VALVE SETTING AND BOX

REINFORCED CONCRETE CYLINDER PIPE DETAILS

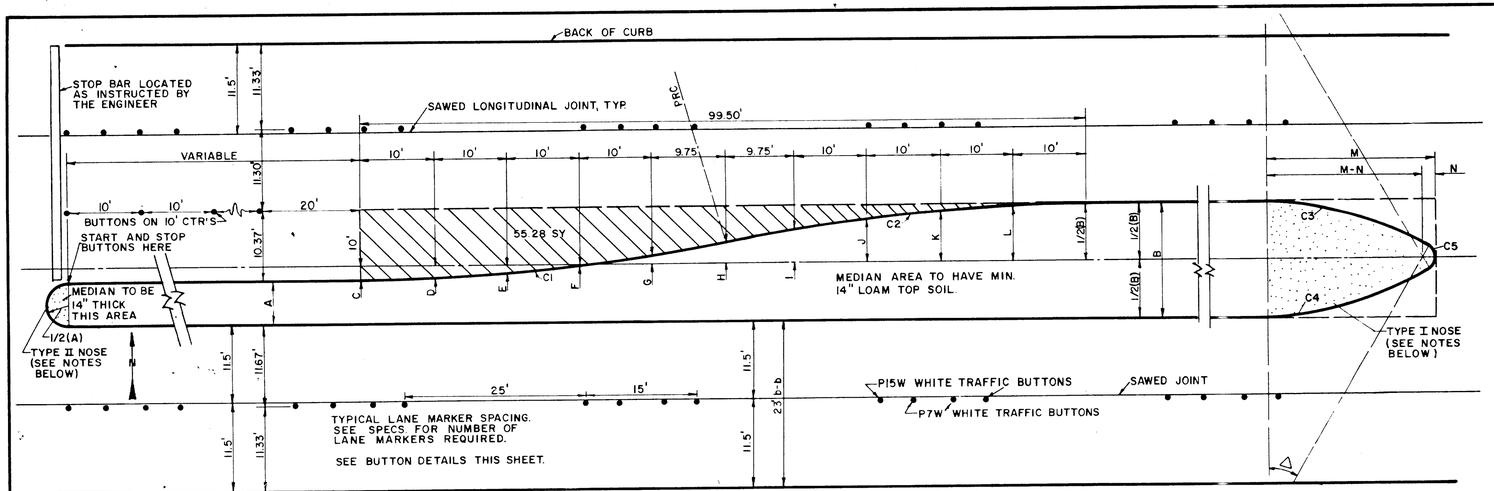
TOWN OF ADDISON, TEXAS
DEPARTMENT OF ENGINEERING

STANDARD CONSTRUCTION DETAILS WATER

THRUST BLOCKS

Designed -	Drawn -	Date - AUGUST, 1991	Job No. - 90625-5
Approved -	Checked -	Scale -	Sheet D-9 Of

SHT. OF



LEFT TURN LANE

(AS APPLICABLE)

NOTES: 1) FOR 2' ≤ A ≤ 7' USE TYPE II NOSE
2) FOR 7' ≤ A ≤ 14' USE TYPE I NOSE
3) FOR 12' ≤ B ≤ 24' USE TYPE I NOSE

MEDIAN DIMENSION CHART

B	C	D	E	F	G	H	I	J	K	L	M	N
12'	4.00'S	3.80'S	3.20'S	2.19'S	0.78'S	1.00'N	2.78'N	4.19'N	5.20'N	5.80'N	22.56'	1.00'
13'	3.50'S	3.30'S	2.70'S	1.69'S	0.28'S	1.50'N	3.28'N	4.69'N	5.70'N	6.30'N	23.56'	1.00'
14'	3.00'S	2.80'S	2.20'S	1.19'S	0.22'N	2.00'N	3.78'N	5.19'N	6.20'N	6.80'N	22.68'	2.50'
15'	2.50'S	2.30'S	1.70'S	0.69'S	0.72'N	2.50'N	4.28'N	5.69'N	6.70'N	7.30'N	23.71'	2.50'
16'	2.00'S	1.80'S	1.20'S	0.19'S	1.22'N	3.00'N	4.78'N	6.19'N	7.20'N	7.80'N	23.46'	3.50'
17'	1.50'S	1.30'S	0.70'S	0.31'N	1.72'N	3.50'N	5.28'N	6.69'N	7.70'N	8.30'N	24.48'	3.50'
18'	1.00'S	0.80'S	0.20'S	0.81'N	2.22'N	4.00'N	5.78'N	7.19'N	8.20'N	8.80'N	25.44'	3.50'
19'	0.50'S	0.30'S	0.30'N	1.31'N	2.72'N	4.50'N	6.28'N	7.69'N	8.70'N	9.30'N	26.34'	3.50'
20'	0.00'	0.20'N	0.80'N	1.81'N	3.22'N	5.00'N	6.78'N	8.19'N	9.20'N	9.80'N	26.72'	4.00'
21'	0.50'N	0.70'N	1.30'N	2.31'N	3.72'N	5.50'N	7.28'N	8.69'N	9.70'N	10.30'N	27.57'	4.00'
22'	1.00'N	1.20'N	1.80'N	2.81'N	4.22'N	6.00'N	7.78'N	9.19'N	10.20'N	10.80'N	28.39'	4.00'
23'	1.50'N	1.70'N	2.30'N	3.31'N	4.72'N	6.50'N	8.28'N	9.69'N	10.70'N	11.30'N	29.17'	4.00'
24'	2.00'N	2.30'N	2.80'N	3.81'N	5.22'N	7.00'N	8.78'N	10.19'N	11.20'N	11.80'N	29.92'	4.00'

N = NORTH OF CENTERLINE
S = SOUTH OF CENTERLINE

CURVE DATA C3 & C4 FOR 7' ≤ A ≤ 14'

A	△	R	T	L	M	N
7'	18°22'52"	50'	8.09'	16.04'	16.45'	1.00'
8'	20°09'11"		8.89'	17.59'	17.88'	1.00'
9'	21°47'12"		9.62'	19.01'	19.19'	1.00'
10'	23°18'41"		10.31'	20.34'	20.39'	1.00'
11'	24°44'50"		10.97'	21.60'	21.51'	1.00'
12'	26°06'32"		11.59'	22.78'	22.56'	1.00'
13'	27°24'27"		12.19'	23.92'	23.56'	1.00'
14'	25°08'28"		11.15'	21.94'	22.68'	2.50'

CURVE DATA
C1 C2
△ = 11°28'40"
R = 250'
T = 25.13'
L = 50.08'

CURVE DATA C3 & C4 FOR 12' ≤ B ≤ 24'

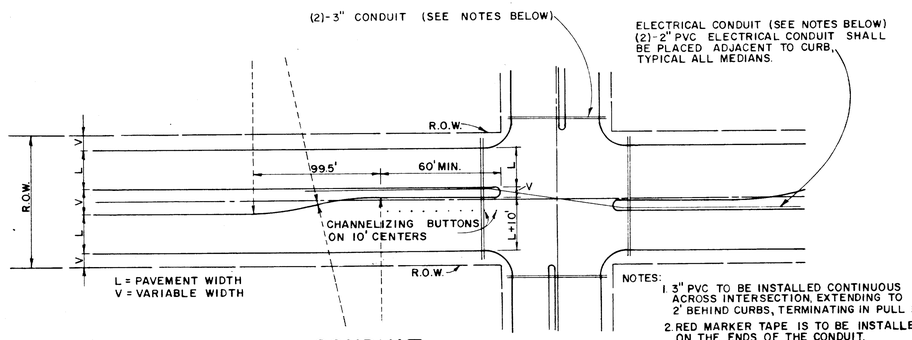
B	△	R	T	L
12'	26°06'32"	50.00'	11.59'	22.78'
13'	27°24'27"		12.19'	23.92'
14'	25°08'28"		11.15'	21.94'
15'	26°31'32"		11.79'	23.15'
16'	25°24'53"		11.27'	22.18'
17'	26°48'51"		11.92'	23.40'
18'	28°08'58"		12.54'	24.57'
19'	29°25'43"		13.13'	25.68'
20'	29°35'30"		13.21'	25.82'
21'	30°49'46"		13.79'	26.90'
22'	32°01'26"		14.35'	27.95'
23'	33°10'48"		14.90'	28.96'
24'	34°18'05"		15.43'	29.93'

CURVE DATA C5 FOR 12' ≤ B ≤ 24'

B	△	R	T	L
12'	127°47'32"	1.00'	2.04'	2.23'
13'	125°12'46"	1.00'	1.93'	2.19'
14'	129°43'08"	2.50'	5.33'	5.66'
15'	126°57'31"	2.50'	5.01'	5.54'
16'	129°09'33"	3.50'	7.36'	7.89'
17'	126°21'44"	3.50'	6.92'	7.72'
18'	123°41'38"	3.50'	6.54'	7.56'
19'	120°52'03"	3.50'	6.17'	7.38'
20'	120°48'56"	4.00'	7.04'	8.43'
21'	118°21'08"	4.00'	6.70'	8.26'
22'	115°57'07"	4.00'	6.40'	8.10'
23'	113°38'22"	4.00'	6.12'	7.93'
24'	111°23'48"	4.00'	5.86'	7.78'

CURVE DATA C5 FOR 7' ≤ A ≤ 14'

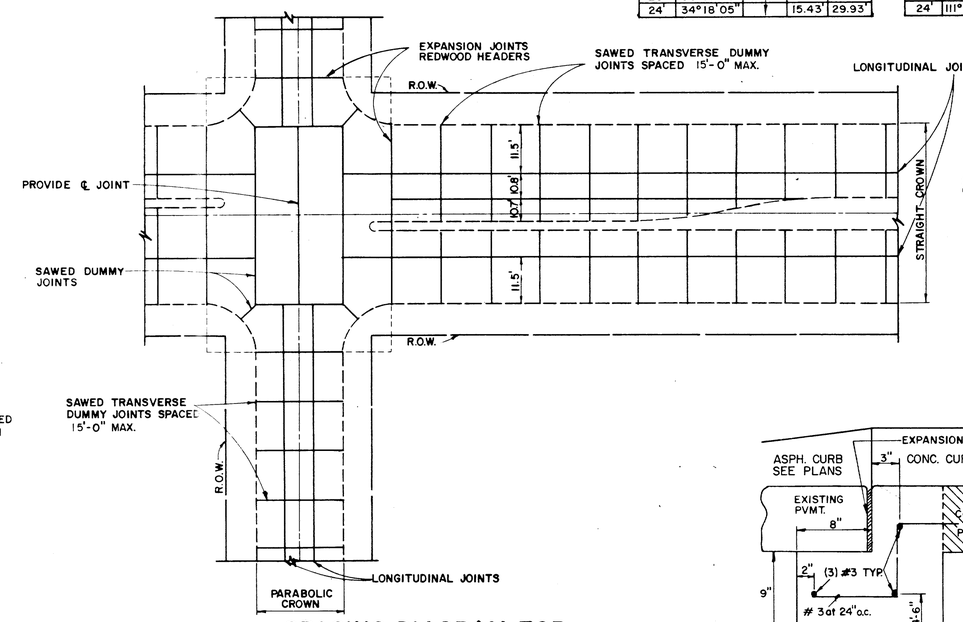
A	△	R	T	L
7'	143°14'15"	1.00'	3.01'	2.50'
8'	139°41'38"	1.00'	2.72'	2.44'
9'	136°25'35"	1.00'	2.50'	2.38'
10'	133°22'38"	1.00'	2.32'	2.33'
11'	130°30'20"	1.00'	2.17'	2.28'
12'	127°47'32"	1.00'	2.04'	2.23'
13'	125°12'46"	1.00'	1.93'	2.19'
14'	129°43'08"	2.50'	5.33'	5.66'



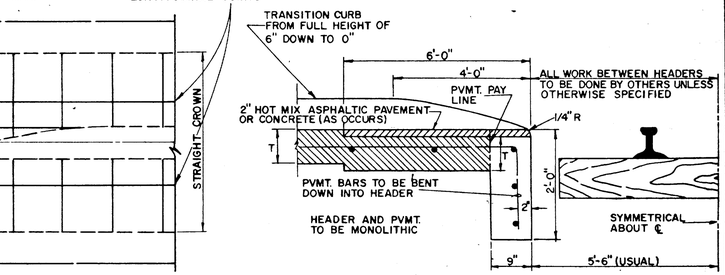
NOTES:
1. 3" PVC TO BE INSTALLED CONTINUOUS ACROSS INTERSECTION, EXTENDING TO 2' BEHIND CURBS, TERMINATING IN PULL BOX.
2. RED MARKER TAPE IS TO BE INSTALLED ON THE ENDS OF THE CONDUIT.
3. THE EXACT LOCATIONS WHERE THE CONDUIT CROSSES UNDER THE PAVING ARE TO BE CHISELED WITH AN "X" AND PAINTED WITH RED PAINT, ON THE CURB OR PAVING.
4. A NYLON CORD SHALL BE PLACED IN ALL CONDUIT UNDER PAVEMENT. THIS CORD SHALL EXTEND A MINIMUM OF 1' FROM THE END OF THE CONDUIT.

CONDUIT

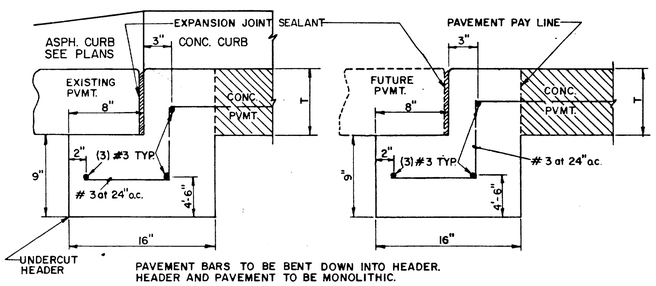
FOR EXACT LOCATIONS, THIS PROJECT-SEE PLANS



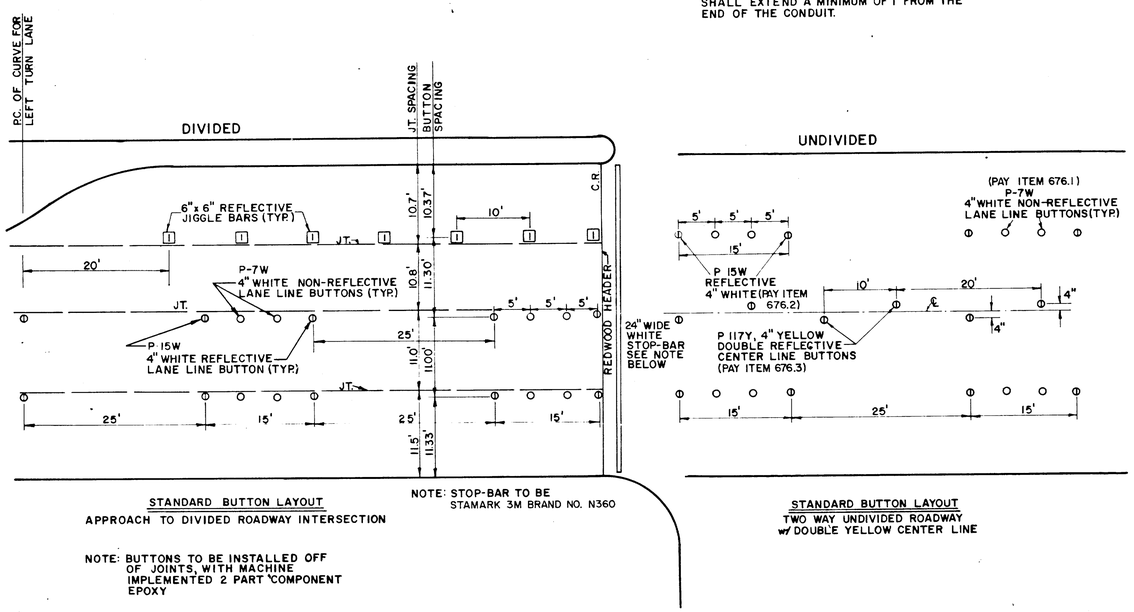
SPACING DIAGRAM FOR TRANSVERSE JOINTS



RAIL HEADER



STREET HEADER



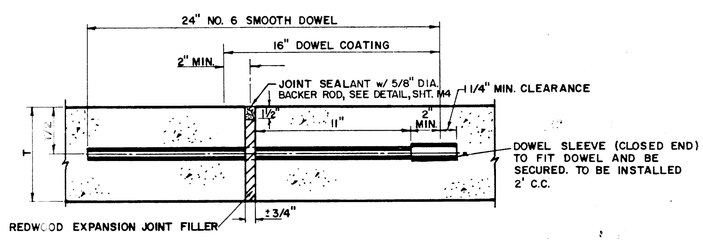
STANDARD BUTTON LAYOUT
APPROACH TO DIVIDED ROADWAY INTERSECTION

NOTE: STOP-BAR TO BE STAMARK 3M BRAND NO. N360

NOTE: BUTTONS TO BE INSTALLED OFF OF JOINTS, WITH MACHINE IMPLEMENTED 2 PART COMPONENT EPOXY

STANDARD BUTTON LAYOUT
TWO WAY UNDIVIDED ROADWAY w/ DOUBLE YELLOW CENTER LINE

BUTTON DETAILS



TRANSVERSE EXPANSION JOINT

(SPACED 600 FT. MAXIMUM; LOCATE AT INTERSECTIONS)

NOTE: DOWELS AND REINFORCING BARS SHALL BE SUPPORTED BY AN APPROVED DEVICE.

TOWN OF ADDISON, TEXAS
DEPARTMENT OF ENGINEERING

STANDARD CONSTRUCTION DETAILS
PAVING

TURN LANES & JOINTS

Designed –	Drawn –	Date – AUGUST, 1991	Job No. – 90025-5
Approved –	Checked –	Scale –	Sheet D-10 Of

SHT. OF

CONSTRUCTION SIGN NOTES

1. ALL SIGNS, SIGN COLOR, SIGN LETTERING AND SIGN REFLECTORIZATION SHALL CONFORM WITH THE TEXAS MANUAL ON TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS. THE CONTRACTOR SHALL MAINTAIN EACH SIGN IN A CLEAN AND GOOD CONDITION.

2. CONSTRUCTION SIGNS SHALL BE MADE FROM WOOD OR METAL. THE DESIGNATION OF METAL AND WOOD AS PRIMARY MATERIALS FOR SIGNS SHALL NOT BE INTERPRETED TO EXCLUDE OTHER SUITABLE RIGID MATERIALS NOW OR HEREAFTER AVAILABLE.

3. SIGNS SHALL BE REMOVED UPON COMPLETION OF THE WORK. INDIVIDUAL WARNING SIGNS SHALL BE REMOVED, TURNED AWAY FROM THE VIEW OF TRAFFIC, OR COVERED WHENEVER THE SPECIFIC DANGER OF WHICH THE PARTICULAR SIGN WARNS HAS CEASED TO EXIST, EITHER PERMANENTLY OR TEMPORARILY. THE SIGN MUST BE PROMPTLY REPLACED, TURNED INTO VIEW, OR UNCOVERED WHEN THE SITUATION AGAIN BECOMES A POTENTIAL DANGER.

4. SIGNS ERECTED ON PORTABLE SUPPORTS FOR USE ON CONSTRUCTION PROJECTS NORMALLY MEAN SIGNS WHICH ARE USED DURING THE DAY TO WARN OR GUIDE TRAFFIC THROUGH AND OR AROUND THE ACTUAL CONSTRUCTION AREA, BUT AT THE END OF THE WORKDAY SUCH SIGNS ARE EITHER REMOVED OR TURNED AWAY FROM THE VIEW OF TRAFFIC. PORTABLE SUPPORTS SHALL BE AS SHOWN OR AS APPROVED BY THE ENGINEER. THE BOTTOM OF THE SIGN SHALL BE A MINIMUM OF ONE (1) FOOT ABOVE THE PAVEMENT EDGE. SIGNS REQUIRED FOR NIGHTTIME USAGE SHOULD NOT NORMALLY BE MOUNTED ON PORTABLE SUPPORTS EXCEPT WHEN APPROVED BY THE ENGINEER.

5. SIGNS ERECTED ON FIXED SUPPORTS FOR USE ON CONSTRUCTION PROJECTS NORMALLY MEAN SIGNS THAT ARE TO REMAIN IN PLACE FOR BOTH DAY AND NIGHT USAGE TO REGULATE, WARN AND GUIDE TRAFFIC IN ADVANCE OF AND WITHIN THE LIMITS OF THE PROJECT INCLUDING THE CROSSROAD APPROACHES. HOWEVER, UNDER CERTAIN CONDITIONS, SUCH AS WHERE A SIGN MAY BE REQUIRED FOR A FEW DAYS DURATION AND THEN IS NO LONGER NEEDED, OR WHERE A SIGN IS MOVED FROM LOCATION TO LOCATION EVERY FEW DAYS OR WHERE IT IS NOT PRACTICAL OR DESIRABLE TO PROVIDE A FIXED MOUNTING, SUCH SIGNS MAY BE ERECTED ON A TEMPORARY TYPE OF SUPPORT. TEMPORARY SUPPORTS SHALL BE AS SHOWN OR AS APPROVED BY THE ENGINEER. SIGNS ERECTED ON TEMPORARY SUPPORTS SHOULD BE AT A MINIMUM HEIGHT OF 3 FEET. SIGNS ERECTED ON FIXED SUPPORTS SHOULD BE AT A MINIMUM OF SEVEN (7) FEET. REGARDLESS OF THE TYPE OF SUPPORT USED, REGULATORY

   SIGNS SHOULD NOT BE ERECTED AT HEIGHT LESS THAN 7-FOOT MINIMUM SPECIFIED ABOVE UNLESS A LOWER HEIGHT IS APPROVED BY THE ENGINEER. POSTS FOR FIXED SUPPORTS SHOULD BE SET IN THE GROUND WITHOUT CONCRETE FOOTINGS.

6. WHERE PORTABLE OR TEMPORARY SUPPORTS REQUIRE THE USE OF WEIGHTS TO KEEP A SIGN OR BARRICADE FROM TURNING OVER, THE USE OF SOME TYPE OF SANDBAG IS RECOMMENDED. THE USE OF PIECES OF CONCRETE, ROCKS, IRON, STEEL OR OTHER SOLID OBJECTS WILL NOT BE PERMITTED.

