THE CITY OF ROCKWALL, TEXAS

CONSTRUCTION PLANS

FOR

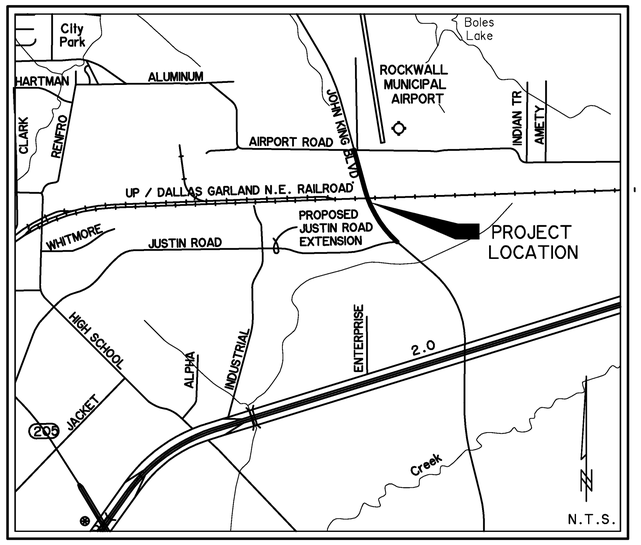
OFFSITE WATER IMPROVEMENTS

TO SERVE

JOHN KING BOULEVARD

(AIRPORT ROAD TO JUSTIN ROAD)

ROCKWALL COUNTY, TEXAS



VICINITY MAP

SHEET INDEX

CITY OF ROCKWALL STANDARD DETAIL SHEETS INCORPORATED HEREIN BY REFERENCE.

DAVID SWEET - MAYOR

COUNCIL MEMBERS

DAVID WHITE - Mayor Pro Tem
JIM PRUITT
BENNIE DANIELS
DENNIS LEWIS
SCOTT MILDER
MIKE TOWNSEND

RICK CROWLEY - City Manager

PREPARED BY:
WIER & ASSOCIATES, INC.
ENGINEERS SURVEYORS LAND PLANNERS
701 HIGHLANDER BLVD., SUITE 300 ARLINGTON, TEXAS 76015 METRO (817)467-7700
Texas Firm Registration No. F-2776 www.WierAssociates.com

RECORD PLANS
MAY 1, 2015

NOTE:

1.) ALL REFERENCES TO "CITY" SHALL MEAN "CITY OF ROCKWALL".

2.) ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF ROCKWALL AND NORTH TEXAS COUNCIL OF GOVERNMENT STANDARD SPECIFICATIONS THIRD EDITION.

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W.A.# I3096 - CONSTRUCTION PLANS FOR WATER IMPROVEMENTS TO SERVE JOHN KING BOULEVARD, ROCKWALL, TEXAS.

EXISTING TOPOGRAPHIC LEGEND

	ASPHALT PAVEMENT
BOL/GP	BOLLARD/GUARD POST
B/C	DIMENSION TO BACK OF CURB
CATV	CABLE TV
CM	CONTROL MONUMENT
CONC.	CONCRETE
EAP	EDGE OF ASPHALT PAVEMENT
EB	ELEC BOX (GROUND)
EM	ELEC METER
FH	FIRE HYDRANT
FO	FIBER OPTIC CABLE
GM	GAS METER
GMH	GAS MANHOLE
GTS	GAS TEST STATION
GUY	GUY WIRE
HDWL.	CONCRETE HEADWALL
ICV	IRRIGATION CONTROL VALVE
IRF	IRON ROD FOUND
IRS	IRON ROD SET
LP	LIGHT POLE
PP	POWER POLE
PP/LP	POWER POLE W/LIGHT
SDMH	STORM DRAIN MANHOLE
SHD	SPRINKLER HEAD
SN	SIGN
SSMH	SANITARY SEWER MANHOLE
SSCO	SANITARY SEWER CLEANOUT
SWBT	SOUTH WESTERN BELL TELEPHONE
TPD	TELEPHONE PEDESTAL
TSG	TELEPHONE SWITCH GEAR
TSB	TRAFFIC SIGNAL BOX
TSP	TRAFFIC SIGNAL POLE
TSC	TRAFFIC SIGNAL CONTROLLER
	TRANSFORMER PAD
WM	WATER METER
WV	WATER VALVE
OE	OVERHEAD ELECTRIC LINE
UE	UNDERGROUND ELECTRIC LINE
W	WATER LINE
SS	SANITARY SEWER LINE
FO	FIBER OPTIC LINE
UT	UNDERGROUND TELEPHONE
OT	OVERHEAD TELEPHONE
G	UNDERGROUND GAS
24" RCP	EXISTING CONCRETE STORM DRAIN LINE
24" CMP	EXISTING CORREGATED METAL STORM DRAIN LINE
	EXISTING FLOWLINE
BARBED WIRE FENCE	BARBED WIRE FENCE
CHAIN LINK FENCE	CHAIN LINK FENCE
WOOD FENCE	WOOD FENCE
	GUARD RAIL / BARRICADE
	EXISTING TREE LINE
	EXISTING TREE

WATER & SANITARY SEWER PLAN LEGEND

24" W	PROPOSED 18" OR LARGER WATER MAIN
8" W	PROPOSED 16" OR SMALLER WATER MAIN
24" W	FUTURE 18" OR LARGER WATER MAIN
8" W	FUTURE 16" OR SMALLER WATER MAIN
	PROPOSED GATE VALVE
	PROPOSED REDUCER
	PROPOSED WATER METER
	PROPOSED FIRE HYDRANT
	PROPOSED AIR RELEASE VALVE OR BLOW-OFF VALVE
24" SS	PROPOSED 18" OR LARGER SANITARY SEWER
8" SS	PROPOSED 15" OR SMALLER SANITARY SEWER
24" SS	FUTURE 18" OR LARGER SANITARY SEWER
8" SS	FUTURE 15" OR SMALLER SANITARY SEWER
	PROPOSED SANITARY SEWER MANHOLE
	PROPOSED SANITARY SEWER CLEANOUT

EROSION CONTROL LEGEND

	LIMITS OF OPERATOR DAY TO DAY OPERATIONAL CONTROL
	PROPOSED SWALE
	INDICATES STABILIZED CONSTRUCTION ENTRANCE
	INDICATES UN-REINFORCED SILT FENCE
	INDICATES REINFORCED SILT FENCE
	INDICATES ROCK BERM
	INDICATES DROP INLET PROTECTION
	INDICATES PROPOSED INLET TREATMENT
	CURLEX EROSION CONTROL BLANKET
	INDICATES SEDIMENT TRAP OUTLET CONTROL DEVICE
640	EXISTING CONTOUR LINE
640	PROPOSED CONTOUR LINE

WATER QUANTITIES

ITEM No.	DESCRIPTION	SHEET UNITS	TOTAL QUANTITY	U101	U102	U103	U104
101	6" Water Main C-900 Class 200 PVC 3	LF	40	20	20		
102	16" Water Main C-905 Class 200 DR 18 PVC	LF	1,454	400	380	500	174
103	16" Water Main C-905 Class 200 DR 18 PVC by Bore	LF	120		120		
104	6" Gate Valve 3	EA	2	1	1		
105	16" Butterfly Valve 2 3	EA	4	1	1	2	
106	12"x12" Tapping Sleeve & Valve	EA	1	1			
107	Make Dry Connection to 16" Water Main by Separate Contract	EA	1				1
108	Fire Hydrant Assembly 3	EA	2	1	1		
109	6" Blow-off Assembly	EA	1	1			
110	2" Air Release Valve	EA	2	1		1	
111	2" Irrigation Water Service Tap & Corporation Stop	EA	1	1			
112	26" Steel Casing Pipe	LF	120		120		
113	Ductile Iron Fittings 3	TON	3.9	1.5	0.7	1.6	0.1
114	4" PVC Steel Casing Pipe Vents	EA	2		2		
115	Railroad Crossing R.O.W. Marker Sign	EA	2		2		
116	Trench Safety	LF	1,518	420	400	524	174
117	Erosion Control Measures	LS	1				
118	8" Water Main C-900 Class 200 PVC 3	LF	15			15	
119	8" Gate Valve 3	EA	3			3	