CONSTRUCTION PAVEMENT MARKINGS

1. WHEN REQUIRED ELSEWHERE IN THE PLANS, THE CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING PAVEMENT MARKINGS ON ALL ROADWAYS THAT ARE OPEN TO TRAFFIC WITHIN THE LIMITS OF THE PROJECT. ON PROJECTS INVOLVING ROADWAY SURFACING WHICH WILL REQUIRE PAVEMENT MARKING FOR CONTROL OF TRAFFIC DURING CONSTRUCTION, THE MARKINGS MAY INCLUDE BOTH STANDARD AND ABBREVIATED MARKINGS AS DEFINED BELOW:

   A. STANDARD PAVEMENT MARKINGS -- STANDARD MARKINGS PLACED IN CONFORMANCE WITH THE REQUIREMENTS OF THE TEXAS MUTCD. SUCH MARKINGS SHOULD BE PLACED ON ALL ROADWAYS OPEN TO TRAFFIC DURING CONSTRUCTION, INCLUDING NEW PAVEMENT, RESURFACING, DETOURS OR OTHER ROADWAYS WHERE CONSTRUCTION ACTIVITIES MAY HAVE COVERED OR OBLITERATED EXISTING MARKINGS. STANDARD MARKINGS SHOULD BE PLACED AS SOON AS POSSIBLE AND PRACTICAL. WHEN IT IS NOT PRACTICAL OR POSSIBLE TO PLACE STANDARD MARKINGS AT THE END OF EACH DAYS WORK, ABBREVIATED MARKINGS MAY BE UTILIZED FOR SHORT PERIODS UNTIL STANDARD MARKINGS CAN BE PLACED.

   B. ABBREVIATED PAVEMENT MARKINGS -- ABBREVIATED PAVEMENT MARKINGS ARE SHORTER IN LENGTH THAN STANDARD MARKINGS. ABBREVIATED PAVEMENT MARKINGS MAY BE USED TO DELINEATE LANE CONTINUITY ONLY UNTIL SUCH TIME AS STANDARD MARKINGS CAN BE PLACED. THEY ARE NOT INTENDED TO SUBSTITUTE FOR STANDARD MARKINGS FOR PERIODS GREATER THAN TWO (2) WEEKS. TO SEPARATE TRAFFIC FLOWS IN OPPOSING DIRECTIONS, THE PAVEMENT MARKINGS SHALL BE YELLOW. WHITE PAVEMENT MARKINGS SHALL BE USED TO DELINEATE THE SEPARATION OF TRAFFIC FLOWS IN THE SAME DIRECTION.

   C. PAVEMENT MARKINGS, MATERIALS -- TEMPORARY PAVEMENT MARKING MAY BE ACCOMPLISHED BY USE OF STANDARD TRAFFIC PAINT, MARKING PAINT OR BY PAVEMENT MARKING TAPE (SCOTCHLANE OR STAMARK BRAND OR AS APPROVED BY THE ENGINEER). TEMPORARY PAVEMENT MARKINGS SHALL BE REMOVED IMMEDIATELY WHEN NO LONGER APPLICABLE.

2. WHEN ABBREVIATED PAVEMENT MARKINGS ARE USED, A DO NOT PASS SIGN SHALL BE USED TO MARK THE BEGINNING OF THE SECTION WHERE PASSING IS TO BE PROHIBITED AND A PASS WITH CARE SIGN SHALL BE USED TO MARK THE BEGINNING OF A SECTION WHERE PASSING IS PERMITTED.

REMOVAL OF PAVEMENT MARKINGS

1. REMOVAL OF PAVEMENT MARKINGS -- INCLUDES CENTERLINE, BARRIER LINES, LANE LINES, EDGE LINES, AND RAISED PAVEMENT MARKINGS.

2. IMMEDIATELY UPON OPENING A DETOUR TO TRAFFIC, ANY PAVEMENT MARKINGS ON THE EXISTING ORIGINAL ROADWAY IN THE DETOUR TRANSITION AREA THAT ARE NO LONGER APPLICABLE AND WHICH MAY CREATE CONFUSION OR DIRECT A MOTORIST TOWARD OR INTO THE CLOSED PORTION OF THE ROADWAY, SHALL BE REMOVED OR OBLITERATED . IN ADDITION, WHEN A DETOUR IS TO BE DISCONTINUED, ANY PAVEMENT MARKINGS USED TO TRANSITION TRAFFIC INTO THE DETOUR WHICH MAY CREATE CONFUSION OR DIRECT A MOTORIST INTO THE DISCONTINUED DETOUR SHALL LIKEWISE BE REMOVED OR OBLITERATED. THE ABOVE SHALL NOT APPLY TO DETOURS OF A SHORT TIME DURATION OF A FEW HOURS WHERE FLAGMEN OR SUFFICIENT CHANNELIZING DEVICES ARE USED TO OUTLINE THE DETOUR ROUTE AND THE DETOUR IS NOT TO BE MAINTAINED OVERNIGHT.

3. THE REMOVAL OF PAVEMENT MARKINGS SHALL BE AN INTEGRAL PART OF ESTABLISHING THE DETOUR. DETOURS SHALL BE PLANNED AND SCHEDULED WELL ENOUGH IN ADVANCE TO ALLOW ADEQUATE TIME TO COMPLETE ALL PHASES OF THE OPERATION PRIOR TO DARKNESS. IF INCLEMENT WEATHER OR DARKNESS BECOMES A FACTOR, IT WILL BE THE CONTRACTORS DECISION TO CONTINUE WITH THE DETOUR OPERATION OR RETAIN THE EXISTING TRAVELWAY OPEN TO TRAFFIC WHEN ANY OR ALL OF THE REQUIREMENTS OF THE DETOUR CANNOT BE ACCOMPLISHED.

4. PAVEMENT MARKINGS SHALL BE REMOVED TO THE FULLEST EXTENT POSSIBLE, SO AS NOT TO LEAVE A DISCERNIBLE MARKING, BY ANY METHOD THAT DOES NOT MATERIALLY DAMAGE THE SURFACE OR TEXTURE OF THE PAVEMENT. SUBJECT TO THE APPROVAL OF THE ENGINEER, ANY METHOD THAT PROVES TO BE SUCCESSFUL ON A PARTICULAR TYPE PAVEMENT MAY BE USED. OVERPAINTING OF THE MARKING WILL NOT BE PERMITTED. REMOVAL OF RAISED PAVEMENT MARKINGS SHALL BE AS DIRECTED BY THE ENGINEER.

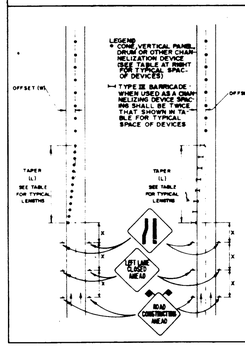
5. WHERE MECHANICAL MEANS OF MARKING REMOVAL HAVE BEEN EMPLOYED TO COMPLETELY REMOVE THE MARKING AND ITS REFLECTIVITY, PAINT OF A COLOR MATCHING THE PAVEMENT SURFACE OR USED CRANKCASE OIL MAY BE EMPLOYED IF NECESSARY AS A MEANS OF COVERING CONTRASTING PAVEMENT TEXTURE. NIGHTTIME INSPECTIONS ARE NEEDED TO VERIFY THE CONTINUED EFFECTIVENESS OF THE CHANGE.

6. PAVEMENT MARKINGS TO BE REMOVED SHALL BE AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER. REMOVAL OF PAVEMENT MARKINGS WILL BE CONSIDERED SUBSIDIARY TO THE ITEM BARRICADES, SIGNS AND TRAFFIC HANDLING.

MINIMUM CONSTRUCTION WARNING SIGN SPACING

POSTED SPEED OR 85% SPEED	30	35	40	45	50	55
X MINIMUM DISTANCE (FT.)	80	120	160	240	320	500

B. FOR ROADS WITH A 55 MPH POSTED SPEED LIMIT, ADVANCE WARNING SIGNS SHOULD BE PLACED APPROXIMATELY 1,500 FEET IN ADVANCE OF THE CONDITION TO WHICH THEY ARE CALLING ATTENTION. WHERE A SERIES OF ADVANCE WARNING SIGNS ARE USED, THE WARNING SIGN NEAREST THE WORK SITE SHOULD BE PLACED APPROXIMATELY 500 FEET FROM THE POINT OF RESTRICTION WITH THE ADDITIONAL SIGN AT APPROXIMATELY 500-1000 FOOT INTERVALS.

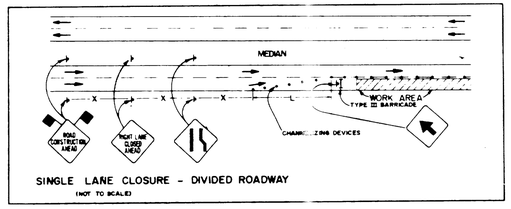


TYPICAL TRANSITION LENGTHS AND SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES

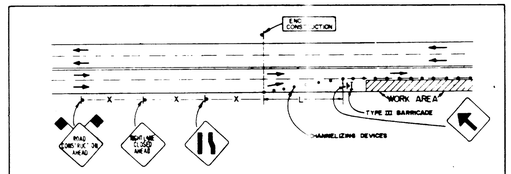
POSTED SPEED	FORMULA	MINIMUM TAPER	MINIMUM OFFSET	MINIMUM OFFSET	SUGGESTED MAXIMUM SPACING OF DEVICE	SUGGESTED MAXIMUM SPACING OF DEVICE
			(W)	(W)	ON A TAPER	ON A TANGENT
30	$L=\frac{WS^2}{60}$	150'	15'	180'	30'	60'-75'
35		205'	15'	245'	35'	70'-90'
40		268'	15'	320'	40'	80'-100'
45	L=WS	450'	15'	540'	45'	90'-110'
50		500'	15'	600'	50'	100'-125'
55		550'	15'	660'	55'	110'-140'
60		600'	15'	720'	60'	120'-150'

*85TH PERCENTILE SPEED MAY EXCEED THE POSTED SPEED LIMIT BY 5 MPH ON ROADS WHERE TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT.
**TAPER LENGTHS HAVE BEEN ROUNDED OFF.
L = LENGTH OF TAPER (FT.) W = WIDTH OF OFFSET (FT.) S = POSTED SPEED (MPH)

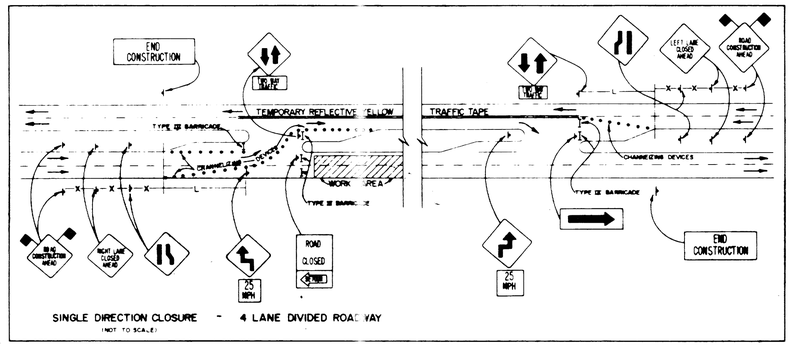
TYPICAL TRANSITION & SIGNING FOR DIVIDED ROADWAYS
(NOT TO SCALE)



SINGLE LANE CLOSURE - DIVIDED ROADWAY
(NOT TO SCALE)



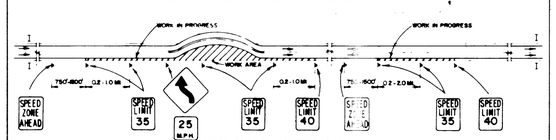
SINGLE LANE CLOSURE - UNDIVIDED ROADWAY
(NOT TO SCALE)



SINGLE DIRECTION CLOSURE - 4 LANE DIVIDED ROADWAY
(NOT TO SCALE)

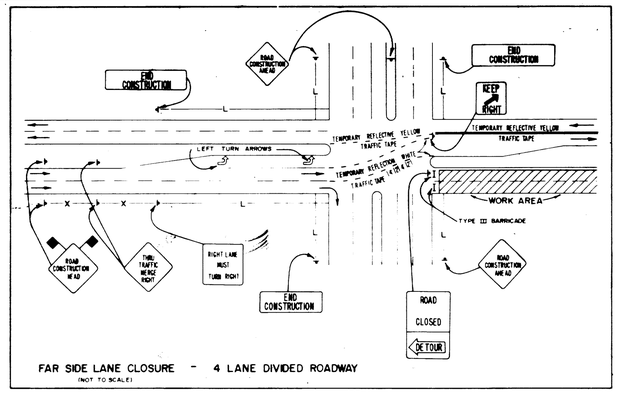
LENGTH OF ROADWAY SPEED ZONE

SPEED LIMITS SHOWN ARE FOR ILLUSTRATIVE PURPOSE ONL

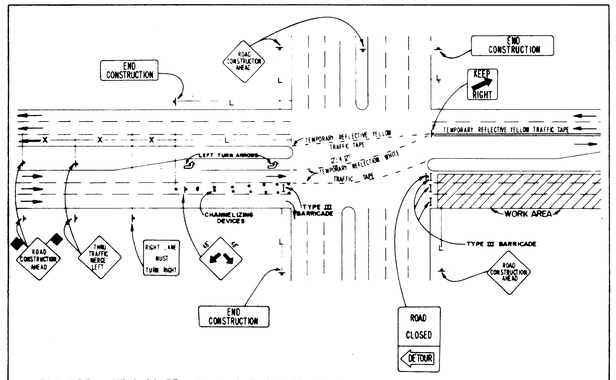


TYPICAL APPLICATION OF SPEED ZONE SIGNS

NOTES
1. FREQUENCY OF SPEED SIGNS SHOULD BE EVERY 0.2 TO 2.0 MILES FOR SPEEDS 40MPH AND ABOVE AND 0.2 TO 1.0 MILES FOR SPEEDS 35 MPH AND BELOW
2. REDUCE SPEEDS WHEN REQUIRED (SHOULD ONLY BE POSTED IN THE VICINITY OF WORK BEING PERFORMED OR OTHER AREAS WHEN NEEDED RATHER THAN THROUGHOUT THE ENTIRE PROJECT
3. SPEED ZONE SIGNS ARE ILLUSTRATED FOR ONE DIRECTION OF TRAVEL ONLY AND ARE ORIGINALLY POSTED FOR EACH DIRECTION OF TRAVEL.
4. REGULATORY SIGNS SPEED ZONE SIGNS SHALL HAVE BLACK LEGEND ON A WHITE REFLECTIVE BACKGROUND.



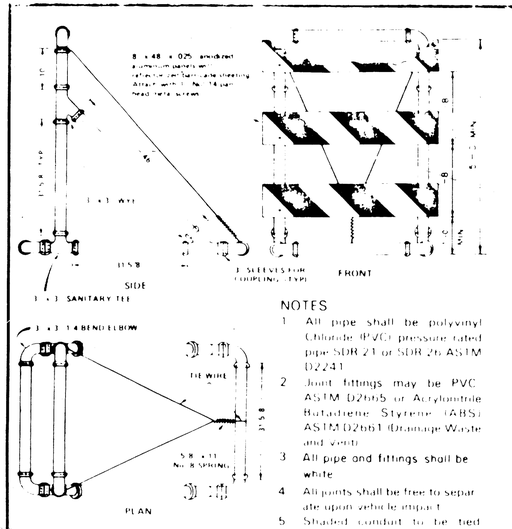
FAR SIDE LANE CLOSURE - 4 LANE DIVIDED ROADWAY
(NOT TO SCALE)



FAR SIDE LANE CLOSURE - 6 LANE DIVIDED ROADWAY
(NOT TO SCALE)

THE TOWN OF ADDISON						
CONSTRUCTION SIGNING AND BARRICADING DETAILS						
DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
D.R.D.	A.R.M.	8/00	NONE			

SHT. 05

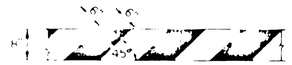


NOTES

1. All pipe shall be polyvinyl Chloride (PVC) pressure rated pipe SDR 21 or SDR 26 ASTM D2241
2. Joint fittings may be PVC ASTM D2665 or Acrylonitrile Butadiene Styrene (ABS) ASTM D2661 (Drainage Waste and Vent)
3. All pipe and fittings shall be white
4. All joints shall be free to separate upon vehicle impact
5. Shaded conduit to be tied together with rope threaded into pipe interior. Use 3 lb. No. 6 solid braided nylon or equivalent
6. A fixed frangible pavement connection is preferred. Sand Bags may be substituted

OPTIONAL
TYPE III PVC BARRICADES
TYPICAL DESIGN DETAILS

May be used at the option of the Contractor



STRIPING FOR BARRICADE

Where a barricade extends entirely across a roadway, it is desirable that the stripes slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided for, the chevron striping may slope downward in both directions from the center of the barricade.

Striping should cover the full width of the rail. Striping of rails, panels and gates for the right side of the roadway is shown above. For the left side of the roadway, striping should slope downward to the right.

For all types of barricades with rails less than 3' 0" long, stripes 4" wide shall be used.

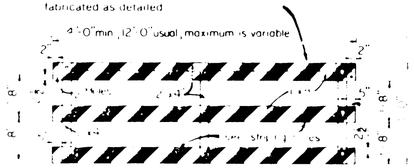
The 8" rail width is a nominal dimension for rails made of lumber.

Identification markings may be shown only on back side of barricade rails.

BARRICADE DETAILS

All dimensions are nominal dimensions. Fabrication details ± 1/2"

When Wood Barricades are used and when orange and white stripes are required on the backside a 2" x 8" rail may be used in lieu of a 1" x 8" rail and 2" x 4" stiffener. Otherwise the rail should be fabricated as detailed.



PANEL FOR
TYPE III BARRICADE

BARRICADE NOTES

Channelizing devices other than barricades should normally be used for channelization purposes.

Barricades should normally be placed perpendicular to the traffic flow. Other channelizing devices, such as drums, vertical panels or portable barriers, should be used where needed to separate traffic from the work area. In all cases, the barricades should be so located as to most advantageously warn and direct traffic.

Barricades may be designed and constructed from wood, PVC pipe or any other suitable material in a manner approved by the Engineer. The construction details shown hereon are typical and are suggested details for wood and PVC pipe support systems for barricades. The details of rail width and striping, number and spacing of rails, minimum length and height (above pavement) of rails must be adhered to when alternate designs are used.

When signs are placed on barricades, a maximum number of 2 signs should be visable to the motorist.

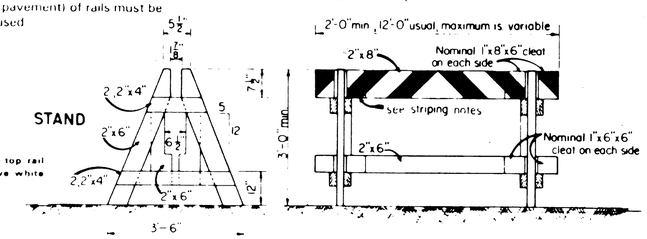
Barricades are to be constructed in a first class workmanship manner of clean sound material. All surfaces above ground, which are not striped, shall be white except the unpainted galvanized metal or aluminum components may be used. Components made of lumber shall be painted with a minimum of two coats of an approved brand of white paint to secure thorough coverage and a uniform white color.

The Contractor shall maintain each barricade in a clean and good condition.

Barricades shall be removed upon completion of the work and/or the elimination of the hazard on any section.

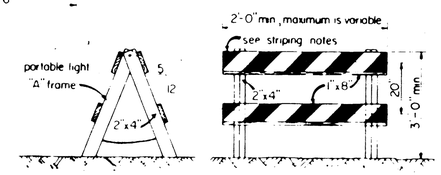
TYPE I BARRICADE

For Type I barricades, both sides of the top rail shall have reflective orange and reflective white striping.



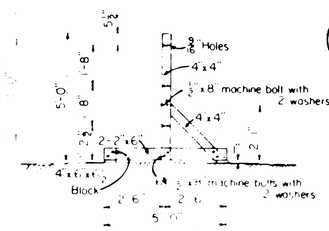
TYPE II BARRICADE

For Type II Barricades, all four (4) rail faces shall have reflective orange and reflective white striping.

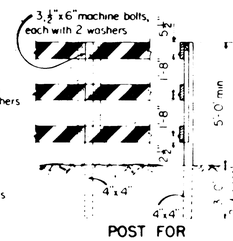


TYPE III BARRICADE

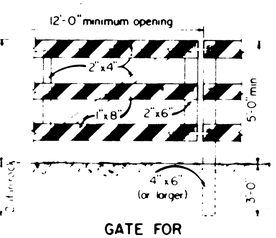
For Type III Barricades, the three (3) rails shall be reflective orange. Use [illegible] and reflective white stripes on one side [illegible] direction only and on both sides [illegible] traffic in two directions. See Barricade Layouts on Sheet BC-2.



STAND FOR TYPE III BARRICADE



POST FOR
TYPE III BARRICADE



GATE FOR
TYPE III BARRICADE

GENERAL NOTES

REFLECTORIZATION

The reflectorized white and reflectorized orange stripes for barricades, drums and vertical panels shall be constructed of retroreflective sheeting in conformance with project specifications and shall be maintained to meet the appearance, color, and reflectivity requirements of those specifications.

WARNING LIGHTS

Warning lights are portable lens directed, enclosed lights. The color of the light emitted shall be yellow. The lights should be mounted at a minimum height of 36 inches to the bottom of the lens.

Type A-Low Intensity Flashing Warning Lights are commonly mounted on barricades, other channelization devices or advance warning signs and are intended to warn the driver that he is approaching a hazardous area. Their use shall be as specified elsewhere in the plans, on Sheets BC(1) and BC(2), or as directed by the Engineer.

Type B High Intensity Flashing Warning Lights are normally used at/or approaching extremely hazardous site conditions within the construction area. They may be mounted on barricades, signs or other supports. As these lights are effective in daylight as well as dark, they are designed to operate 24 hours per day. Their use should be specified elsewhere in the plans or as directed by the Engineer. Flashing warning lights shall not be used in a series.