RECORD PLANS
MAY 1, 2015

REVISIONS			
NO	DESCRIPTION	DATE	BY
1	REVISED LEGEND & QUANTITIES	4/16/14	PLG
2	CHANGED 16" G.V. TO BUTTERFLY VALVES	4/21/14	PLG
3	REVISED QUANTITIES	8/13/14	PLG

PREPARED BY:
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JOHN KING BOULEVARD
FROM ARPORT ROAD
TO JUSTIN ROAD
OFFSITE WATER LINE
TOPOGRAPHIC LEGEND
& SHEET QUANTITIES

STATE OF TEXAS
PHILIP L. GRAHAM
94719
LICENSED
PROFESSIONAL ENGINEER
5/1/2015

LAST SHEET EDIT DATE 4/21/2015
WA# 13096

SHEET NO.
S001

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CAUTION !!

EXISTING UTILITIES ARE INDICATED ON THE PLANS FROM AVAILABLE INFORMATION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATION OF ALL UTILITIES, TO NOTIFY ALL UTILITY COMPANIES OF THE CONTRACTORS OPERATIONS, TO PROTECT ALL UTILITIES FROM DAMAGE, TO REPAIR ALL UTILITIES DAMAGED DUE TO THE CONTRACTORS OPERATIONS, AND TO NOTIFY THE ENGINEER PROMPTLY OF ALL CONFLICTS OF THE WORK WITH EXISTING UTILITIES.

*** BENCHMARKS ***

BM A: AN "X" CUT ON THE CENTER OF CURB INLET AT THE EDGE OF SIDEWALK ±25' FROM CURB RETURN AT NORTHWEST INTERSECTION OF JUSTIN RD & INDUSTRIAL PKWY.

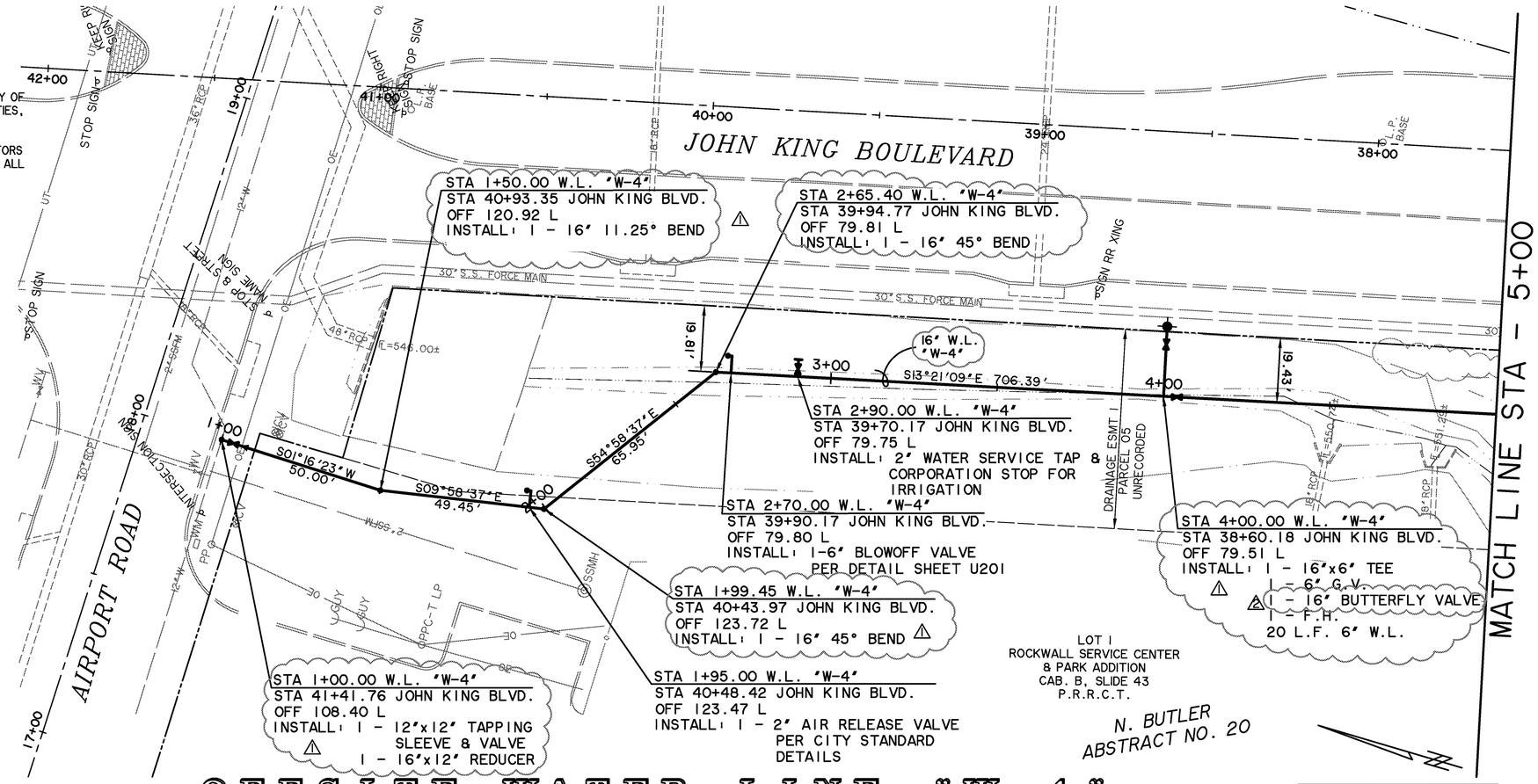
561.99 FT.