Type C Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices used to delineate the edge of the traveled way on detour curves, lane changes, lane closures, shoulder drop-offs and other similar conditions or hazards. The series of Steady Burn Lights should have a Type B High Intensity Flashing Warning Light at the beginning and end of the series to mark the hazard. Where Steady Burn Lights are to be used for delineation, the contractor may at his option, utilize delineators.

Contractors shall furnish a copy of a certification from the manufacturer of the lights that the warning lights meet the requirements of the ITE Standard For Flashing and Steady Burn Warning Lights as contained in the latest edition of the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways".

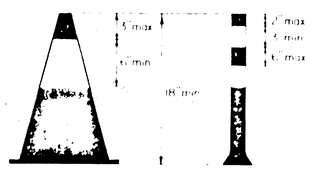
DELINEATORS

Delineators are normally used to indicate roadway alignment where improved nighttime visibility is needed but other roadway features are sufficient for daytime alignment. They should generally be used on high fills and horizontal and vertical curves where only nighttime delineation is needed. Delineators, when required for temporary use to control traffic through construction areas, will be considered subsidiary to the item BARRICADES, SIGNS AND TRAFFIC HANDLING. Delineators shall meet the material requirements of the project specifications. When used, delineators on the right side of the roadway facing traffic shall be white. The color of delineators used along the left edge of divided streets and highways and one-way roadways shall be yellow.

SPACING OF DELINEATORS

Spacing of Delineators on curves should be according to the Table below. Spacing of delineators on tangent sections should normally be between 100 and 200 feet with the closer spacing for lower speeds and greater spacing for higher speeds.

RADIUS OF CURVE (FEET)	50	150	200	250	300	400	500	600	700	800	900	1000
APPROX. SPACING ON CURVE (FEET)	20	30	35	40	50	55	65	70	75	80	85	90



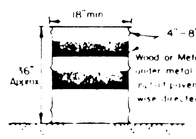
CONES

Traffic cones and tubular markers shall be a minimum of 18 inches in height with a broadened base and may be made of various materials to withstand impact without damage to themselves or to vehicles. Larger sizes should be used on freeways and other roadways where speeds are relatively high or wherever more conspicuous appearance is needed. Orange shall be the predominant color on cones and tubular markers. They should be kept clean and bright for maximum target value. For nighttime use they shall be reflectorized or equipped with lighting devices for maximum visibility. Reflectorized material shall have a smooth, sealed outer surface which will display the same approximate color day and night.

Reflectorization of tubular markers shall be a minimum of two three inch bands, placed a maximum of 2" from the top with a maximum of 6" between the bands. Reflectorization of cones shall be provided by a minimum 6" band placed a maximum of 4" from the top.

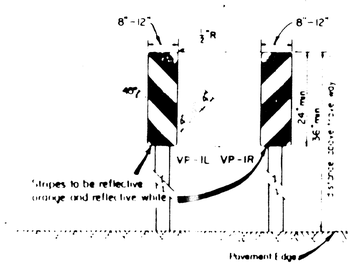
Cones or tubular markers are generally only suitable for temporary usage (up to 8 hours) with other channelization devices such as vertical panels or barricades, preferred for longer term usage. Care should be taken to insure that they remain in their proper location and in an upright position.

DRUMS



Drums, set on end, and used for traffic warning or channelization shall be approximately 36" in height and minimum of 18" in diameter. The contractor, at his option, may use drums made from steel barrels, or black polyethylene plastic drum liners, weighing approximately eight pounds each. The markings on drums shall be horizontal, circumferential reflectorized orange and reflectorized white stripes, 4 to 8 inches wide. The first reflectorized stripe should start within two (2) inches of the top of the drum. There shall be at least two orange and two white stripes on each drum. If there are non-reflectorized spaces between the horizontal orange and white stripes, they shall be no more than 2 inches wide. Metal drums shall be painted black or orange before reflectorized stripes are added. All drums on a project will be the same color. When drums are placed in the roadway, appropriate warning signs should be used. During hours of darkness, a flashing warning light should be placed on drums used singly as a warning device. Steady burn/reflectorized lights or delineators should be placed on drums used in series for traffic channelization. Drums should not be weighted with sand, water or other material to the extent that it would make the drum dangerous to motorists.

CW1-8 CHEVRON signs, CW1-6A ARROW signs or VP-1 Vertical Panels mounted above drums may be used as supplements to drum delineation.

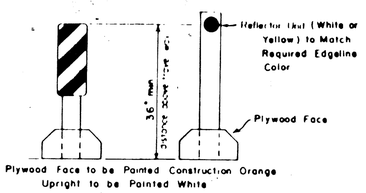


VERTICAL PANELS (VP)

Vertical Panels are normally used [illegible] channelizing devices to indicate tangent or nearly tangent roadway alignment where good target value of a device is needed in daylight as well as the nighttime. In addition, vertical panels should be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive day and night delineation may be required. Vertical panels should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes should always slope downward toward the traveled way.

CHANNELIZING DEVICES

The Type or Types of Channelizing Devices used are to be as specified by the Engineer.



TYPICAL PORTABLE VERTICAL PANEL OR DELINEATOR

Other similar supports may be used when approved or directed by the Engineer

STATE OF TEXAS

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

BARRICADE AND CONSTRUCTION STANDARDS

BARRICADE DETAILS
DELINEATORS & VERTICAL PANELS
DRUMS & CONES
REFLECTORIZATION
WARNING LIGHTS

BC(3)-82

ORIGINAL DRAWING DATE 5-[illegible]	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT				SHEET
DN: REVISIONS		6					
CK: 2-82	COUNTY			CONTROL	SECTION	JOB	HIGHWAY
DN:							
CK:							

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SHT. OF

SPECIAL PROVISIONS FOR INSTALLATION OF TRAFFIC SIGNALS

INDEX OF SPECIAL PROVISIONS FOR INSTALLATION OF TRAFFIC SIGNALS

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1.0 GENERAL NOTES FOR INSTALLING TRAFFIC SIGNALS

1.1 These Special Provisions and the 1983 North Central Texas Standard Specifications for Public Works Construction with Amendments where applicable, shall govern the materials and installation of traffic control signals, including illumination, at the intersections and, when required, interconnection conduit between signalized intersections. In the event of a conflict, the Special Provisions shall control.

1.2 This project shall consist of installing materials and equipment necessary for the complete signal system at the proposed location.
The Contractor shall install and shall activate completed signals and signal systems in the sequence specified by the Engineer. The Engineer will issue the anticipated sequence of intersection work at the time the work order is issued.

1.3 The total installation shall be in accordance with the applicable sections of the National Electrical Code, all governing local ordinance and regulations, the plans, these special provisions and those sections of the Standard Specifications which apply. All workmanship shall be first class and finished work shall present a neat, uncluttered appearance. The Contractor shall schedule his work so as to cause the minimum interference to moving traffic and the operation of the existing signal system. Existing signals may be shut down for modification and/or equipment installation only with 72 hour advanced the approval of the Director of Streets. These traffic signal installations consist of the following items:

1. Furnishing and placing all concrete and steel for signal pole foundations.
2. Installation of steel traffic signal poles.
3. Installing necessary conduit and pullboxes.
4. Installing all signal control equipment including controller assemblies signal head assemblies, detector units, AC service, conductors, and all other miscellaneous equipment that is required. The Contractor shall furnish concrete, reinforcing steel, and forms for structure foundations, grouting materials, painting materials, detector loop sawcut and sealing materials, No. 12 T.W. stranded wire for connecting the signal heads to the signal cable system, and miscellaneous nuts, bolts, and washers under three-quarters inch (3/4") in diameter. The Contractor shall be required to assemble all signal head units.
5. The Contractor shall connect existing and proposed communication cable for interconnect as required by any system where applicalbe. Communication cable runs shall be continuous from controller to controller. Splicing may be permitted in pullboxes, subject to approval by the Traffic Engineer.
6. The Contractor will be responsible to maintain existing traffic signal operation at all intersections during the installation of new signals.
7. The Contractor will be responsible for removing the existing traffic signal equipment and hardware (controllers, poles, heads, cable, signs, etc.) at a specified location.
8. Project acceptance will be by individual intersection. The Contractor shall guarantee all work performed and materials he has furnished under this project for a period of twelve (12) months following the date of project acceptance.
9. The contractor shall provide a portable upload-download unit as per TEXAS D.O.T. requirements.

NO EXTRA COMPENSATION WILL BE ALLOWED FOR FULFILLING THE REQUIREMENTS STATED ABOVE.

1.4 All materials furnished by the Contractor shall be new undepreciated stock.

1.5 If the Contractor desires to deviate from any of the following procedures or to make substitutions for any materials or equipment, a written approval must be obtained from the Traffic Engineer after a request from the Contractor is made and sample(s) of the substitute materials or equipment is/are furnished to the Traffic Engineer.

2.0 MATERIALS TO BE FURNISHED BY THE CONTRACTOR

2.1 The Contractor shall furnish all materials necessary to complete the project, including materials for the power connection that are not furnished by the Power Company, and shall install the materials in accordance with the plans and specifications.

2.2 The Contractor shall also furnish all labor, tools, equipment, and incidentals necessary to complete the project in an efficient and workmanlike manner.

2.3 Electrical materials and fittings shall conform to the requirements of the National Electrical Code. Electrical fittings shall be approved by the National Electrical Association.

2.4 The Contractor shall furnish painting materials and labor as well as "touch-up" all painted items that are damaged during the installation process (whether previously painted by the contractor or by others). See Section 9.9 Field Painting. The finishing paint appearance will meet the Traffic Engineer's approval before acceptance of the signal installation is made.

3.0 INSTALLATION OF ELECTRICAL SERVICE

3.1 The Contractor shall furnish and install conduit and wire from pullboxes or signal foundations for AC Service as shown on plans and as required by the Power Company for traffic signal controllers and street lighting. The Contractor shall coordinate and verify exact requirements for conduit and wire with the Power Company before any work is started. Installation of conduit and wire to the Power Company vaults shall be per the Power Company specifications.

3.2 Unless otherwise called for in the plans, the power connection shall be made to a 115-125 volt, single phase, 60 cycle A.C. supply. The wire used for the power connection shall be a minimum size as indicated on plans and shall be insulated for six hundred (600) volts.
The common wire shall be white-coded and the power positive shall be black-coded. The Contractor shall also provide an electrical meter for the signal installation.

4.0 INSTALLATION OF CONDUIT

4.1 (DELETED)

4.2 The Contractor shall provide and install underground cable facilities required to satisfy the requirements of the signal system proposed. Cable routing can be accomplished through existing conduits and conduits to be installed by the Contractor as shown in the plans.
The Contractor shall be responsible for detailed coordination of proposed cable routing and actual installation, with utility company before any work is started. Installation of conduit and cable to other utility manholes shall be per utility company Specifications, which includes adequate ventilation to prevent injury to personnel caused by toxic or harmful gases.

4.3 New Conduit

4.3.1 Unless otherwise shown on plans, all conductors shall be in conduit except when in metal poles. All conduit and fittings shall be of the sizes and types shown on the plans. Each section of conduit shall bear evidence of approval by Underwriter's Laboratories.

4.3.2 Conduit terminating in posts or pedestal bases shall not extend vertically more than 3 inches above the concrete foundation. Field bends in rigid metal conduit shall have a minimum radius of 12 diameters of the nominal size of the conduit. Copperclad ground rods in signal bases shall not extend vertically more than 3 inches above the concrete foundation.

4.3.3 Each length of galvanized rigid metal conduit, where used, shall be reamed and threaded on each end and couplings shall be made up tight. White-lead paint or equal shall be used on threads of all joints. PVC conduit shall be joined by solvent-weld method in accordance with the conduit manufacturer's recommendations. No reducer couplings shall be used unless specifically indicated on the plans.

4.3.4 All conduit and fittings shall have the burrs and rough places smoothed and shall be clean and free of obstructions before the cable is installed. Field cuts shall be made with a hacksaw only, and shall be square and true so that the ends will butt or come together for the full diameter thereof. In no case shall a cutting torch be used to cut or join conduit. Slip joints or running threads will not be permitted for coupling conduit unless approved by the Traffic Engineer. When a standard coupling cannot be used, an approved union coupling shall be used and shall provide a water-tight coupling between the conduit. All couplings shall be properly installed to bring the ends of connected conduit together to produce a good rigid connection throughout the entire length of the conduit run. Where the coating on a conduit run has been damaged in handling or installation, such damaged parts shall be thoroughly painted with rust preventive paint. Ends of conduits shall be capped or plugged until installation of wire. Upon request by the Traffic Engineer, the Contracator shall draw a full-size metal wirebrush, attached by swivel joint to a pull tape, through the metal conduit to insure that the conduit is clean and free from obstructions. The conduits shall be placed in an open trench at a minimum 24 inches depth below the curb grade in the sidewalk areas, or 24 inches below the finished street grade in the street areas.

4.3.5 Conduit placed for concrete encasement shall be secured and supported in such manner that the alignment will not be disturbed during placement of the concrete. No concrete shall be placed until all of the conduit ends have been capped and all box openings closed.

4.3.6 PVC conduit, which is to be placed under existing pavement, sidewalks, and driveways, shall be placed by first providing a void through which the PVC conduit shall be inserted. The void may be made by either boring or jacking a mandrel. Metal conduit, which is to be placed under existing pavement, sidewalks, and driveways, shall be placed by jacking or boring.

43.7 Pits for jacking or boring shall not be closer than 2 feet to the back of the curb or the outside edge of the shoulder unless otherwise directed by the Traffic Engineer. The jacking and boring method used shall not interfere with the operation of street, highway, or other facility, and shall not weaken or damage any embankment structure, or pavement. Heavy jacks are to be used for jacking. Boring is to be done by mechanical means providing a maximum one inch overcut for the conduit to be placed, and use of water or other fluids in connection with the boring operating will be permitted only to the extent to lubricate cuttings. Water jetting will not be permitted.

4.3.8 Where conduit is to be placed under existing asphaltic pavement, the jacking method is to be used unless written approval is given by the Traffic Engineer for placement of conduit by boring.

4.3.9 Backfill for all excavations shall be tamped with mechanical tamps in six inch (6") layers to the density of the surrounding ground.

4.4 Existing Conduit

4.4.1 Prior to pulling cable in existing underground conduit to be reused in the system, the conduit shall be cleaned with a mandrel or cylindrical wire brush and blown out with compressed air. The Traffic Engineer shall be notified prior to disconnection or removal of the existing interconnect cable.

4.4.2 Where existing conduit is found to be unuseable (conduit has collapsed or the cable is unable to be pulled from the existing conduit), the Contractor shall, upon approval by the Traffic Engineer, install new rigid metal P.V.C. or conduit.

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE:

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

GENERAL NOTES

Scale : NONE

SHEET NO.
OF SHEETS
JOB NO.

5.0 INSTALLATION OF CABLE

5.1 General

5.1.1 The cables shall be installed in the conduit. The conduit must be continuous, reasonably dry, completely free of debris, and without sharp projections, edges or short bends. If so required by the Traffic Engineer, the Contractor shall demonstrate that the conduit is dry and free of debris by pulling a swab and/or mandrel through the conduit. The conductors shall be installed in such a manner and by such methods so as to insure against harmful stretching of the conductor or damage to the insulation and shall conform to the recommendations of the cable manufacturer. The Contractor shall furnish, at the request of the Traffic Engineer, at least two copies of the manufacturer's recommendations, which includes: methods of attaching pull cable, pulling tension per conductor size and per radius of conduit bend, and the type of lubricant to be used.

5.1.2 All cables in a given conduit run shall be pulled at the same time and the conductors shall be assembled to form one loop in such a manner that the pulling tension is distributed to all the cables. Long, hard pulls will necessitate the use of pulling eyes. For short runs, the cables may be gripped directly by the conductors by forming them into a loop to which the pull wire or rope can be attached. The insulation on each conductor shall be removed before the loop is formed. The method used will depend on the anticipated maximum pulling tension in each case.

5.1.3 In many instances, existing conduits which contain signal cable are to be used for the installation of new cables. In such locations, where new cables are to replace all existing cables, the existing cables may be used to pull in the new cables. At locations where new cables are to be added to existing cable runs, the existing cables shall first be pulled out, then replaced, adding the new cables to the existing cables to form one cable pull. Installation shall be done in such a way as to prevent damage to the existing and/or new cables. In the event of damage, the Contractor shall bear the responsibility of material and labor for replacement of defective cables.

5.1.4 All conduit runs shall be measured accurately and precisely for determining cable lengths to be installed. A measuring device shall be inserted into the conduit, and the length shall be measured (to the nearest foot) from entry point to exit point. All conduit run measurements shall take place in the presence of the Engineer or the Inspector. The Contractor shall record all cable measurements and include the distances in the as-built drawings. In locations where new cables are to replace existing cables, the Contractor may use the removed cables as a measuring device to determine the lengths of the removed cables to be installed, however, this does not relieve the Contractor of his responsibility to record accurate measurements of all cable lengths.

5.1.5 The manufacturer's recommended maximum pulling tensions shall not be exceeded under any circumstances. If so required by the Traffic Engineer, the Contractor shall insert a dynamometer in the pull wire as the cables are being pulled into the conduit to demonstrate that the maximum tensions are not being exceeded. The cable shall be fed freely off the reel into the conduit without making a reverse curve. At the pulling end, the pull wire and cables shall be drawn from the conduit in direct line with the conduit. Sheaves or other suitable devices shall be used as required to reduce any hazards to the cable during installation. The cables shall be adequately lubricated to reduce friction and further minimize possible damage. Such lubricants shall not be the grease or oil type used on lead sheathed cables, but shall be one of several commercially available wire pulling compounds that are suitable for P.V.C. sheathed cables. They shall consist of soap, talc, mica, or similar materials and shall be designed to have no deleterious effect on the cables being used.

5.1.6 The cables shall be neatly trained to their destinations in manholes, cabinets, pole bases, pullboxes, and all other terminations. The cable manufacturer's recommended values for the minimum bending radii to which cables may be bent for permanent training during installation shall be adhered to. These limits do not apply to conduit bends, sheaves or other curved surfaces around which these cables may be pulled under tension while being installed. Larger radius bends are required for such conditions.

5.2 Wire and Cable

5.2.1 All wire and cable shall conform to the requirements shown on the plans, except wire and cable specifically covered by other items of this contract. The minimum size of conductors shall be as indicated on the plans.

5.3 Controller Cabinet Wiring

5.3.1 Wiring for the controller shall consist of connecting to its terminals; (1) wires to signals, (2) wires to detectors, (3) the power wires, (4) the ground wires, (5) the pedestrian push-button wires, and (6) the interconnect wires. At the controller, the signal conductors from the field shall be stripped back and insulated solderless lugs crimped to wire. These "lugs" shall be inserted under the binder head screw and tightened securely. Other wiring for the controller shall be as required by the wiring diagrams and instructions furnished with the controller by the manufacturer.

5.3.2 All field wiring in cabinets shall be neately done. Incoming cables shall be trained to their destination and neatly laced together. All spare wires shall be trimmed, and neatly coiled with the ends taped. Detector lead-in cables shall have their insulation jackets removed from the terminal strip connection unsheathed to the bottom of the cabinet, and have the ground wires tied together in the bottom of the cabinet. Communication and detector lead-in cables shall be clearly identified by use of metal or plastic tags. For example: System Detector Eastbound Right Lane.

5.3.3 Pedestrian pushbuttons shall have a common ground wire that is completely isolated and independent from all other ground wires. This wire shall be connected to the designated terminal in the controller cabinet.

5.4 Signal Head Wiring

5.4.1 Wiring for the signal head shall consist of connecting the terminal block in each signal section to the common terminal block in each signal face to the terminal block in the signal-head terminal compartment. All such connecting wires shall be number twelve (12 ga.) stranded American Wire Guage. All conductors running from any terminal points located in the pole or transformer base to the signal-head terminal shall likewise be number twelve (12 ga.) stranded A.W.G. wire. The Contractor shall furnish the No. 12 ga. stranded A.W.G. wire for this task.

5.5 Terminals

5.5.1 Except for controllers, the ends of all stranded wires which are to be attached to terminal posts shall be provided with solderless terminal lugs that meet the requirements of the National Electrical Code. Terminal lugs on solid wires are prohibited.

5.6 Splices

5.6.1 Splices inside conduit runs and in loop detector T.H.W. wire are absolutely prohibited. Except for detector lead-in cables, all splices shall be made above ground. Splices in pullboxes are prohibited unless specific written permission has been issued by the Traffic Engineer.

5.6.2 Splicing methods shall be in accordance with good electrical practice and the cable manufacturer's recommendations. All materials used shall be high quality and specifically intended for these purposes. The cables shall be trained to their final position and cut to proper lengths. The jacket and insulation shall be removed as required. In doing this, use proper care to insure against nicking the conductors. The connector shall be installed tightly and all burrs, rough edges, etc. shall be removed. If required in the plans or by the Traffic Engineer, the connection also shall be soldered. Heat shall be applied by use of hot solder. Heating the connection with a direct flame will not be permitted. Care shall be used to protect the insulation when soldering. The entire surface shall be cleaned taking special care in cleaning the outside jacket in order to remove the wax finish. Before the first layer of tape is wrapped, the entire area shall be coated with an electric grade rubber cement. After this solvent has dried, the connection shall be insulated with electrical grade rubber splicing compound tape to proper thickness. This tape requires a pressure and temperature in service to complete its vulcanizing process and thus be stretched to 2/3 width when applied. The completed splice shall be covered with a half-lap layer of vinyl plastic electrical tape. This wrapping shall be smooth but the tape shall not be stretched more than necessary.

5.6.3 Splices in communications cables shall include the shield. Splices between cable pairs shall be made with scotchlock solderless connectors designed for this specific application. The completed splice shall be insulated with a re-enterable plastic splice case. Splices at points other than those shown on the plans may be made only with the written permission of the Traffic Engineer.

5.6.4 The Traffic Engineer shall select at random at least 5 splices to be thoroughly inspected. The Contractor shall, in the presence of the Traffic Engineer sectionalize the splice to expose the various layers of materials and the connector. The splice shall be thoroughly checked for compliance to these special provisions. The splice shall then be remade by the Contractor. This work shall not require extra payment, but is considered subsidiary to other items in the Contract. All of the splices selected for this inspection shall conform to the requirements of these special provisions. If any splices fail to meet these requirements, ten (10) more splices shall be selected at random by the Traffic Engineer for inspection.

5.7 Enclosed Wiring

5.7.1 All cables and signal conductor wire above the ground surface shall be enclosed in approved metal conduit up to but no closer than one foot of the lowest power conductor. Power-tap lines carried down poles shall be placed in metal conduit.

5.8 Identification of Signal Wires

5.8.1 IMSA color coded signal cable shall be used for all signal and interconnect systems. Colors shall be continuous from the point of origin to the point of terminatioin. Splices will be permitted only if same colors are spliced.

6.0 GROUNDING

6.1 There shall be a properly installed and connected ground rod for each controller cabinet and power drop to reduce any extraneous voltage to a safe level. The ground rod shall be located so as to minimize the length of the grounding-conductor run. All grounding circuits shall be substantial and permanent and shall be electrically continuous with an ohms-to-ground resistance not to exceed 10 ohms when tested by volt-ohm-meter.

6.2 Grounding Connectors and Electrodes

6.2.1 The grounding conductor shall be a No. 6 AWG standard copper wire. The conductor shall be bonded to ground rods. Ground rod electrodes shall be solid copper-bonded steel being at least 5/8 inch in diameter and shall be driven into the ground to a depth sufficient to provide the required resistance between electrodes and ground (10 ohms). All ground rods shall be a minimum of six feet long. When the location precludes driving a single ground rod to a depth of six feet or when a multiple ground rod matrix is used to obtain the required resistance to ground, ground rods shall be spaced at least six feet apart and bonded by a minimum No. 6 AWG copper wire. Connections to underground metallic conduit shall be considered sufficient for grounding requirements. Connection of grounding circuits to grounding electrodes shall be by devices which will ensure a positive, fail-safe grip between the conductor and the electrode (such as lugs or pressure connectors). No splice joint will be permitted in the grounding conductor.

7.0 LOOP VEHICLE DETECTOR INSTALLATION

7.1 This section specifies the Contractor's responsibility for the loop and lead-in installation for vehicle loop detectors. It is required that all work related to the installation of a particular loop, with the exception of the layout task, shall be completed in the same work day. loop installation work shall be performed during off-peak traffic hours. Loop installation shall not be made during any type of precipitation or when pavement is wet from landscape irrigation systems.

7.2 The installation of loop detectors shall occur as shown in the Plans. The lead-in saw cuts from the street to the pullbox shall maintain a minimum separation from other loops of 12 inches and a minimum separation of 6 inches from other lead-in saw cuts. The saw cut depth, as specified in the plans, shall be consistent, including the entry point into the curb. The maximum number of wires placed in a single saw slot shall be four (4) wires. All wires in saw slots shall be a minimum of one inch (1") below the street level grade. The maximum number of wires placed in any lead-in saw cut from the street to curb side shall be two (2).

7.3 The Contractor shall furnish the sealing compound for the loop detectors at his expense. Samples of the sealant and methods for sealant installation shall be submitted to the Engineer for his approval before any detector installation may begin. If a hot sealant is used, the temperature of the sealant shall be in a range that will not cause damage to the detector wires. Loop sealant shall completely fill the saw cut, but shall not be more than three inches (3") in width on the street surface. The Contractor shall be required, at his expense, to remove all excess sealant, otherwise the loop will not be considered as a completed item.

7.4 Detector lead-in cables shall be run continuously without splices from the curbside pullbox to the controller where possible. If splices must be made, they shall be made in a signal base. Splices shall be solder connected (including the ground wire) and the splice connection shall be insulated and waterproofed with scotchcoat materials. Splices at the curb side pullboxes shall also be made in the same manner. See Section 5.6 Splices. The Traffic Engineer shall approve any splice in detector cables.

7.5 Each detector loop shall penetrate the curb in a separate conduit.

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE:

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13800 Montfort Drive Suite 230 Dallas, Texas 75240
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GENERAL NOTES

Scale : NONE

SHEET NO.
OF SHEETS
JOB NO.

8.0 CONCRETE FOUNDATIONS FOR SIGNAL STRUCTURES

8.1 Concrete foundations for signal structures shall be located so that the closest structure leg is a minimum of six (6) feet from the face of vertical curbs. The Contractor shall probe before excavating foundations to determine the location of utilities and structures. Foundations shall be paid for once, regardless of extra work caused by obstructions. The Contractor shall furnish all supplementary items necessary for its proper installation.

8.2 Excavation for all required foundations shall be done in accordance with lines and depths indicated on the plans. All loose material shall be removed from the excavation before the concrete is placed. Any water shall be removed by pumping or bailing. The use of explosives will not be permitted.

8.3 Foundations shall be constructed to the dimensions shown on the plans or as directed by the Traffic Engineer. The Contractor shall be required to insure that the top of the finished foundation is exactly level and formed. Anchor bolts and conduits shall be held rigidly in place by a template until the concrete is set. A mechanical vibrator shall be used for compacting and working the concrete. After the concrete has been placed and the top struck off, it shall be covered with wet cotton or burlap mats, for not less than ninety-six hours. All bracing and templates for anchor bolts shall remain in place for ninety-six (96) hours after the concrete is poured. During that time, the anchor bolts and conduit shall not be subjected to any applied strain. The Contractor shall furnish the Traffic Engineer a level for the purpose of inspecting the foundation. Signal pole shall not be installed on any foundations until approval has been given by the Traffic Engineer.

8.4 Backfill shall be tamped with mechanical tamps in 6-inch layers to the density of the surrounding ground. Where excavation is made in the surfaced shoulder, the shoulder shall be replaced with material equal to the original composition.

8.5 All excavated material not required for backfill shall be promptly removed and disposed of by the Contractor outside the limits of the project. The work site shall be kept clean and neat at all times.

8.6 No concrete shall be placed when the atmospheric temperature is at or below 40 degrees F. (taken in shade away from artificial heat) unless permission to do so is given by the Traffic Engineer.

9.0 INSTALLATION OF TRAFFIC SIGNAL STRUCTURE

9.1 The Contractor shall provide a complete traffic signal structure location plan/or schedule showing all pertinent details for each standard. This plan shall be approved by the Traffic Engineer before any structure in installed.

9.2 The Contractor shall examine foundations, which are to receive traffic signal standards, to assure proper anchorage alignment. Report any discrepancies to the Traffic Engineer.

9.3 Signal poles shall be leveled and tightly secured to the foundation before the structure is placed on the base. If shims are required for leveling, total shim height shall not exceed 1/2 inch. Foundation anchor bolts shall extend a minimum of three (3) threads through each nut in the base.

9.4 Except as modified herein, erection shall be in accordance with the applicable Specifications and Standards of the AISC Manual of Steel Construction. Erecting equipment shall be suitable for the work and shall be in first class condition. Where parts cannot be assembled or fitted properly as a result of errors in fabrication or deformation due to handling or transportation, such condition shall be reported immediately to the Traffic Engineer for approval of the method of correction obtained. The straightening of plates and angles or other shapes shall be approved methods. Bent or damaged heat-treated parts will be rejected. Steel work shall be drained properly. Pockets in structures exposed to the weather shall be filled with an approved waterproof material. The erector will be responsible for shrinkage and distortion of all butt welds. Moment connections in the field on beams and girders shall have a minimum of 3/16 inch root opening for all flange preparations prior to welding. Loose joints shall be corrected by cutting with a hand guided torch if necessary.

9.5 The steel structure frame shall be carried up true as shown and all match marking shall be followed. Temporary bracing shall be used wherever necessary to support all loads to which the structure may be subjected, including equipment, operation, and material loading. Such bracing shall be left in place as long as may be required for safety. The various members, after being assembled, shall be aligned and adjusted accurately before being fastened. Fastening of splices on compression members shall be done after the abutting surfaces have been brought completely into contact. No welding or bolting shall be done until as much of the structure as will be stiffened thereby has been aligned properly.

9.6 Bearing surfaces and surfaces which will be in permanent shall be cleaned before the members are assembled. Bearing plates shall be set in exact position and shall have a full and even bearing upon the concrete. As erection progresses, the work shall be bolted to take care of all dead load, wind and erection stresses. Splices will be permitted only where indicated. All erection bolts used in welded construction may be tightened securely and left in place. If removed, the holes shall be filled with plug welds.

9.7 Field bolting shall be in accordance with the requirements specified for shop fabrication. Unfair holes shall be corrected by reaming. Where the surface of a bolted part has a slope of more than 1:20 a beveled washer shall be used to compensate for the lack of parallelism. Bolt heads and nuts shall be drawn tight against the work with a suitable wrench not less than 15 inches long. Bolt heads shall be tapped with a hammer while the nut is being tightened.

9.8 Field welding shall be as specified for shop fabrication of welded construction. Any shop paint on surfaces adjacent to joints to be field welded shall be wire brushed to reduce the paint film to a minimum.

9.9 Field Painting: Surfaces where the shop coat of paint has been damaged shall be retouched using the same system as the original shop painting. The cleaning, pretreatment, and priming of welds and the areas adjacent thereto shall be done promptly after the acceptance of the weld as specified under the shop painting. If required, Controller cabinets shall be painted. Cabinets must be cleaned and treated with a bonding agent before finish coat is applied. Bonding agent shall be of the type condusive for adherence of paint to aluminum surfaces, and shall be approved by the Traffic Engineer before use is permitted.

9.10 Contractor shall furnish bonding agent at his expense. Contractor shall be required to follow manufacturer's specifications and directions for use of all materials used in the painting process.

9.11 High Strength Steel Bolts: The allowable working stresses for A325 bolts shall be given in Table 2 of the Specifications for Structural Joints using ASTM A325-N or A490-N bolts.

9.12 Bolted parts shall fit solidly together when assembled and shall not be separated by gaskets or any other interposed compressible material. When assembled, all joint surfaces, including those adjacent to the bolt heads, nuts or washers shall be free of scale, except tight mill scale, and shall also be free of burrs, dirt and other foreign material that would prevent solid seating of the parts. Each fastener shall be tightened to provide, when all fasteners in the joint are tight, at least the minimum bolt tension shown in Table 3 in the Specifications for Structural Joints using ASTM A325 or A490 bolts for the size of fastener used. Threaded bolts shall be tightened with properly calibrated wrenches or by the "turn-of-nut" method. Bolts may be installed without hardened washers when tightening is by the "turn-of-bolt" method. Any bolt tightened by the calibrated wrench method (or by torque control) shall have a hardened washer under the element (nut or bolt head) turned in to a point not closer than 7/8 of the bolt diameter from the center of the washer. Calibrated wrench tightening and "turn-of-nut" tightening shall conform to the Specifications for Structural Joints using ASTM A325 or A490 bolts.

9.13 Grouting: The Contractor shall perform all work required to complete the grout work associated with installing the signal structure and furnish all supplementary items necessary for its proper installation. A waterproof sealer shall be required between the controller cabinet and the controller foundation.

10.0 INSTALLATION OF SIGNAL HEADS

10.1 The Contractor shall be required to assemble all signal head units as specified in the plans or as directed by the Engineer. The Contractor shall mount the signal heads within standards level and plumb. The Contractor shall position and secure the signal heads so they are visible at a minimum of 200 feet from the stop bar.

10.2 No Alternate signal head mounting hardware will be acceptable by the Traffic Engineer.

10.3 All signal heads or parts of heads not in operation shall be covered with burlap until placed into operation. When the signal heads become operational, all existing heads no longer required shall be removed immediately.

10.4 All mast arm heads installed shall require ASTRO-BRAC mounting. The Contractor shall be required to drill the mast arm at the point where the wire enters the mast arm.

10.5 All pipework in each signal head assembly shall be completely tight. Signal and pedestrian heads shall be securely tightened immediately after signal head assembly has been installed. If any signal head assembly is found to be loose or asymmetrical in any manner, the Contractor shall be required to remove and rebuild the signal head assembly to the satisfaction of the Engineer.

10.6 All signal cables from the heads to the pole base shall be totally enclosed within the signal mounting hardware.

11.0 INSTALLATION OF GRAPHICS/SIGNS

11.1 Perform all work required to compelte the identifying graphics/signs indicated by the plan details and furnish all supplementary items necessary for their proper installations.

11.2 Installation: The Contractor shall clean all surfaces to which graphics are to be applied according to manufacturer's written instructions. Level grid lines of tape shall be incorporated for graphic application. All copy shall be set in normal letter spacing and standard inter-work spacing shall be made as required by the Traffic Engineer.

12.0 PAINT AND PAINTING

12.1 All poles and bases shall be painted with two coats of Town of Addison "Brushing Brown" paint at the time of installation. The metal-pipe conduit and exposed conduit fittings which are not galvanized shall be given one coat of No. 802 Aluminum paint after they are in place.

12.2 No painting will be required for the signal heads black in color except those parts on which the paint has been scratched or marred, and such parts shall be given two coats of high-grade enamel or paint of the same color as the factory paint.

13.0 PRESERVATION OF LANDSCAPING, SPRINKLER SYSTEMS, AND OTHER PRIVATE PROPERTY / PUBLIC PROPERTY

13.1 The Contractor shall assume full responsibility for the preservation of the existing landscaping (sod, private property at the site during the installation of items in this Contract Document. Damaged landscaping, sprinkler systems and other private property shall be replaced by the Contractor at his own expense, to the satisfaction of the Traffic Engineer.

14.0 REMOVAL AND REPLACEMENT OF CURBS AND WALKS

14.1 The Contractor shall secure permission from the proper authority and the approval of the Traffic Engineer before cutting into or removing any walks or curbs which might be required in making the installation.

14.2 After the work is completed, the Contractor shall restore any curbs or walks which have been removed to the equivalent of, or better than, their original condition and to the satisfaction of the Traffic Engineer.

15.0 SAMPLING AND TESTING

15.1 Initial testing of all materials, construction items, or products incorporated in the work will be performed at the direction and expense of the authority including initial compaction and density tests deemed necessary in connection with the construction of embankment, backfill of structures, excavation.

15.2 In the event a material, construction item, product incorproated in the work, embankment, backfill, excavation or any other item tested fails to satisfy the minimum requirements of the initial test described above, appropriate prove-out tests shall be made as directed by the Traffic Engineer to determine the extent of the failure and to verify that the corrective measures have brought the item up to specification requirements. The cost of all testing necessary to determine the extent of the failure and the adequacy of the corrective measures shall be the responsibility of the Contractor.

15.3 The failure of the proper authority to make any tests of materials shall in no way relieve the Contractor of his responsibility of furnishing materials conforming to the specifications.

NO.	REVISION	BY	DATE

DESIGNED BY:
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SCALE:
DATE:

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GENERAL NOTES

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15.4 Tests, unless otherwise specified, shall be made in accordance with the latest methods of the American Society for Testing and Materials. The Contractor shall provide such facilities, as the Traffic Engineer may require, for the collecting and forwarding of samples and shall not use the materials represented by the samples until tests have been made. The Contractor shall furnish adequate samples without charge.

15.5 Concrete

15.5.1 All concrete materials, reinforcing steel, and preparation shall be in accordance with the requirements of the Standard Specifications for Public Works Construction, North Central Texas.

15.6 Vehicle Loop Detectors

15.6.1 Prior to termination of the shielded, twisted pair loop lead-in cables at the controller cabinet, insulation tests shall be made with an insulation test set applying not less than 500 volts D.C. to the completed loop detector. A minimum resistance of 1 megohm shall be obtained.

15.6.2 After the above insulation tests are completed and the lead-in cable has been terminated in the cabinet, the Contractor shall assist the Traffic Engineer in determining the loop inductance of each loop detector installation. The Contractor shall furnish a loop detector analyzer which shall determine the total inductance of the loop in the pavement and the associated lead-in cable and shall also be used in determining the percentage shift in loop inductance for various size vehicles that may be actuating the detector.

15.7 Signal Cables

15.7.1 All cables shall be checked for insulation resistance upon installation and prior to termination. The tests shall be made with a test set operating at a minimum of 500 volts D.C. applied to the conductors.

15.7.2 Each conductor in the multiconductor signal cables shall be tested for insulation resistance relative to each other and to the outer covering of the cable. The following minimum acceptance values for insulation resistance shall be obtained:

No. 8 AWG, Type THW	592 Megohms/1000 Ft.
No. 12 AWG, Type THW	668 Megohms/1000 Ft.
12, NO. 12 AWG Conductors	1018 Megohms/1000 Ft.
15, No. 12 AWG Conductors	1018 Megohms/1000 Ft.
20, No. 12 AWG Conductors	1141 Megohms/1000 Ft.
25, No. 12 AWG Conductors	1141 Mehohms/1000 Ft.

16.0 WARRANTIES/GUARANTEES

16.1 The Contractor guarantees all work performed and materials furnished under this project for a period of twelve (12) months following the date of acceptance. In addition, he shall furnish any normal manufacturer warranties with effective beginning dates the same as the date of final project acceptance.

17.0 TRAFFIC SIGNAL MAINTENANCE DURING CONSTURCTION

17.1 While performing work under this contract, Contractor bears the sole rise of loss for damage to or destruction of any traffic signal equipment, appurtenances, on operations that were not to be replaced or installed under this contract but which are damaged or destroyed through the fault or negligent act of Contractor, and Contractor shall replace such damaged or destroyed equipment, etc., at no cost to the authority, regardless of whether or not the damaged or destroyed equipment, etc., was a part of this contract or any warranties under this contract.
Upon written acceptance by the authority of a particular intersection of work, Contractor's responsibility for the intersection under this paragraph shall cease.

17.2 The Contractor shall provide, at his expense, tempory signal cable systems and signals mounted on the span wires, mast arms, portable bases, or other locations as necessary during the project to insure that signal head displays are always in operation. All such temporary signals shall be finished in apperarance, meet the requirements of the Texas Manual on Uniform Traffic Control Devices (TMUTCD), and be approved by the Traffic Engineer.

17.3 The Contractor's responsibility for full operation and maintenance of all traffic signal equipment shall begin when he starts any type of work which affects active intersection control at the first intersection and shall extend through the period of project final acceptance of each intersection. This maintenance responsibility includes existing controllers/ masters, existing interconnect and cabling system, existing signal hardware installed, new cabling controllers/masters, new signal hardware installed, new cabling system, and other hardware elements which are considered part of either the existing or new traffic signal system.

17.4 The Contractor shall utilize qualified personnel to respond to all trouble calls and to repair any malfunctions. A local telephone number (not subject to frequent changes) where trouble calls are to be received on a 24-hour basis shall be provided to the Traffic Engineer by the Contractor. The Contractor's response to reported trouble calls shall be within a reasonable travel time from an Addison address, but not more than two (2) hours maximum. Appropriate repairs shall be made within 12 hours.

17.5 It is recognized that the City may continue to make a first response to any trouble call. Action on such response will, however, be limited to placing the intersection on flash, replacing load switches or detector amplifiers, erecting temporary control devices, requesting immediate traffic control by uniformed police officer, or other such action deemed necessary to provide a safe operation. Such action will in no way relieve the Contractor of his operation and maintenance responsiblity.

17.6 The Contractor shall be required to provide adequate police traffic control assistance for planned controller change-outs or any other operational procedures, when requested by the Engineer. Police assistance shall be arranged by the Contractor directly, at least twenty-four (24) hours in advance. If the Engineer discovers that the Contractor has failed to provide adequate police assistance, the Engineer may order additional assistance. Police traffic control assistance, for any purpose, shall be the financial responsibility of the Contractor, regardless of who obtains the assistance.

18.0 BARRICADES

18.1 The Contractor shall comply with all the requirements of the TMUTCD.

18.2 The Contractor shall have the responsibility to provide and maintain all warning devices and take all precautionary measures by law to protect persons and property while said persons or property are approaching, leaving, or within the work site of any area adjacent to said work site. No separate compensation will be paid to the Contractor for the installation or maintenance of any warning devices, barricades, lights, signs, or any other precautionary measure required by law for the protection of persons or property, including off duty police officers.

18.3 The Contractor shall assume all duties owed by the authority to the general public in connection with the general public's immediate approach to and travel through the work site and the area adjacent to said work site.

18.4 Where the work is carried on, in, or adjacent to, any street, alley, sidewalk, public right-of-way or public place, the Contractor shall at his own cost and expense provide flagmen and watchmen and shall furnish, erect, and maintain such warning devices, barricades, lights, signs, and other precautionary measures which shall not cease until the project has been accepted by the governing Authority.

19.0 AS-BUILT DRAWINGS

19.1 The City shall furnish two (2) sets of Construction Drawings to the Contractor at the time construction is commenced. These prints shall be marked-up by the Contractor throughout the construction period, indicating all changes, revisions, and additions to the work, including field relocations of work concealed from view and conductor cable lengths. Upon completion of the work at each intersection, the Engineer shall deliver the As-Built drawings to the Traffic Engineer within ten (10) working days after the turn-on/cut-over date.

20.0 MEASUREMENT AND PAYMENT

20.1 The traffic signal installation as indicated on the Plans and as described herein, when installed, will be measured as a completed installation and payment will be made at the contract unit bid price for "Traffic Signal(s)", which price shall be full compensation for furnishing, placing, and testing all materials and equipment and for all tools, labor, equipment, and incidentals necessary to complete the work. Portions of the work that have not been approved by Engineer will not be considered complete, and payment shall be withheld until the Contractor has corrected the work to the satisfaction of the Engineer.

21.0 EXPERIENCE AND QUALIFICATIONS

21.1 The low bidder shall be required to furnish the Engineer a written assessment of previous experience in the installation of traffic signal systems. The response shall include the name and population of the city or area served, Contract name and/or number, date of installed, date of Contract completion, Contract delays and discrepancies, liquidated damages and the name, address, and phone number of a specific individual representing the client who is in a position to verify such experience. The response shall be delivered to the Engineer within ten (10) working days after bid opening.

21.2 The Bidder shall also furnish information as required above for each major subcontractor (i.e., manufacturer or fabrication of traffic signal structures) that could be active in the project.