BM B: AN "X" CUT ON SOUTHEAST CORNER OF SIDEWALK NEXT TO HEADWALL ON WEST SIDE OF JOHN KING BLVD ±1,700' NORTH OF I-30.

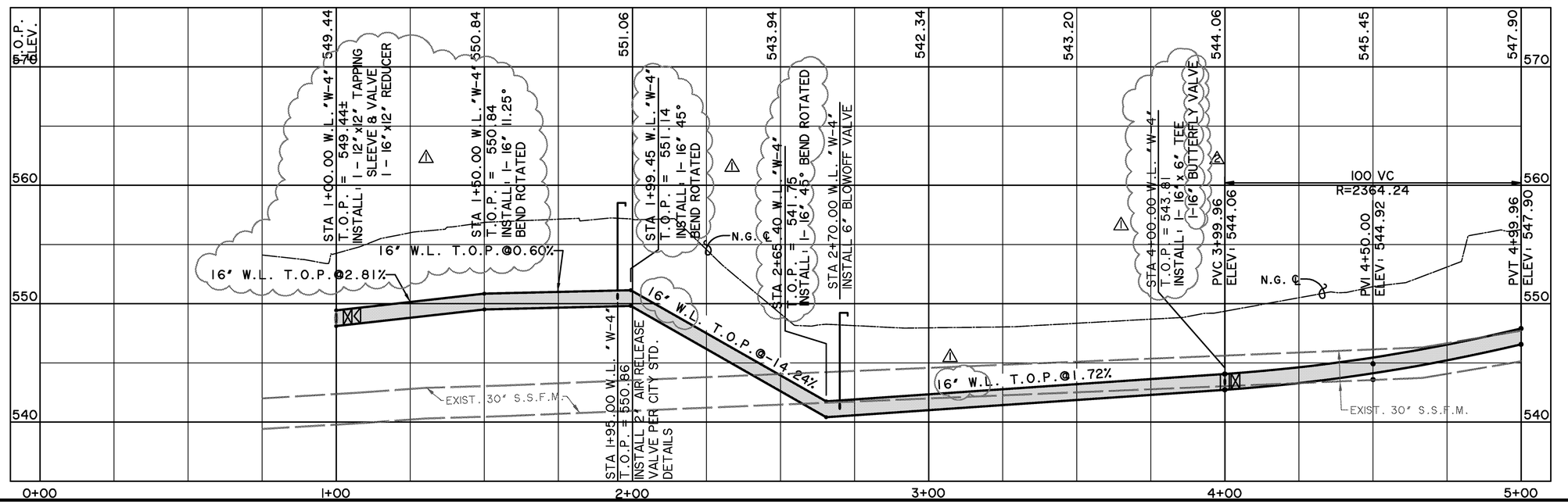
563.49 FT.