22.0 MISCELLANEOUS NOTES

22.1 THE LOCATIONS OF DRIVEWAYS, SIDEWALKS, DRAIN GUTTERS, ETC., AS SHOWN ON THESE PLANS ARE APPROXIMATE. ACCURATE LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR AT THE TIME OF CONSTRUCTION.

22.2 THE LOCATIONS OF TRAFFIC SIGNAL FOUNDATIONS, BASES, CONDUIT DETECTORS, ETC., SHOWN ON THE PLANS ARE APPROXIMATE. THE CONTRACTOR SHALL GIVE THE GOVERNING TRAFFIC AUTHORITY 48 HOURS NOTICE OF HIS INTENTION TO ESTABLISH THE FINAL LOCATION OF ANY FOUNDATIONS, BASES, CONDUIT, DETECTORS, ETC., AND HAVE THE LOCATIONS APPROVED ON THE GROUND BY THE TRAFFIC ENGINEER OR HIS DULY AUTHORIZED REPRESENTATIVE.

22.3 NO TREES SHALL BE CUT EXCEPT UPON THE SPECIFIC AUTHORITY OF THE ENGINEER.

22.4 WHERE POSSIBLE, DIG UNDER SIDEWALKS. IF THE CONTRACTOR CHOOSES TO REMOVE OR CUT THE SIDEWALK THE CONCRETE MUST BE SAWED AND BROKEN OUT AND THEN RESTORED TO AN EQUAL OR BETTER CONDITION THEN THE ORIGINAL.

22.5 REMOVAL OF MAIL BOXES IN THE WAY OF CONSTRUCTION REQUIRES 48 HOURS ADVANCE NOTICE TO THE POST OFFICE.

22.6 PIPELINES, STORM SEWERS, POWER CABLES, SHTRUCTURES, AND OTHER UNDERGROUND ITEMS BOTH PUBLICLY AND PRIVATELY OWNED EXIST ADJACENT TO THE CONSTRUCTION LIMITS OF THIS PROJECT. THE CONTRACTOR SHALL MAKE HIS OWN INVESTIGATION AS TO THE LOCATION OF THESE UNDERGROUND ITEMS AND SHALL HOLD THE AUTHORITY EXEMPT FROM ANY SUITS OR CLAIMS RESULTING FROM DAMAGE BY THE CONTRACTOR'S OPERATIONS TO ANY UNDERGROUND INSTALLATION. THE CONTRACATOR SHALL COMPLY WITH ALL UTILITY CLEARANCES.

22.7 ALL CONDUIT RUNS SHALL BE CONTINUOUS OF THE SAME MATERIAL (METAL ONLY OR PVC ONLY). WHERE TYING INTO EXISTING CONDUIT, THE CONTRACTOR MUST CONTINUE WITH THE SAME MATERIAL (METAL TO METAL OR PVC TO PVC).

22.8 ON ALL INTERCONNECT CONDUIT RUNS, THE CONTRACTOR SHALL INSTALL PULLBOXES AT INTERVALS OF 250 FEET TO PREVENT DAMAGE OR BREAKAGE TO THE CABLE BEING INSTALLED. ANY INCREASE OR DECREASE IN DISTANCE BETWEEN PULLBOXES, UNLESS SHOWN ON THE PLANS, MUST BE APPROVED BY THE TRAFFIC ENGINEER OR HIS DULY AUTHORIZED REPRESENTATIVE.

23.0 ACCEPTANCE NOTES

23.1 PRIOR TO FINAL ACCEPTANCE BY THE TOWN OF ADDISION:
1. A TEXAS REGISTERED PROFESSIONAL ENGINEER SHALL CERTIFY THAT THE PROJECT WAS CONSTRUCTED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS APPROVED BY THE TOWN OF ADDISON.

2. THE OWNER SHALL PROVIDE 1 REPRODUCIBLE SET OF AS-BUILTS (SEALED AND CERTIFIED BY A TEXAS REGISTERED ENGINEER) AND 2 BLUE LINE SETS.

23.2 PRIOR TO STARTING CONSTRUCTION, THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANIES TO LOCATE EXISTING FACILITIES. THESE INCLUDE BUT MAY NOT BE LIMITED TO THE FOLLOWING:
1. TOWN OF ADDISON
2. LONE STAR GAS
3. SOUTHWESTERN BELL
4. STORER CABLE
5. PLANNED CABLE SYSTEMS
6. TU ELECTRIC

23.3 PRIOR TO BEGINNING CONSTRUCTION, THE OWNER OR HIS AUTHORTISED REPRESENTATIVE SHALL CONVENE A PRE-CONSTRUCTION CONFERENCE. BETWEEN THE TOWN OF ADDISON, CONSULTING ENGINEER, CONTRACTORS, UTILITY COMPANIES AND ANY OTHER AFFECTED PARTIES, NOTIFY BRUCE ELLIS 450-2847 AT LEAST 48 HOURS PRIOR TO THE TIME OF CONFERENCE AND 48 HOURS PRIOR TO BEGINNING OF CONSTRUCTION.

23.4 ANY EXISTING PAVEMENT, CURBS, AND/OR SIDEWALKS DAMAGED OR REMOVED WILL BE REPAIRED BY THE CONTRACTOR AT THEIR EXPENSE.

23.5 AT INTERSECTIONS THAT HAVE VALLEY DRAINAGE, THE CROWN OF THE INTERSECTING STREETS WILL CULMINATE IN A DISTANCE OF 40 FEET FROM THE INTERSECTING CURB LINE UNLESS OTHERWISE NOTED.

23.6 CONTRACTOR SHALL OBTAIN A RIGHT-OF-WAY PERMIT BY THE TOWN OF ADDISON FOR WORKING WITHIN THE PUBLIC RIGHT-OF-WAY.

23.7 DURING CONSTRUCTION, THE OWNER SHALL PROVIDE A QUALIFIED GEOTECHNICAL LAB TO PERFORM MATERIALS TESTING DURING THE CONSTRUCTION, AT THE REQUEST OF THE TOWN OF ADDISON.

23.8 THE CONTRACTOR SHALL SUBMIT MATERIAL SHEETS TO THE TOWN OF ADDISON FOR APPROVAL PRIOR TO INCORPORATING MATERIALS INTO THE JOB.

23.9 THE CONTRACTOR SHALL PROVIDE INTEGRATION OF THE NEW CONTROLLER DATA BASE AND INTERSECTION / SUB-SYSTEM GRAPHICS INTO THE TOWN OF ADDISON'S ON STREET MASTER SIGNAL SYSTEM.

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE:

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
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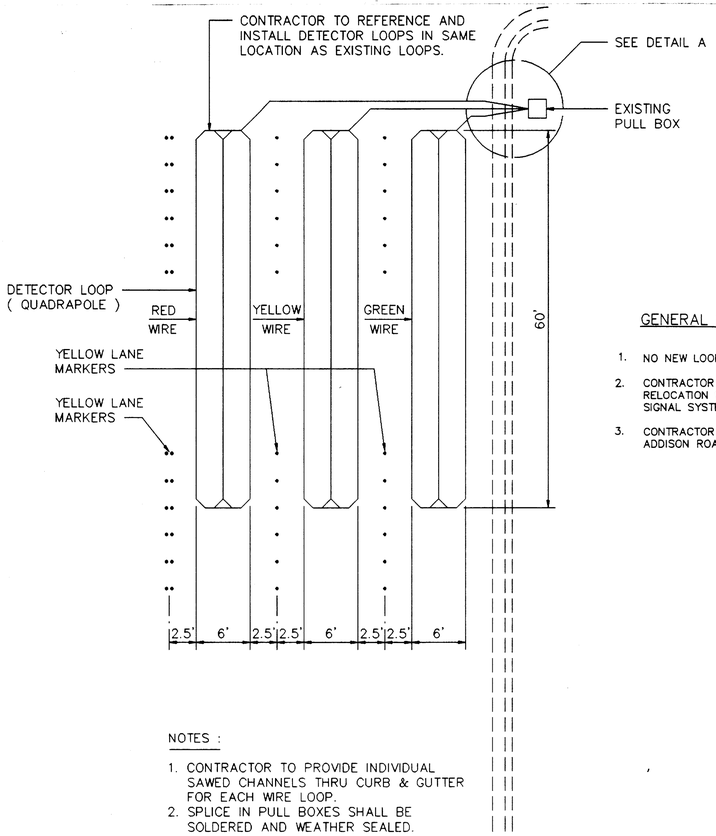
(214) 387-0771

GENERAL NOTES

Scale: NONE

SHEET NO.
OF SHEETS
JOB NO.



NOTES :

1. CONTRACTOR TO PROVIDE INDIVIDUAL SAWED CHANNELS THRU CURB & GUTTER FOR EACH WIRE LOOP.
2. SPLICE IN PULL BOXES SHALL BE SOLDERED AND WEATHER SEALED.

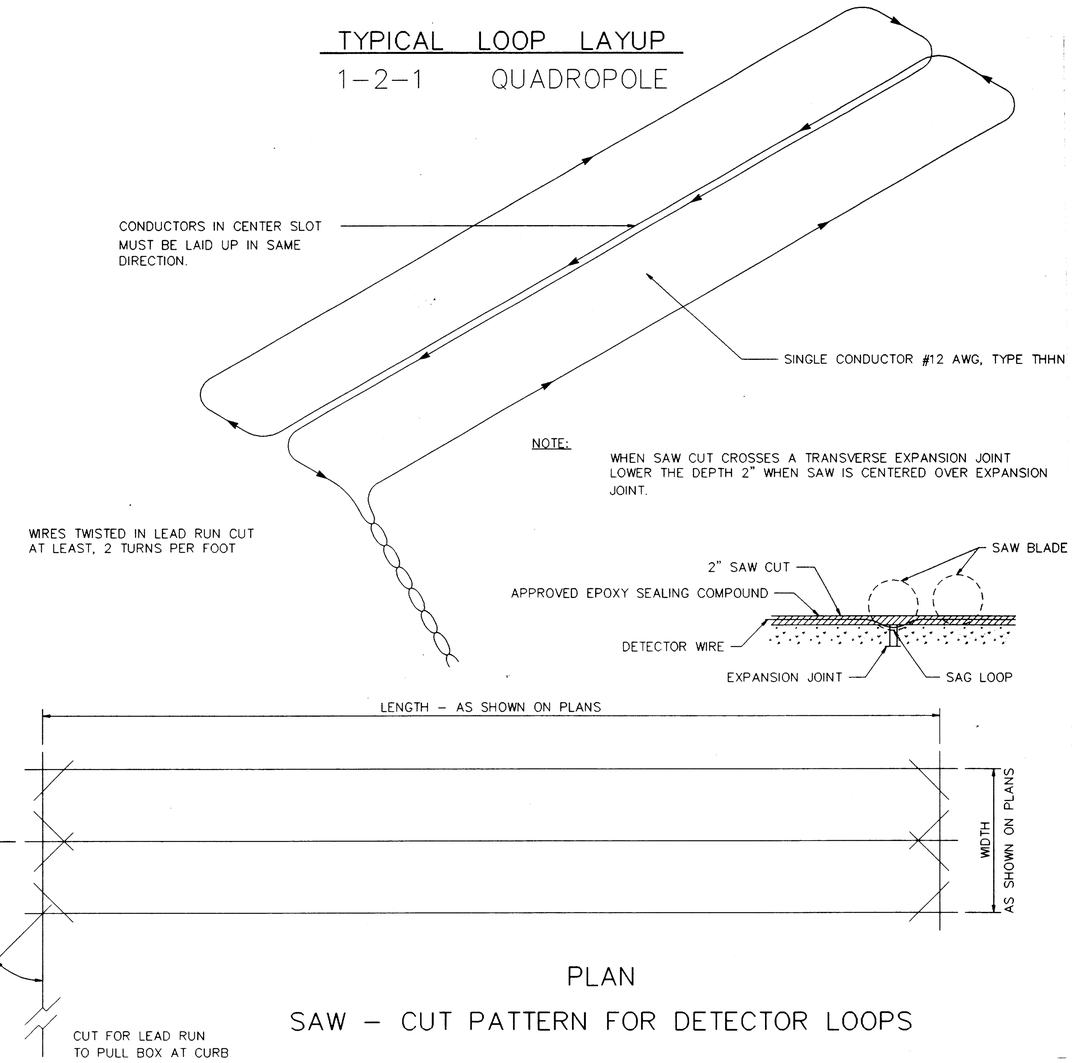
PLAN

GENERAL NOTES:

1. NO NEW LOOPS ARE REQUIRED FOR WESTBOUND BELT LINE ROAD APPROACH.
2. CONTRACTOR SHALL COMPLETE ALL TRAFFIC SIGNAL IMPROVEMENT AND RELOCATION WORK REQUIRED FOR THIS PROJECT TO ENSURE AN OPERATIONAL SIGNAL SYSTEM CONSISTENT WITH THE EXISTING SYSTEM.
3. CONTRACTOR MAY OBTAIN EXISTING TRAFFIC SIGNAL LAYOUT PLANS FOR THE ADDISON ROAD – BELT LINE ROAD INTERSECTION FROM THE TOWN OF ADDISON.

TYPICAL LOOP LAYUP

1–2–1 QUADROPOLE

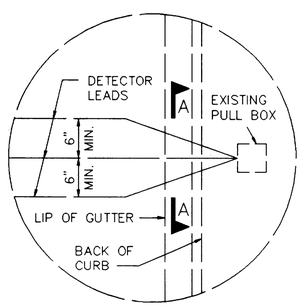


NOTE:

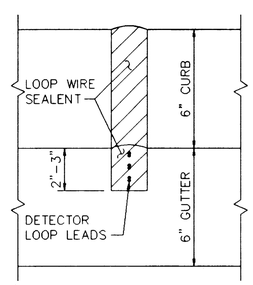
WHEN SAW CUT CROSSES A TRANSVERSE EXPANSION JOINT LOWER THE DEPTH 2" WHEN SAW IS CENTERED OVER EXPANSION JOINT.

PLAN

SAW – CUT PATTERN FOR DETECTOR LOOPS



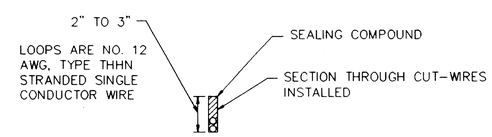
DETAIL A



SECTION A–A

VEHICLE LOOP DETECTOR LAYOUT

1. INSTALLATION OF WIRE LOOPS IS TO BE MADE IN THE SHORTEST TIME PRACTICAL, NOT TO EXCEED A 4 HR. MAX. AND SCHEDULED DURING OFF PEAK HOURS TO MINIMIZE DELAY TO VEHICLE TRAFFIC.
2. THE PAVEMENT CUT IS TO BE CUT WITH A CONCRETE SAW TO NEAT LINES AND LOOSE MATERIAL REMOVED. THE CUT SHOULD BE CLEAN AND DRY WHEN THE SEALING COMPOUND IS PLACED.
3. THE LEAD-IN WIRES ARE TO BE TWISTED A MINIMUM OF TWO TURNS PER FOOT AND REMAIN UNDISTURBED AFTER THE LOOP HAS BEEN TUNED.
4. EACH LOOP IS TO BE RETURNED TO CONTROLLER VIA ONE PAIR OF UNSPLICED SHIELDED LEAD-IN WIRES. MULTIPLE, TWISTED LEADS TO MORE THAN ONE LOOP IN SINGLE LEAD RUN SAW SLOT ARE NOT PERMISSIBLE.
5. ALL LOOPS TO PENETRATE CURB IN A SEPERATE CONDUIT.



NO.	REVISION	BY	DATE

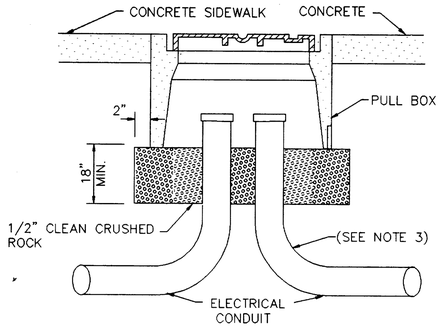
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE :

STATE OF TEXAS — WILLIAM J. PATTERSON — 25755 — PROFESSIONAL ENGINEER

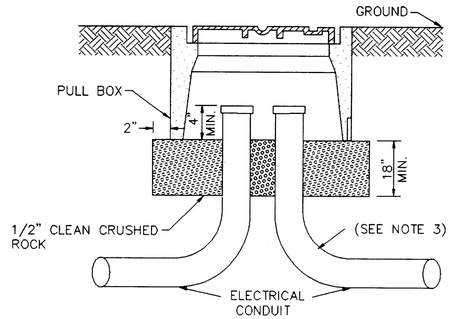
ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

TRAFFIC SIGNAL DETAILS

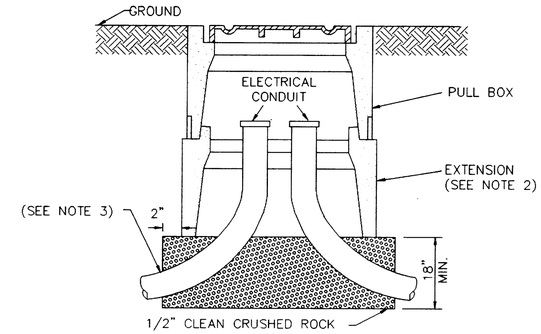
SHEET NO.
OF SHEETS
JOB NO.



TYPICAL PULL BOX AND CONDUIT DETAILS IN EXISTING SIDEWALK



TYPICAL PULL BOX AND CONDUIT DETAILS PLACED IN GROUND



TYPICAL PULL BOX AND CONDUIT DETAILS WITH EXTENSION

NOTES :

(1) IF SPECIFIED IN THE PLANS, A 1/2" X 8'-0" GROUND ROD SHALL BE INSTALLED INSIDE THE PULL BOX. THE COST AND INSTALLATION OF THIS ROD SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PULL BOX.

(2) IF SPECIFIED, THE PULL BOX EXTENSION SHALL BE INSTALLED AT THE LOCATIONS SHOWN IN THE PLANS. THE COST AND INSTALLATION OF THE PULL BOX EXTENSION SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PULL BOX.

(3) CONDUIT BENDS AS SHOWN ARE DIAGRAMMATIC AND SHALL CONFORM TO NATIONAL ELECTRICAL CODE.

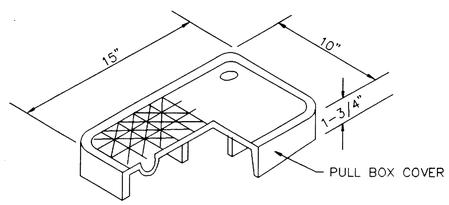
(4) SEE NORTH CENTRAL TEXAS STANDARD CONSTRUCTION SPECIFICATIONS FOR ADDITIONAL INFORMATION CONCERNING THE MATERIALS AND INSTALLATION OF THE PULL BOX, EXTENSIONS AND CONDUITS.

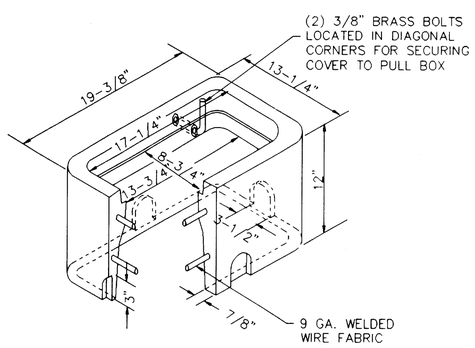
(5) WHEN A PULL BOX IS INSTALLED BY THE GRADING OR SURFACING CONTRACTOR, THE PULL BOX COVER LEGEND SHALL BE "TRAFFIC SIGNALS", UNLESS OTHERWISE SPECIFIED IN THE PLANS.

(6) THE COMPLETE PULL BOX INSTALLATION SHOULD BE BUILT TO FIT EXISTING FIELD CONDITIONS. THE PULL BOX SHOULD BE PLACED A MIN. OF 2'-0" BEHIND CURB AND SHALL PRESENT A NEAT, WORKMAN LIKE APPEARANCE. THE COST FOR THE REPLACEMENT OF EXISTING SIDEWALK MATERIAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR STRUCTURAL CONCRETE.

(7) COVERS FOR PULL BOX SHALL BE CAST IRON WITH TEXT.

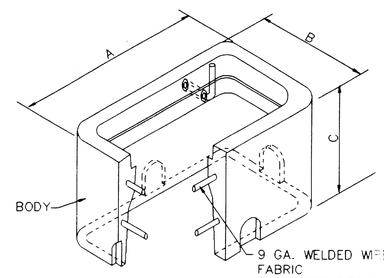
(8) ALL PULL BOXES SHALL BE CONSTRUCTED OF CAST IRON MATERIALS.

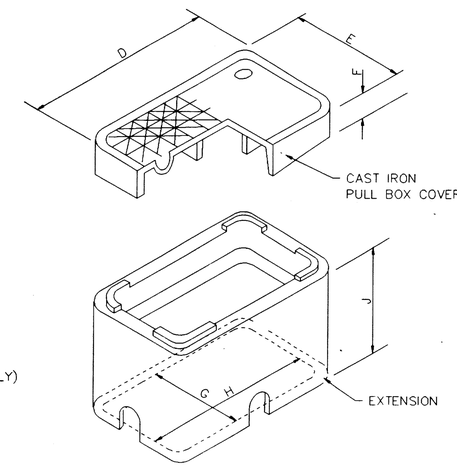




TYPICAL PULL BOX SIZE I CONCRETE DESIGN

(DIMENSIONS ARE NOMINAL)





TYPICAL PULL BOX SIZE II

NOMINAL PULL BOX SIZE II DIMENSIONS

PULL BOX CONSTRUCTION MATERIAL	PULL BOX DIMENSIONS			CAST IRON PULL BOX LID DIMENSIONS		
	A	B	C	D	E	F
CONCRETE	25"	15"	12"	2[illegible] 3/4"	11 3/4"	2"

PULL BOX EXTENSION DIMENSIONS		
G	H	J
12 1/4"	22 1/4"	10 1/4"

THE DIMENSIONS SHOWN IN THE SCHEDULE ABOVE MAY VARY SLIGHTLY BY MANUFACTURER'S DESIGNS

TYPICAL PULL BOX COVERS

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DRAWN BY:
CHECKED BY:
SCALE:
DATE :

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Engineering & Environmental Consultants
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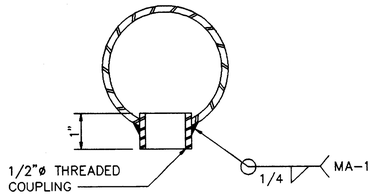
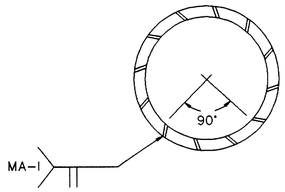
(214) 387-0771

PULL BOX DETAILS

SHEET NO.
OF SHEETS
JOB NO.