NOTE:
1. INSTALL BLUE EMS PAD ALONG WATER LINE EVERY 250', CHANGES IN DIRECTION, WATER VALVES, AND SERVICE CONNECTIONS.
2. 6" TO 12" WATER LINES SHALL BE CLASS 200 DR 14. 16" WATER LINE SHALL BE CLASS 200 DR 18.

RECORD PLANS
MAY 1, 2015



OFFSITE WATER LINE "W-4"



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REVISIONS

NO	DESCRIPTION	DATE	BY
1	CHANGED WATER LINE FROM 12" TO 16"	4/16/14	PLG
2	CHANGED 16" G.V. TO BUTTERFLY VALVES	4/21/14	PLG

JOHN KING BOULEVARD
FROM AIRPORT ROAD
TO JUSTIN ROAD
OFFSITE WATER LINE "W-4"
PLAN & PROFILE
BEGINNING TO STA 5+00

STATE OF TEXAS
PHILIP L. GRAHAM
94719
LICENSED
PROFESSIONAL ENGINEER
4/21/2015

LAST SHEET EDIT
DATE 4/21/2015
WA# 13096

SHEET NO.
U101

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JOHN KING BOULEVARD

DAVID HARR ABSTRACT NO. 102

N. BUTLER ABSTRACT NO. 20

MATCH LINE - STA 5+00

MATCH LINE STA 10+00

APPROX. LOC. SURVEY LINE

EX. CONC. PVMT.

SSN 45MPH

MINIMALLY REMOVE/TRIM TREES TO INSTALL HYDRANT LEAD

S.S. FORCE MAIN

CEDAR TREE VISIBILITY SCREEN

19.25'

18.47'

S13°21'09"E 706.39'

DRAINAGE ESMT I PARCEL 05 UNRECORDED

16" W.L. 'W-4'

ENTRY BORE PIT

R.R. R.O.W. MARKER SIGN

RECEIVING BORE PIT

120 L.F. 16" W.L. & 26" STEEL ENCASEMENT BY JACK & BORE

STA 9+71.79 W.L. 'W-4'
STA 32+88.38 JOHN KING BLVD.
OFF 78.25 L
INSTALL: 1 - 16" 11.25° BEND

STA 9+70.00 W.L. 'W-4'
STA 32+90.18 JOHN KING BLVD.
OFF 78.25 L
END 26" STEEL ENCASEMENT
INSTALL RUBBER END SEAL WITH STAINLESS STEEL BANDS

STA 8+50.00 W.L. 'W-4'
STA 34+10.18 JOHN KING BLVD.
OFF 78.51 L
BEGIN 26" STEEL ENCASEMENT
INSTALL RUBBER END SEAL WITH STAINLESS STEEL BANDS

STA 7+50.00 W.L. 'W-4'
STA 35+10.18 JOHN KING BLVD.
OFF 78.74 L
INSTALL: 1 - 16"x6" TEE
1 - 6" G.V.
1 - 16" BUTTERLY VALVE
1 - F.H.
20 L.F. 6" W.L.

STA 8+54 4" PVC CASING VENT PIPE

STA 9+66 4" PVC CASING VENT PIPE

CROSSING SIGNAL & ARM

RR CROSSING SIGNAL & ARM

U.P./ DALLAS GARLAND NORTHEAST RAILROAD

S24°36'09"E 41.01'

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION VOL. 4168, PG. 317 D.R.R.C.T.

LOT 1 ROCKWALL SERVICE CENTER & PARK ADDITION CAB. B, SLIDE 43 P.R.R.C.T.