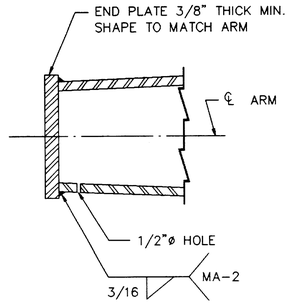


COUPLING DETAILS



LONGITUDINAL SEAM WELD MUST BE ORIENTED WITHIN THE LOWER 90° OF THE SIGNAL ARM.

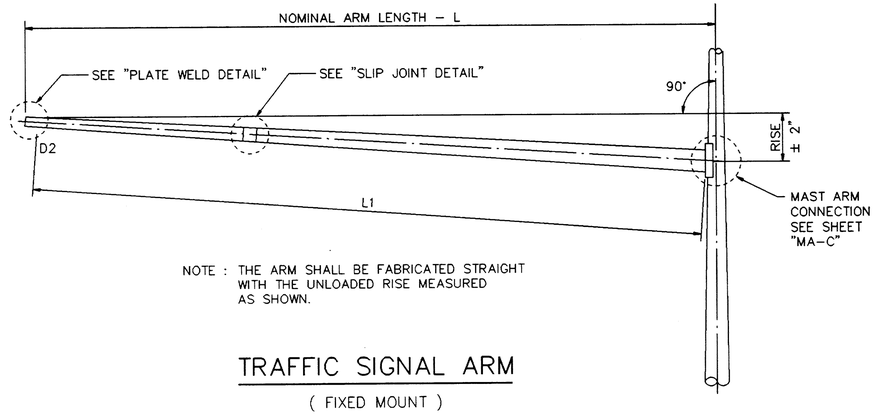
ARM WELD DETAIL



NOTE :

"POLE MANUFACTURER SHALL DRILL 1/2" HOLE IN BOTTOM OF MAST ARM AT END PLATE"
(FOR HOT-DIP GALVANIZING)

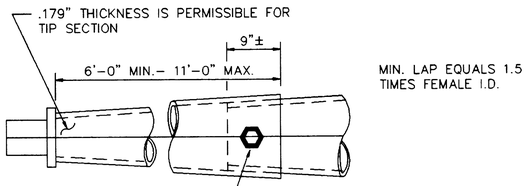
PLATE WELD DETAIL



NOTE : THE ARM SHALL BE FABRICATED STRAIGHT WITH THE UNLOADED RISE MEASURED AS SHOWN.

TRAFFIC SIGNAL ARM

(FIXED MOUNT)



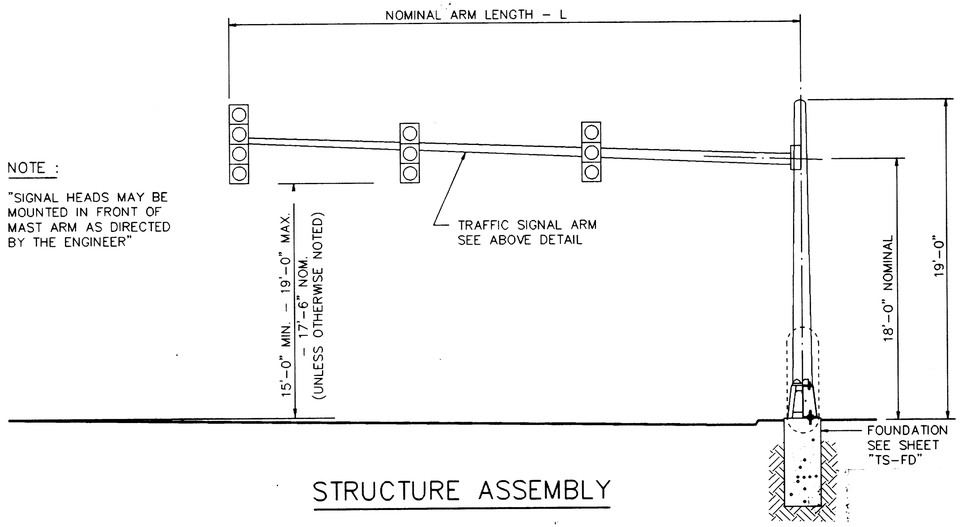
NOTE :

A SLIP JOINT IS PERMISSIBLE FOR ARMS 40' AND GREATER IN LENGTH. THE SLIP JOINT SHALL BE MADE IN THE SHOP, BUT MAY BE MATCH MARKED AND SHIPPED DISASSEMBLED.

SLIP JOINT DETAILS

NOTE :

"SIGNAL HEADS MAY BE MOUNTED IN FRONT OF MAST ARM AS DIRECTED BY THE ENGINEER"



STRUCTURE ASSEMBLY

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE :

STATE OF TEXAS — JOHN W. HATCHELL — 26755 — REGISTERED PROFESSIONAL ENGINEER

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

SINGLE MAST ARM ASSEMBLIES
(80 MPH WIND ZONE)

SHEET NO.
OF SHEETS
JOB NO.

ARM LENGTH	ROUND POLES			FOUNDATION TYPE
	D8	D19	# THK.	
FT.	IN.	IN.	IN.	
20	10.0	7.5	.179	30-A
24	11.0	8.5	.179	30-A
28	11.5	9.0	.179	30-A
32	12.0	9.5	.179	30-A
36	12.5	10.0	.179	30-A
40	12.0	9.5	.239	30-B
44	12.5	10.0	.239	30-B
48	13.0	10.5	.239	30-B

ARM LENGTH	ROUND ARMS				
	L1	D1	D2	# THK.	RISE
FT.	FT.	IN.	IN.	IN.	
20	19.1	6.5	3.8	.179	1'-9"
24	23.1	7.5	4.3	.179	1'-10"
28	27.1	8.0	4.2	.179	1'-11"
32	31.0	9.0	4.7	.179	2'-1"
36	35.0	9.5	4.6	.179	2'-4"
40	39.0	9.5	4.1	.239	2'-8"
44	43.0	10.0	4.1	.239	2'-11"
48	47.0	10.5	4.1	.239	3'-4"

D8 = POLE BASE O.D.

D19= POLE TOP O.D. W/OUT LUMINAIRE

D1 = ARM BASE O.D.

D2 = ARM END O.D.

L1 = SHAFT LENGTH

L = NOMINAL ARM LENGTH

THICKNESS SHOWN ARE MINIMUMS, THICKER MATERIALS MAY BE USED.

SHIPPING PARTS LIST

POLES

NOMINAL ARM LENGTH			19' POLES WITHOUT LUMINAIRE	
			SHIP EACH POLE WITH THE FOLLOWING HARDWARE ATTACHED : ENLARGED HAND HOLE, POLE CAP, FIXED ARM CONNECTION BOLTS AND WASHERS.	
FT.			DESIGNATION	QUANTITY
20			20-80	
24			24-80	
28			28-80	
32			32-80	
36			36-80	
40			40-80	
44			44-80	
48			48-80	

TRAFFIC SIGNAL ARMS 1 PER POLE

NOMINAL ARM LENGTH	TYPE I ARM (1 SIGNAL)		TYPE II ARM (2 SIGNAL)		TYPE III ARM (3 SIGNAL)	
	SHIP EACH TYPE I ARM WITH THE FOLLOWING HARDWARE ATTACHED : 1 CGB CONNECTOR		SHIP EACH TYPE II ARM WITH THE FOLLOWING HARDWARE ATTACHED : ● 1 BRACKET ASSEMBLY AND 2 CGB CONNECTOR		SHIP EACH TYPE III ARM WITH THE FOLLOWING HARDWARE ATTACHED : ● 2 BRACKET ASSEMBLY AND 3 CGB CONNECTOR	
FT.	DESIGNATION	QUANTITY	DESIGNATION	QUANTITY	DESIGNATION	QUANTITY
20	20 I -80		20 II -80			
24	24 I -80		24 II -80			
28	28 I -80		28 II -80		28 III -80	
32			32 II -80		32 III -80	
36			36 II -80		36 III -80	
40					40 III -80	
44					44 III -80	
48					48 III -80	

ANCHOR BOLT ASSEMBLIES 1 PER POLE

ANCHOR BOLT DIAMETER	ANCHOR BOLT LENGTH	QUANTITY
1-1/2"	3'-4"	
1-3/4"	3'-10"	

EACH ANCHOR BOLT ASSEMBLY CONSISTS OF THE FOLLOWING: TOP AND BOTTOM TEMPLATES, 4 ANCHOR BOLTS, 8 NUTS, 8 FLAT WASHERS, 4 LOCK WASHERS AND 4 NUT ANCHOR DEVICES (TYPE 2) PER STANDARD DRAWING 10.

TEMPLATES MAY BE REMOVED FOR SHIPMENT.

● SUPPLY "OPTION A" UNLESS OTHERWISE NOTED.

GENERAL NOTES :

DESIGN CONFORMS TO 1975 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS AND INTERIM SPECIFICATIONS THERETO. DESIGN WIND SPEED EQUALS 80 MPH PLUS A 1.3 GUST FACTOR.

THE SPECIFIED LUMINAIRE LOAD APPLIED AT THE END OF THE LUMINAIRE ARM EQUALS 75 LBS. VERTICAL DEAD LOAD PLUS THE HORIZONTAL WIND LOAD ON AN EFFECTIVE PROJECTED AREA OF 1.5 SQ.FT. THE SPECIFIED SIGNAL LOAD APPLIED AT THE END OF THE TRAFFIC SIGNAL ARM EQUALS 180 LBS. VERTICAL DEAD LOAD PLUS THE HORIZONTAL WIND LOAD ON AN EFFECTIVE PROJECTED AREA OF 32.4 SQ.FT. (ACTUAL AREA TIMES DRAG COEFFICIENT).

FABRICATION SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND WITH THE DETAILS, DIMENSIONS, AND WELD PROCEDURES SHOWN HEREIN. WELD REFERENCES CALL FOR PREAPPROVED WELD PROCEDURES WHICH THE FABRICATOR MUST OBTAIN PRIOR TO FABRICATION. MISCELLANEOUS WELDS WHICH DO NOT CALL FOR PREAPPROVED WELD PROCEDURES ARE NEVERTHELESS SUBJECT TO REJECTION FOR POOR WORKMANSHIP, MATERIALS, FABRICATION TOLERANCES, AND SHIPPING PRACTICES SHALL MEET THE REQUIREMENTS OF THIS SHEET AND THE SPECIFICATIONS.

UNLESS OTHERWISE NOTED, ALL PARTS SHALL BE GALVANIZED IN ACCORDANCE WITH THE SPECIFICATIONS.

SPECIAL DESIGNS REQUIRE SUBMISSION OF SHOP DRAWINGS IN ACCORDANCE WITH THE ITEM "STEEL STRUCTURES".

ALL MAST ARMS 35' AND GREATER IN LENGTH SHALL HAVE DAMPENING PLATES INSTALLED.

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
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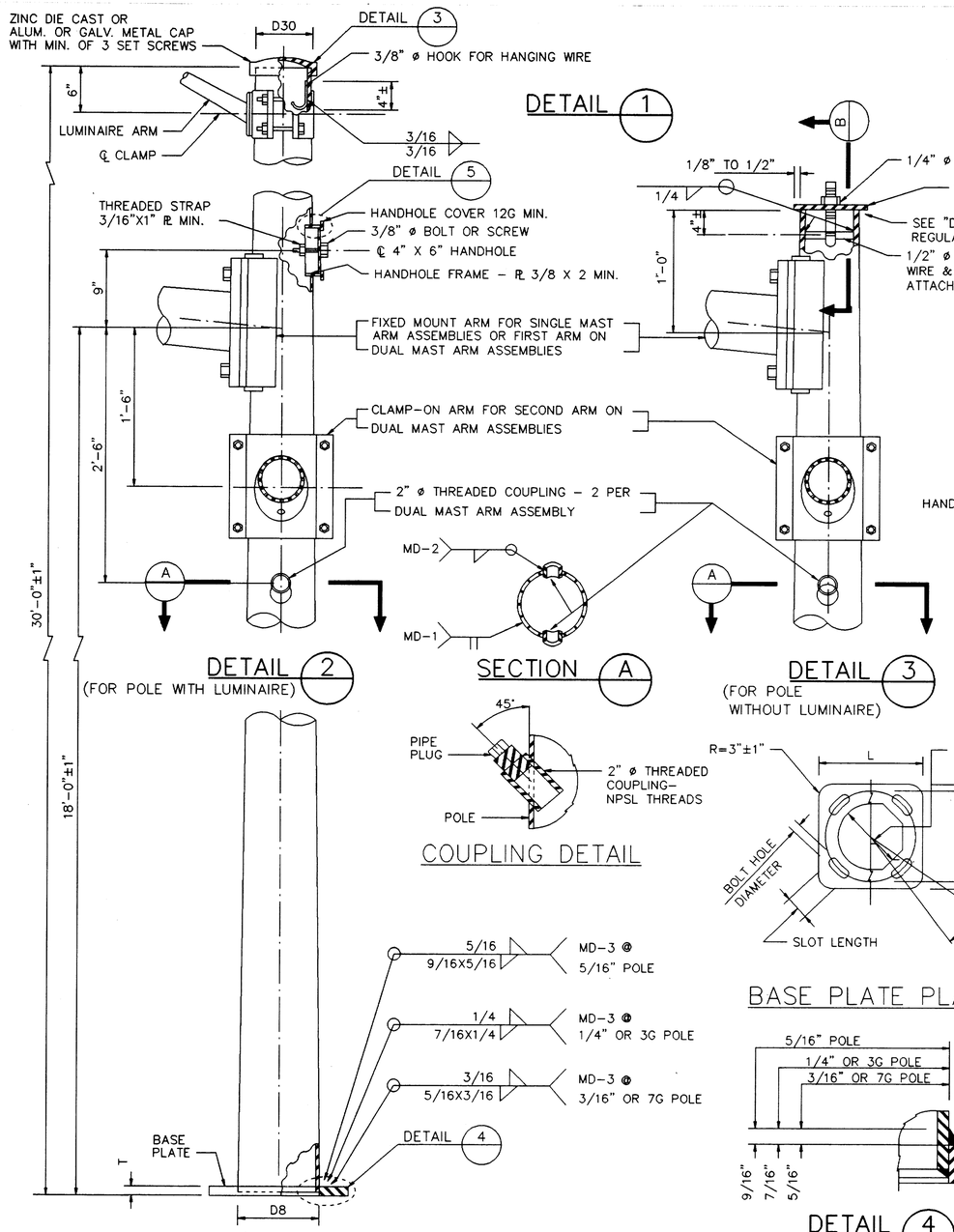
SCALE:
DATE :

STATE OF TEXAS — REGISTERED PROFESSIONAL ENGINEER

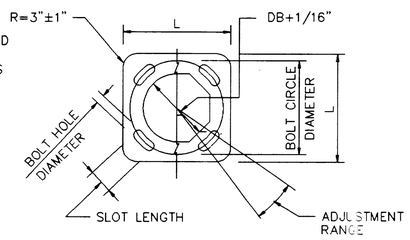
ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

SINGLE MAST ARM ASSEMBLIES
(80 MPH WIND ZONE)

SHEET NO.
OF SHEETS
JOB NO.

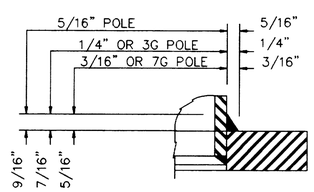


COUPLING DETAIL

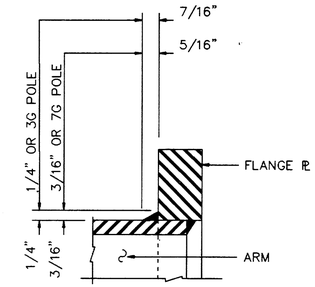


BASE PLATE PLAN

POLE ELEVATION



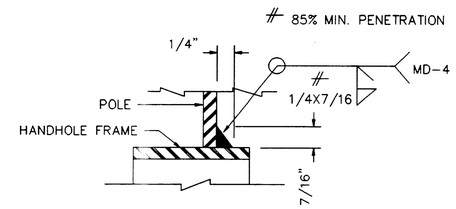
DETAIL 4



ARM BASE WELD DETAILS

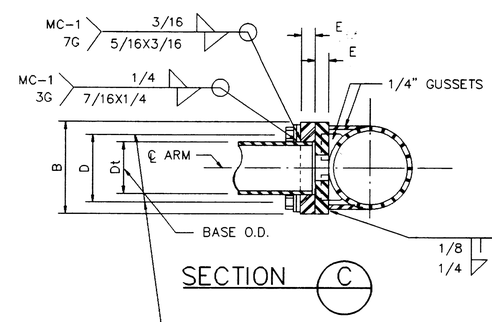
MATERIALS	
ROUND SHAFTS	ASTM A595 GRA, ASTM A570 GR50
PLATES (1)	ASTM A36 OR A572 GR50 OR A595 (2) OR A36M50
CONNECTION BOLTS	ASTM A325 EXCEPT WHERE NOTED
PIN BOLTS	ASTM A325
PIPE	ASTM A53 GR A OR B, OR A501
MISC. HARDWARE	GALVANIZED STEEL OR STAINLESS OR AS NOTED

(1) ANY OF THE MATERIALS LISTED FOR PLATES MAY BE USED WHERE THE DRAWINGS DO NOT SPECIFY A PARTICULAR GRADE DESIGNATION.
(2) IF A595 MATERIAL IS USED, IT NEED NOT BE COLD WORKED TO A595 REQUIREMENTS, BUT MATERIALS MUST HAVE 40 KSI MINIMUM YIELD PRIOR TO FABRICATION.

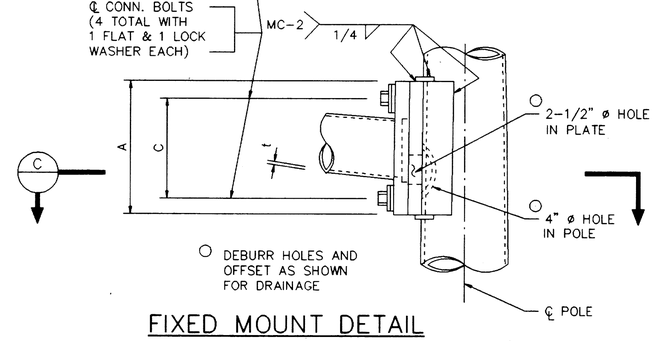


DETAIL 5

ARM SIZE		A	B	C	D	E	CONN. BOLT DIAM.
Dt	t						
in	in	in	in	in	in	in	in
6.5	.179	12	9	9	6	1	1
7.5	.179	13	9	10	6	1	1
8.0	.179	14	10	11	7	1–1/4	1–1/4
9.0	.179	16	11	13	8	1–1/4	1–1/4
9.5	.179	17	12	14	9	1–1/4	1–1/4
9.5	.239	18	12	15	9	1–1/4	1–1/4
10.0	.239	18	12	15	9	1–1/4	1–1/4
10.5	.239	18	13	15	10	1–1/2	1–1/2
11.0	.239	18	13	15	10	1–1/2	1–1/2



SECTION C



FIXED MOUNT DETAIL

GENERAL NOTES:

CLAMP–ON DETAILS ARE USED FOR THE SECOND ARM ON DUAL MAST ARM ASSEMBLIES. A MAXIMUM 1–1/2" WIDE VERTICAL SLOTTED HOLE MAY BE CUT IN THE FRONT CLAMP PLATE TO FACILITATE DRAINAGE DURING GALVANIZING. THE SLOT SHALL BE CENTERED BEHIND THE ARM AND SHALL BE NO LONGER THAN THE ARM DIAMETER MINUS 1".

FIXED MOUNT DETAILS ARE USED FOR SINGLE MAST ARM ASSEMBLIES AND FOR THE FIRST ARM ON DUAL MAST ARM ASSEMBLIES.

WHERE DUPLICATE PARTS OCCUR ON DETAIL, WELDS SHOWN FOR ONE PART SHALL APPLY TO ALL SIMILAR PARTS ON THE DETAIL.

PIN BOLTS ARE REQUIRED TO PREVENT ROTATION OF CLAMP–ON ARMS UNDER DESIGN WIND FORCES.

ALL POLES ARMS & METAL HARDWARE TO BE PAINTED "BRUSHING BROWN".

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE:

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13800 Montfort Drive Suite 230 Dallas, Texas 75240
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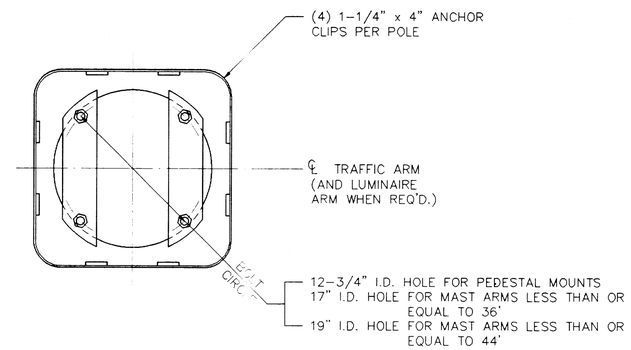
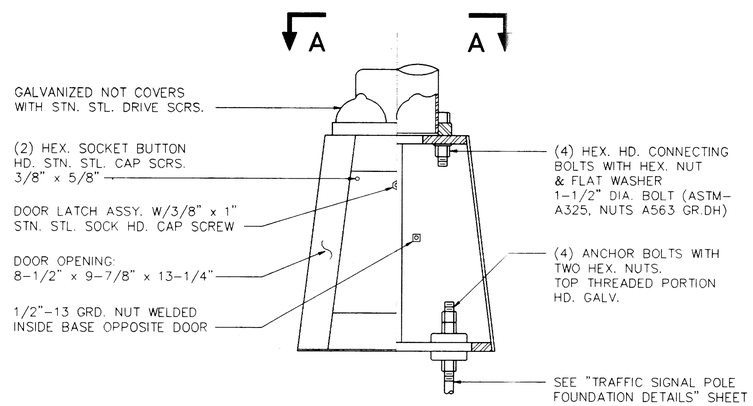
MAST ARM CONNECTIONS

SHEET NO.
OF SHEETS
JOB NO.



SECTION A



TRANSFORMER BASE
MOUNTING DETAILS

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
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SCALE:
DATE:

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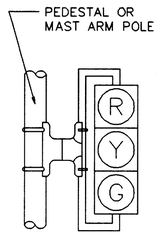
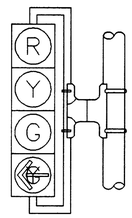
(214) 387-0771

MAST ARM
POLE DETAILS

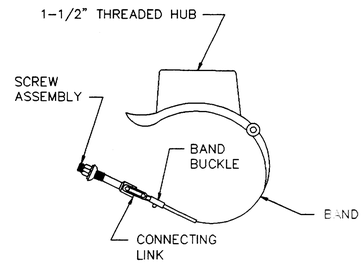
SHEET NO.
OF SHEETS
JOB NO.



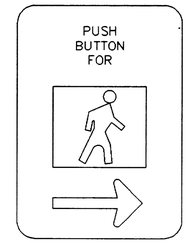
V3



V4LT



ASTRO MINI-BRAC

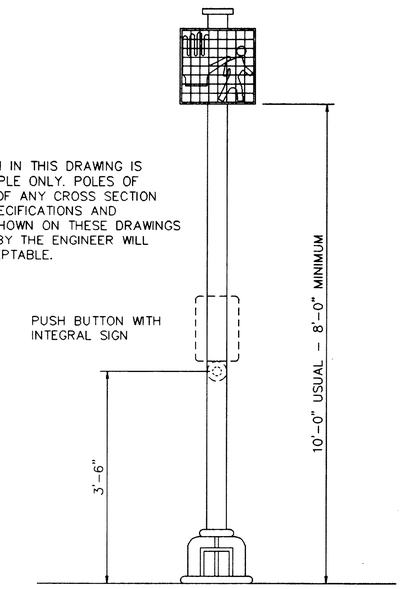


SIGN R10-4b
9" x 12"

PEDESTRIAN PUSH BUTTON
SIGN DETAILS

NOTE :

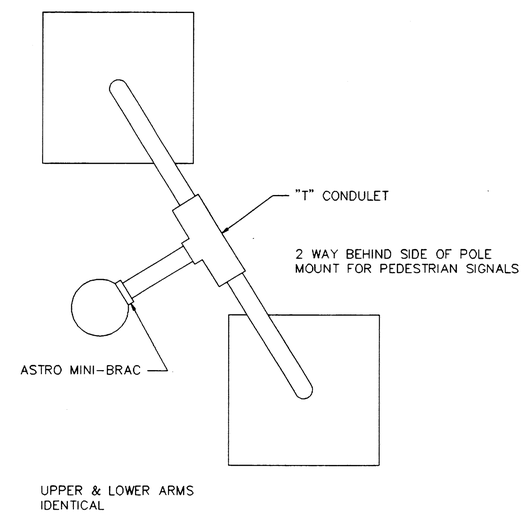
THE POLE SHOWN IN THIS DRAWING IS SHOWN AS EXAMPLE ONLY. POLES OF SIMILAR DESIGN OF ANY CROSS SECTION AND MEETING SPECIFICATIONS AND REQUIREMENTS SHOWN ON THESE DRAWINGS AND APPROVED BY THE ENGINEER WILL BE DEEMED ACCEPTABLE.



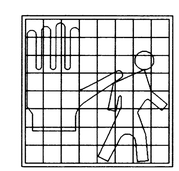
POST DETAIL

NOTES :

1. ALL SIGNAL HEAD LENSES SHALL BE 12" IN DIAMETER.
2. VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE MOUNTED WITH "ASTRO-BRACS" AND APPROPRIATE TUBING, PAINTED BLACK. ALL SIGNALS TO BE BLACK, ALL LENSES TO BE GLASS.
3. ALL VISORS SHALL BE TUNNEL VISORS.
4. ALL POLE MOUNTED VEHICLE AND PEDESTRIAN SIGNAL HEADS SHALL BE INSTALLED ON THE AWAY-FROM-TRAFFIC SIDE OF THE PEDESTAL OR MAST ARM POLE.
5. ALL SIGNAL HEADS WILL BE PROVIDED WITH BLACK 5" POLYCARBONATE VACUUM FORMED BACKPLATES.
6. ALL WIRING FOR VEHICLE AND PEDESTRIAN SIGNALS SHALL BE TOTALLY ENCLOSED WITHIN THE SIGNAL MOUNTING HARDWARE.
7. ALL DAMPING DEVICES SHALL BE 18" TO 2' WIDE BY 4' IN LENGTH.
8. ALL PEDESTRIAN SIGNAL HEADS AND PUSH BUTTON SIGNS SHALL DISPLAY THE SYMBOLIZED MESSAGES SHOWN ON THIS SHEET.
9. SYMBOLIZED MESSAGE HIGHT SHALL BE 10 INCHES MINIMUM.
10. PROVIDE DURO TEST 135 WATT SAVER LAMPS IN VEHICLE SIGNALS.
11. PROVIDE DURO TEST 60 WATT SAVER LAMPS IN PEDESTRIAN SIGNALS.



PEDESTRIAN SIGNAL HEAD MOUNTING
FOR TWO PEDESTRIAN SIGNAL HEADS



152A

PEDESTRIAN SIGNAL HEAD IDENTIFICATION

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE :

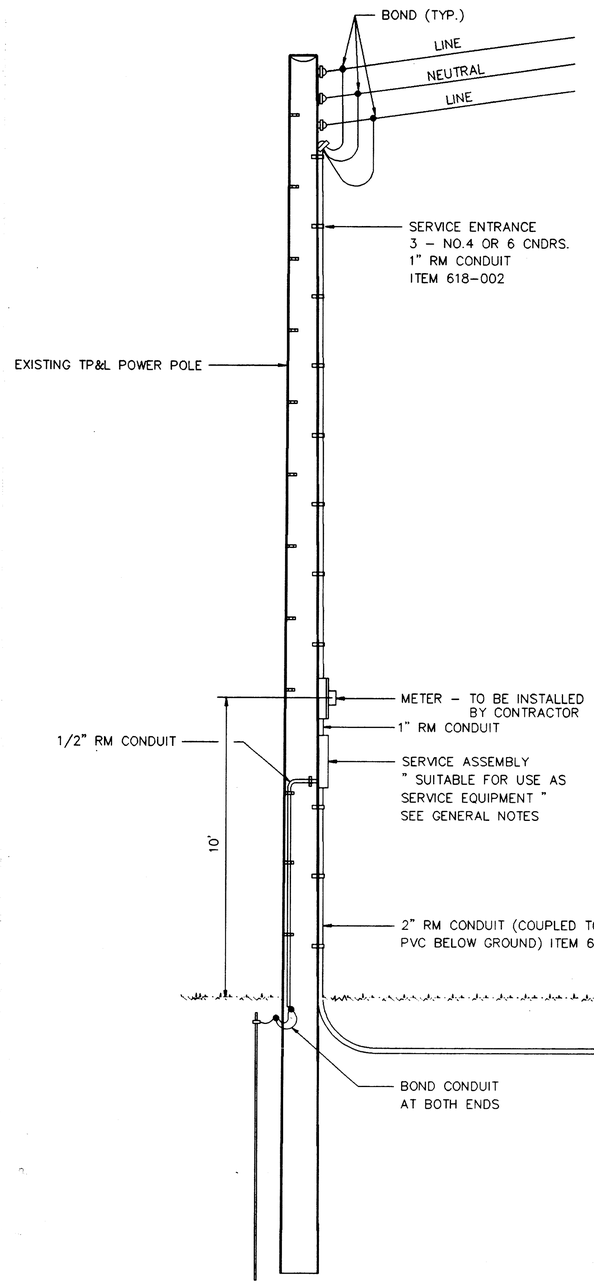
STATE OF TEXAS

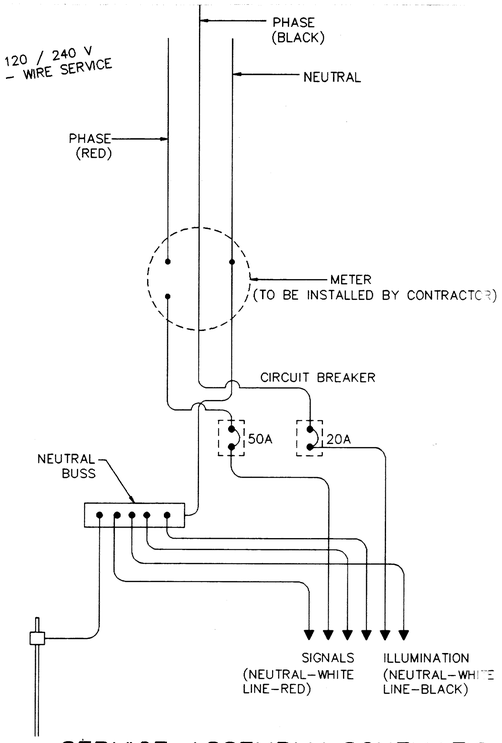
ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

TRAFFIC SIGNAL HEAD
IDENTIFICATION

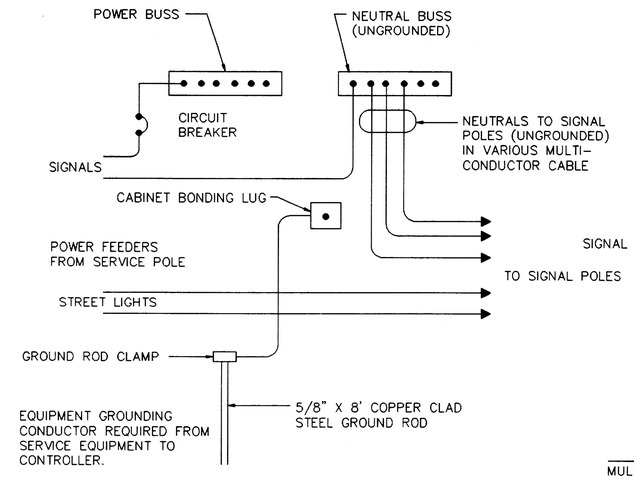
SHEET NO.
OF SHEETS
JOB NO.

TELEDYNE POST 1482-PM

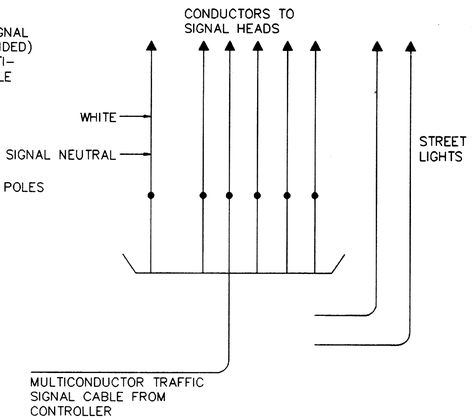




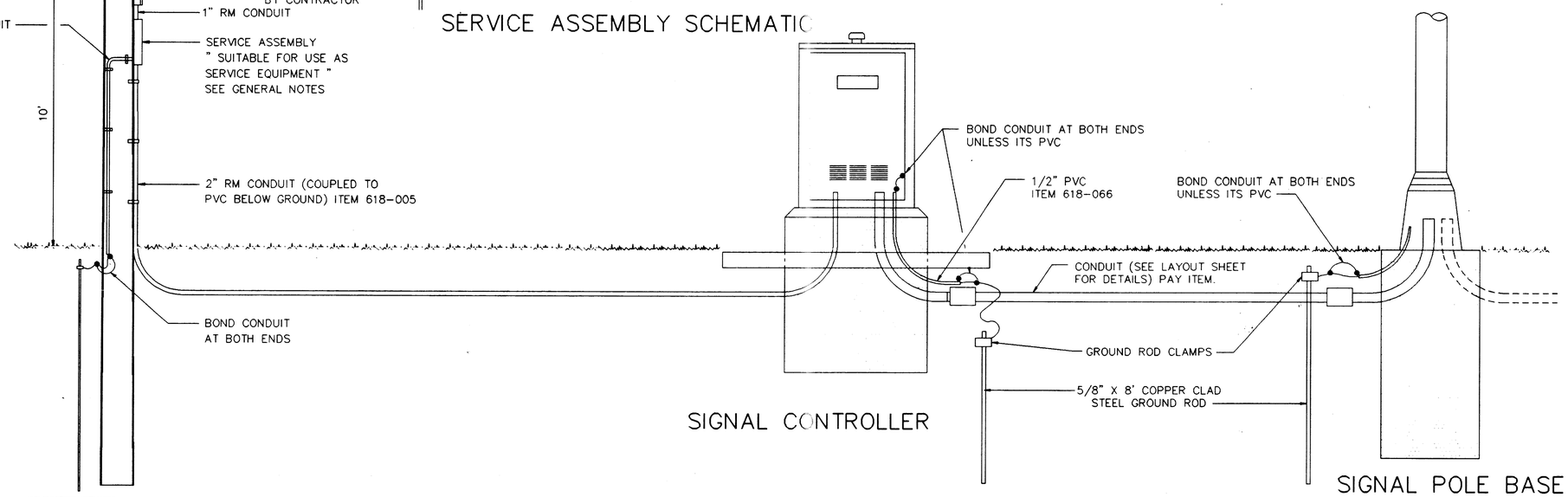
SERVICE ASSEMBLY SCHEMATIC



CONNECTIONS AT SIGNAL CONTROLLERS



CONNECTIONS AT POLE BASE



SIGNAL CONTROLLER

SIGNAL POLE BASE

NO.	REVISION	BY	DATE

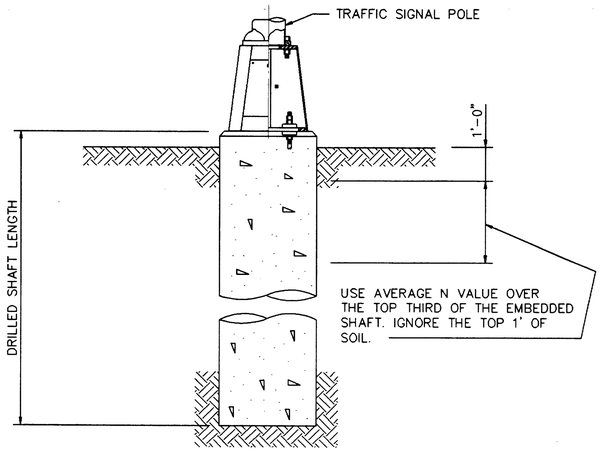
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE:

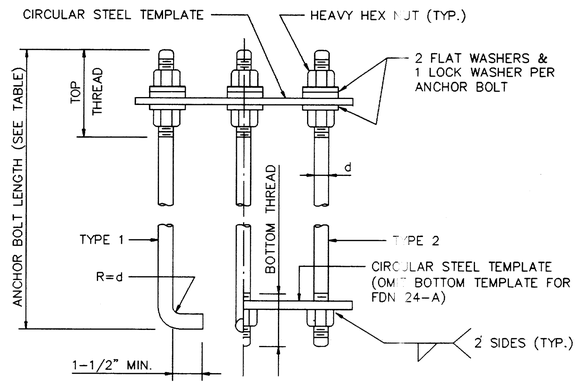
STATE OF TEXAS
REGISTERED
PROFESSIONAL ENGINEER

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

SERVICE POLE AND
GROUNDING DETAILS

SHEET NO.
OF SHEETS
JOB NO.





HOOKED ANCHOR (TYPE 1) NUT ANCHOR (TYPE 2)

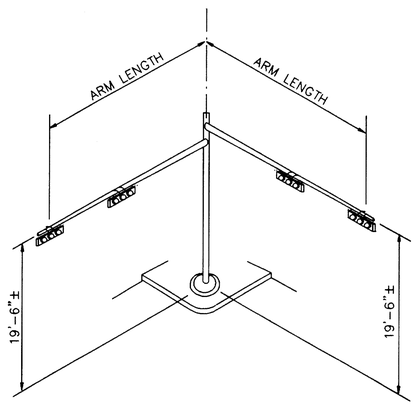
ANCHOR BOLT ASSEMBLY

ANCHOR BOLT & TEMPLATE SIZES						
BOLT DIAMETER	*BOLT LENGTH	TOP THREAD	BOTTOM THREAD	BOLT CIRCLE	R2	R1
3/4"	1'-6"	3"	–	12-3/4"	7-1/8"	5-5/8"
1-1/2"	3'-4"	6"	2"	17"	10"	7"
1-3/4"	3'-10"	7"	2-1/4"	19"	11-1/8"	7-3/4"
2"	4'-3"	8"	2-1/2"	21"	12-1/2"	8-1/2"

* MINIMUM DIMENSIONS GIVEN, LONGER BOLTS ARE ACCEPTABLE.

INSTALLATION PROCEDURE :

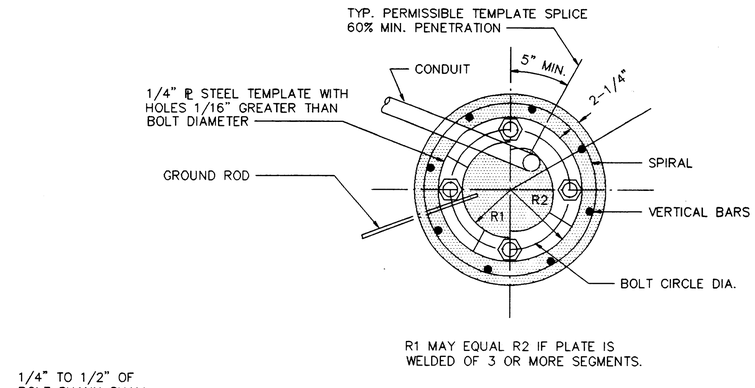
THREADS OF ANCHOR BOLTS SHALL BE COATED WITH PIPE JOINT COMPOUND PRIOR TO INSTALLATION OF UPPER NUTS WHEN ERECTING POLE. AFTER POLE IS PLUMBED AND IN PERMANENT ALIGNMENT, THE EXPOSED THREADS OF PAINTED BOLTS SHALL BE CLEANED AND AN ADDITIONAL COATING OF ZINC-RICH PAINT APPLIED TO SEAL THE BOLT THREAD-NUT JOINT.



TYPICAL MAST ARM ASSEMBLY

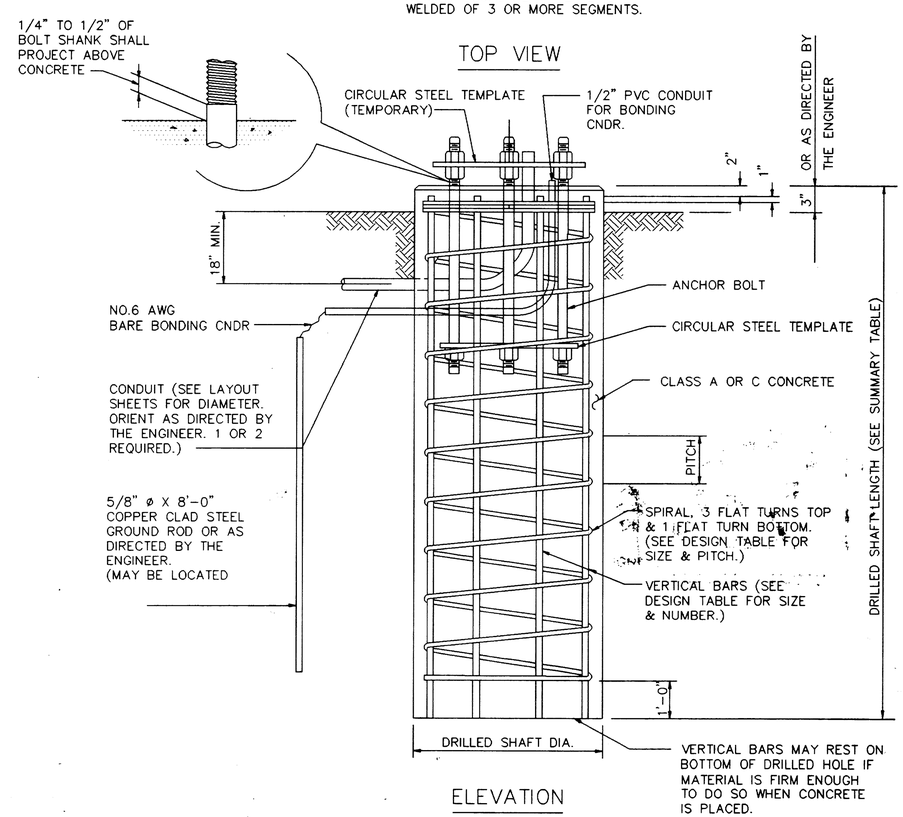
NOTES :

(1) ANCHOR BOLT DESIGN DEVELOPS THE FOUNDATION CAPACITY GIVEN UNDER FOUNDATION DESIGN LOADS.
(2) FOUNDATION DESIGN LOADS ARE THE ALLOWABLE MOMENTS AND SHEARS AT THE BASE OF THE STRUCTURE.
(3) FOUNDATIONS MAY BE LISTED SEPARATELY OR GROUPED ACCORDING TO SIMILARITY OF LOCATION AND TYPE. QUANTITIES ARE FOR THE CONTRACTOR'S INFORMATION ONLY.
(4) FIELD PENETROMETER READINGS AT A DEPTH OF APPROXIMATELY 3 TO 5 FEET MAY BE USED TO ADJUST SHAFT LENGTHS.
(5) IF ROCK IS ENCOUNTERED, THE DRILLED SHAFT SHALL EXTEND A MINIMUM OF TWO DIAMETERS INTO SOLID ROCK.
(6) DECIMAL LENGTHS IN DESIGN TABLE ARE TO ALLOW INTERPOLATION FOR OTHER PENETROMATER VALUES. ROUND TO NEAREST FOOT FOR ENTRY INTO SUMMARY TABLE.



R1 MAY EQUAL R2 IF PLATE IS WELDED OF 3 OR MORE SEGMENTS.

TOP VIEW



ELEVATION

FOUNDATION DETAILS

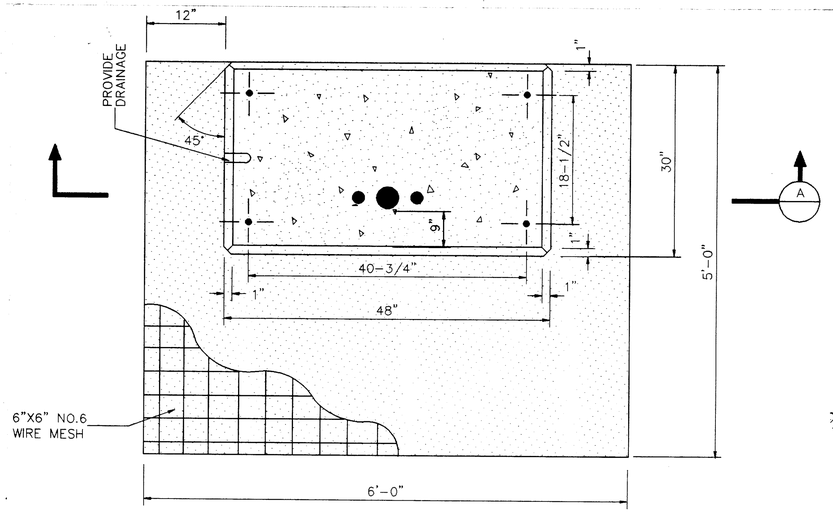
NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE :

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

TRAFFIC SIGNAL POLE FOUNDATIONS

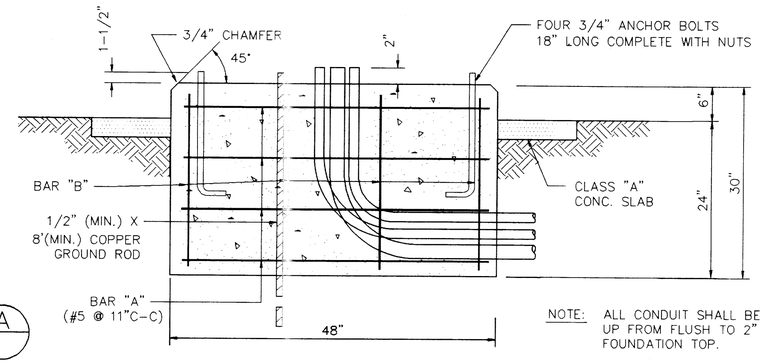
SHEET NO.
OF SHEETS
JOB NO.



TOP VIEW

CONTROLLER FOUNDATION

DETAIL 1



ELEVATION

SECTION A

NOTE: ALL CONDUIT SHALL BE STUBBED UP FROM FLUSH TO 2" MAX. ABOVE FOUNDATION TOP.

FOUNDATION DESIGN TABLE

FDN. TYPE	DRILLED SHAFT DIA.	REINFORCING STEEL VERT. BARS	REINFORCING STEEL SPIRAL & PITCH	DRILLED SHAFT LENGTH – feet (4),(5) (6) TEXAS CONE PENETROMETER, N blows/ft 10	15	40	ANCHOR BOLT DESIGN (1) ANCHOR BOLT DIA.	Fy (ksi)	BOLT CIRCLE DIA.	ANCHOR TYPE	FOUNDATION DESIGN LOAD (2) MOMENT K-ft	SHEAR Kips	TYPICAL APPLICATION
24-A	24"	4-#5	#2at12"	5.7	5.3	4.5	3/4"	36	12-3/4"	1	10	1	PEDESTAL POLE, PEDESTAL MOUNTED CONTROLLER.
30-A	30"	8-#7	#3at9	11.3	10.3	8.0	1-1/2"	55	17"	2	87	3	MAST ARM ASSEMBLY (SEE SELECTION TABLE)
30-B	30"	8-#9	#3at9	13.2	11.9	9.0	1-3/4"	55	19"	2	131	5	MAST ARM ASSEMBLY (SEE SELECTION TABLE) 30' STRAIN POLE WITH OR WITHOUT LUMINAIRE.
36-A	36"	12-#9	#3at9	15.2	13.6	10.4	2"	55	21"	2	190	7	MAST ARM ASSEMBLY (SEE SELECTION TABLE) STRAIN POLE TALLER THAN 30' & STRAIN POLE WITH MAST ARM.

FOUNDATION SELECTION TABLE FOR STANDARD MAST ARM ASSEMBLIES

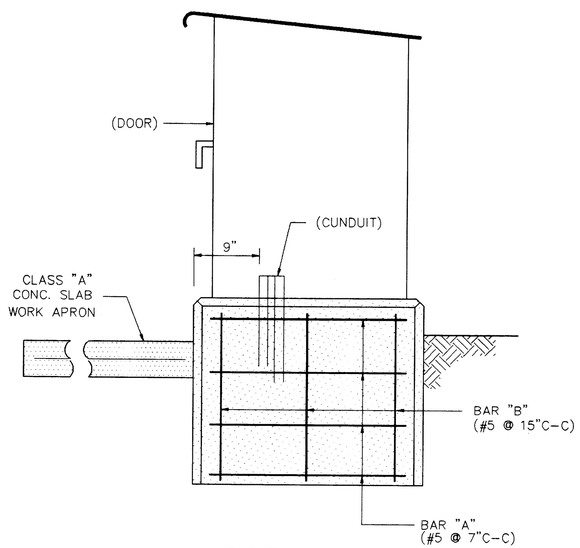
		FDN 30-A	FDN 30-B	FDN 36-A
80 MPH DESIGN WIND SPEED	MAXIMUM SINGLE ARM LENGTH	36'	48'	
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS	24' x 24'		
		28' x 28'		
		32' x 28'	32' x 32'	
			36' x 36'	
			40' x 36'	
			44' x 28'	44' x 36'
100 MPH DESIGN WIND SPEED	MAXIMUM SINGLE ARM LENGTH	24'	36'	44'
	MAXIMUM DOUBLE ARM LENGTH COMBINATIONS		24' x 24'	
			28' x 28'	
			32' x 24'	32' x 32'
				36' x 36'
				40' x 36'
				44' x 36'

EXAMPLES :

(1) FOR 80MPH DESIGN WIND SPEED, FOUNDATION 30-A CAN SUPPORT UP TO A 32' ARM WITH ANOTHER ARM UP TO 28'.
(2) FOR 100MPH DESIGN WIND SPEED, FOUNDATION 30-B CAN SUPPORT A SINGLE 36' MAST ARM.

FOUNDATION SUMMARY TABLE (3)

LOCATION / IDENTIFICATION	AVG. N blows/ft	FDN TYPE	NO. (ea.)	DRILLED SHAFT LENGTH (6) (FEET) 24-A	30-A	30-B	36-A
All 55' Mast Arms & Poles		36-A	6				13.6
All 36' Mast Arms & Poles		30-A	2			10.3	
TOTAL DRILLED SHAFT LENGTHS							



SIDE VIEW

GENERAL NOTES :

DESIGN CONFORMS TO 1975 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS AND INTERIM REVISIONS THERETO.

REINFORCING STEEL SHALL CONFORM TO ITEM 440.

CONCRETE SHALL BE CLASS C.

THREADS FOR ANCHORE BOLTS AND NUTS SHALL BE ROLLED OR CUT THREADS OF UNIFIED NATIONAL COARSE THREAD SERIES EXCEPT FOR A19387 BOLTS WHICH SHALL HAVE 8 PITCH THREAD SERIES. BOLTS AND NUTS SHALL HAVE CLASS 2A AND 2B FIT TOLERANCES. GALVANIZED NUTS SHALL BE TAPPED AFTER GALVANIZING.

ANCHOR BOLTS THAT ARE 1" IN DIAMETER OR LESS SHALL CONFORM TO ASTM A36. ANCHOR BOLTS LARGER THAN 1" IN DIAMETER SHALL CONFORM TO SPECIAL SPECIFICATION A36M55 OR ASTM A19387 OR A687. GALVANIZE OR COAT WITH ZINC-RICH PAINT A MINIMUM OF THE UPPER 14 INCHES OF ALL ANCHORE BOLTS UNLESS OTHERWISE NOTED. NUTS FOR ANCHOR BOLTS SHALL CONFORM TO ASTM A563 Gr A OR BETTER HEAVY HEX. EXPOSED NUTS SHALL BE GALVANIZED OR COATED WITH ZINC-RICH PAINT. WASHERS SHALL BE GALVANIZED. TEMPLATES AND EMBEDED NUTS NEED NOT BE GALVANIZED.

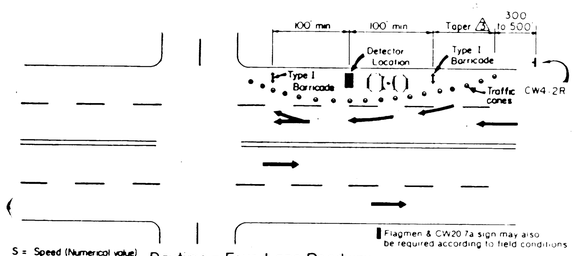
NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE :

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

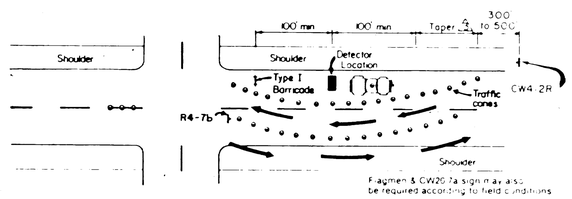
FOUNDATION SUMMARY

SHEET NO.
OF SHEETS
JOB NO.



S = Speed (Numerical value)
W = Width of offset

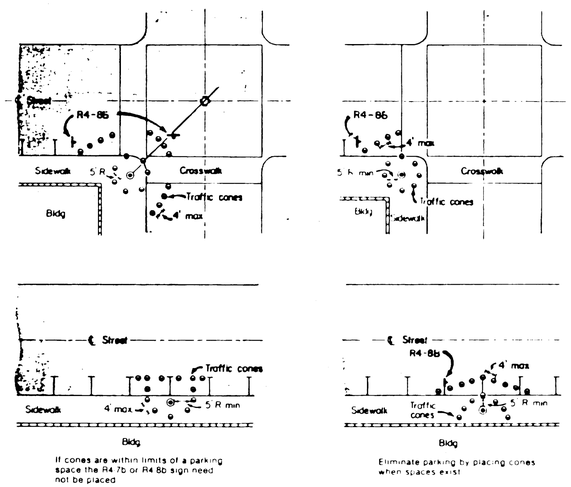
Daytime - Four Lane Roadway



Daytime - Two Lane Roadway

TYPICAL DETECTOR INSTALLATION

At Night — 1. Steady burn lamps for delineation instead of cones
2. Flashers on barricades

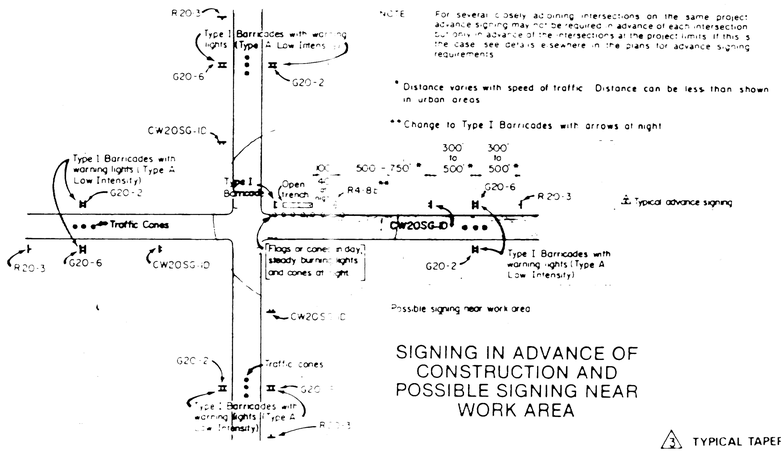


If cones are within limits of a parking space the R4-7b or R4-8b sign need not be placed

Eliminate parking by placing cones when spaces exist

TYPICAL RESTRICTED PEDESTRIAN MOVEMENTS

Where pedestrian movements are anticipated at night all holes, trenches or other hazardous areas shall be adequately protected by use of barricades lights or other protective devices



NOTE

For several closely adjoining intersections on the same project advance signing may not be required in advance of each intersection but only in advance of the intersections at the project limits. If this is the case, see details elsewhere in the plans for advance signing requirements.

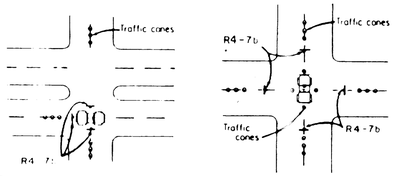
* Distance varies with speed of traffic. Distance can be less than shown in urban areas.

** Change to Type I Barricades with arrows at night

Typical advance signing

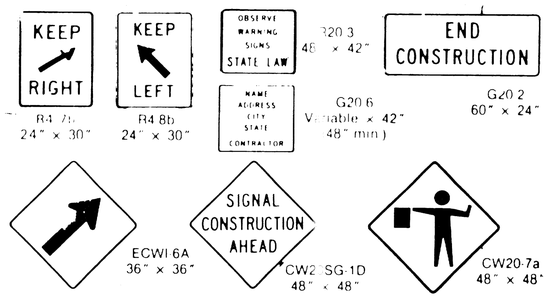
Possible signing near work area

SIGNING IN ADVANCE OF CONSTRUCTION AND POSSIBLE SIGNING NEAR WORK AREA



TYPICAL HANGING SIGNAL INSTALLATIONS

NOTES:
1. Flagmen & CW20-7a sign may also be required according to field conditions.
2. Use vehicle equipped with yellow rotating beacon or strobe.



TYPICAL SIGNS USED IN TRAFFIC SIGNAL CONSTRUCTION AREAS

TYPICAL TAPER LENGTH (L)

Posted Speed	Formula	Minimum Derivative Taper Lengths (L) 10' (Typical Offset)	11' (Typical Offset)	12' (Typical Offset)
30	L = WS²/60	150	165	180
35		205	225	245
40		265	295	320
45		450	495	540
50	L = WS/60	500	550	600
55		550	605	660
60		600	660	720

* 85TH PERCENTILE SPEED MAY BE USED WHEN TRAFFIC SPEEDS NORMALLY EXCEED THE POSTED SPEED LIMIT
** TAPER LENGTHS HAVE BEEN ROUNDED UP

L = TAPER LENGTH IN FEET
W = OFFSET IN FEET
S = SPEED IN MPH

GENERAL NOTES

Reflectorized signs shall be constructed of retro-reflective sheeting in conformance with project specifications and shall be maintained to meet the appearance, color and reflectivity requirements of those specifications. Paints and coloration of signs shall be equal to the Department's standards. Signs shall comply with the general requirements specified in the "Standard Specifications for Construction of Highways, Streets and Bridges" in effect at the time of contract award.

All traffic control devices shall conform with the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways." Contractors shall furnish a copy of a certification from the manufacturer of the lights that the warning lights meet the requirements of the ITE Standard for Flashing and Steady Burn Warning Lights as contained in the lastest edition of the "Texas Manual on Uniform Traffic Control Devices for Streets and Highways."

All signs shown have black letters and borders on a reflective orange background except the R20-3, R4-7b, R4-8b, and G20-6 signs which have a reflective white background.

Signs erected on portable supports for use on construction projects normally mean signs which are used during the day to warn or guide traffic through and/or around the actual construction area, but at the end of the workday such signs are either removed or turned away from the view of traffic. Portable supports shall be as shown on this sheet or as approved by the Engineer. The bottom of the sign shall be a minimum of one (1) foot above the pavement sign. Signs required for nighttime usage should not normally be mounted on temporary supports, except when approved by the Engineer. Signs erected on fixed supports for use on construction projects normally mean signs that are to remain in place for both day and night usage to regulate, warn and guide traffic in advance of and within the limits of the project including the crossroad approaches. However, under certain conditions, such as where a sign may be required for a few days duration and then is no longer needed or where a sign is moved from location to location every few days or where it is not practical or desirable to provide a fixed mounting, such signs may be erected on a temporary type of support. Temporary supports shall be as shown on this sheet or as approved by the Engineer. Signs erected on temporary supports should be at a minimum height of three (3) feet. Signs erected on fixed supports should be at a minimum height of five (5) feet in rural areas and seven (7) feet in urban areas and other rural locations where sight distance obstructions are present. Regardless of the type of support used, regulatory signs should not be erected at height less than the 5' or 7 foot minimum specified above unless a lower height is approved by the Engineer. Posts for fixed supports should be set in the ground without concrete footings.

Where portable or temporary supports require the use of weights to keep a sign or barricade from turning over, the use of some type of sandbag is recommended. The use of pieces of concrete, rocks, iron, steel or other solid objects will not be permitted.

For additional information and guidelines on barricades and construction signs see the Texas Manual on Uniform Traffic Control Devices.

Signing shown is typical and may be adjusted to fit field conditions by the Engineer.

No more than two signs shall be placed on a barricade.

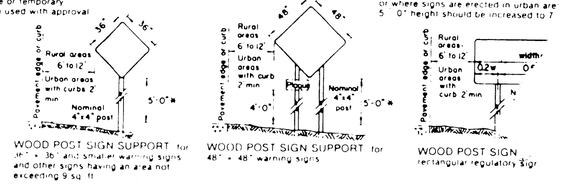
⚠1 Where a sign is to be mounted on a barricade, the barricade length should not be less than the horizontal dimension of the sign. If lights are also to be mounted on the barricade, the barricade should not be less than the sign width plus about 12" for each light to be attached. Barricades of a greater length than the above will be satisfactory.

⚠2 The advance signs and barricades shall be in place when signal construction operations are in progress. The contractor may remove the advance signs and barricades when there are no construction operations underway if permitted elsewhere in the plans. Any obstructions or hazards at the work area shall be clearly marked and delineated at all times.

TYPICAL SIGN SUPPORTS

⚠1 Other type of portable or temporary sign supports may be used with approval of the ENGINEER.

FIXED SUPPORTS



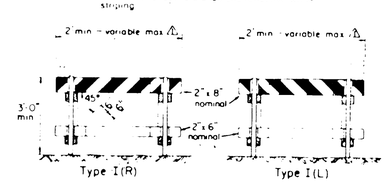
WOOD POST SIGN SUPPORT for 36" x 36" and smaller warning signs and other signs having an area not exceeding 9 sq. ft.

WOOD POST SIGN SUPPORT for 48" x 48" warning signs

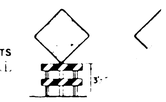
WOOD POST SIGN rectangular regulatory sign

* Where sight distance obstructions are pr or where signs are erected in urban are 5'-0" height should be increased to 7

For Type I Barricades, both sides of the top rail shall have reflective orange and reflective white striping.



TEMPORARY SUPPORTS



TYPE II BARRI SIGN SUPP

PORTABLE SUPPORTS

⚠1

TYP Barri

TYPE I BARRICADES

NO.	REVISION	BY	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SCALE:
DATE:

ESPEY, HUSTON & ASSOCIATES, INC.
Engineering & Environmental Consultants
13800 Montfort Drive Suite 230 Dallas, Texas 75240
(214) 387-0771

TYPICAL CONSTRUCTION LAYOUTS FOR TRAFFIC SIGNAL INSTALLATIONS

INTERSECTION IMPROVEMENTS

FOR

BELT LINE ROAD AT MARSH LANE
BELT LINE ROAD AT BUSINESS AVENUE

TOWN OF ADDISON

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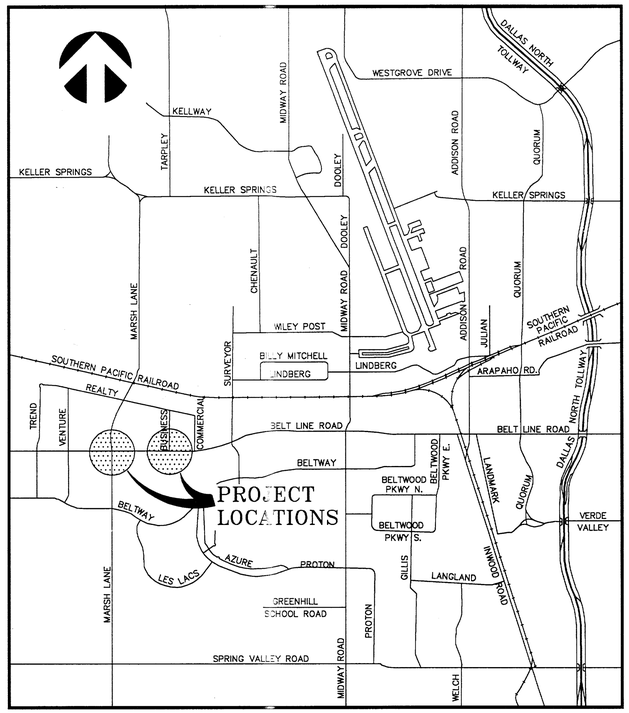

LOCATION MAP

N.T.S.

E.H. & A. JOB NO. 13921
E.H. & A. JOB NO. 15411

CONSTRUCTION SET
ISSUED BY
TOWN OF ADDISON
PUBLIC WORKS DEPARTMENT
NAME: David Wightman DATE: 7/19/94

TOWN OF ADDISON ENGINEER	JOHN BAUMGARTNER, P.E.
EH&A PROJECT MANAGER	BRUCE GRANTHAM, P.E.

Espey, Huston & Associates, Inc.
Engineering & Environmental Consultants
13800 Montfort Drive, Suite 230
Dallas, Texas 75240 (214) 387-0771

BELT LINE ROAD/BUSINESS AVE
BELT LINE ROAD/MARSH LANE

B23-6