STORM DRAINS
3-18" HDPE
T.E.=553.41#
T.E.=553.41#
T.E.=553.34#

RECORD PLANS
MAY 1, 2015

OFFSITE WATER LINE "W-4"

0 20 40 60

T.O.P. ELEV. 547.90 | 550.78 | 552.89 | 554.23 | 555.47 | 556.71 | 557.95 | 558.66 | 558.84 | 559.02 | 559.27

570 / 560 / 550

100 VC
R=2881.67

PVC 5+25.04
ELEV: 549.40

PVI 5+75.00
ELEV: 552.37

PVT 6+25.04
ELEV: 553.62

STA 7+50.00 W.L. 'W-4'
T.O.P. = 556.46
INSTALL: 1 - 16"x6" TEE
1 - 16" BUTTERFLY VALVE

PVC 8+00.00
ELEV: 557.95

50 VC
R=2359.34

PVI 8+25.00
ELEV: 558.57

PVT 8+50.00
ELEV: 558.66

STA 8+70.28
ENTER R.O.W.

STA 9+19.81
CL R.R.

STA 9+68.54
EXIT R.O.W.

STA 9+71.79 W.L. 'W-4'
T.O.P. = 559.10
INSTALL: 16" 11.25° BEND ROTATED

N.G. ℄

16" W.L. T.O.P.@5.96%

16" W.L. T.O.P.@2.48%

16" W.L. T.O.P.@0.36%

16" W.L. T.O.P.@0.60%

EXIST. 30" S.S.F.M.

16" W.L. & 26" DIA. STEEL ENCASEMENT (API 5L - GRADE B STEEL MIN. 0.406" WALL THICKNESS) BY JACK & BORE

STA 8+50.00 W.L. 'W-4'
BEGIN STEEL ENCASEMENT

STA 8+54.00
4" PVC CASING PIPE VENT

STA 9+66.00
4" PVC CASING PIPE VENT

STA 9+70.00 W.L. 'W-4'
END STEEL ENCASEMENT

5+00 | 6+00 | 7+00 | 8+00 | 9+00 | 10+00

REVISIONS		
NO.	DESCRIPTION	DATE BY
1	CHANGED WATER LINE FROM 12" TO 16"	4/16/14 PLG
2	CHANGED 16" G.V. TO BUTTERFLY VALVES	4/21/14 PLG

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JOHN KNG BOULEVARD
FROM AIRPORT ROAD
TO JUSTIN ROAD
OFFSITE WATER LINE "W-4"
PLAN & PROFILE
STA 5+00 TO 10+00

STATE OF TEXAS
PHILIP L. GRAHAM
94719
LICENSED
PROFESSIONAL ENGINEER
4/21/2015

LAST SHEET EDIT DATE 4/21/2015
W.A.# 13096

SHEET NO. U102

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RECORD PLANS
MAY 1, 2015

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MATCH LINE - STA 10+00

MATCH LINE STA - 15+00

JOHN KING BOULEVARD

STA 10+12.80 W.L. 'W-4'
STA 32+48.18 JOHN KING BLVD.
OFF 70.16 L
INSTALL: 1 - 16' 11.25° BEND

STA 10+26.00 W.L. 'W-4'
STA 32+34.99 JOHN KING BLVD.
OFF 70.13 L
INSTALL: 1 - 16'x8' TEE
1 - 8' G.V.
1 - 16' BUTTERFLY VALVE
1 - 8' PLUG
5 L.F. 8' W.L.

STA 10+85.76 W.L. 'W-4'
STA 31+75.38 JOHN KING BLVD.
OFF 70.00 L
PC

STA 10+18.00 W.L. 'W-4'
STA 32+42.98 JOHN KING BLVD.
OFF 70.15 L
INSTALL: 1 - 2' AIR RELEASE VALVE
PER CITY STANDARD
DETAILS

STA 11+15.00 W.L. 'W-4'
STA 31+47.26 JOHN KING BLVD.
OFF 70.00 L
INSTALL: 1 - 16'x8' TEE
1 - 8' G.V.
1 - 16' BUTTERFLY VALVE
1 - 8' PLUG
5 L.F. 8' W.L.

16' W.L. 'W-4'

STA 14+06.00 W.L. 'W-4'
STA 28+67.45 JOHN KING BLVD.
OFF 70.00 L
INSTALL: 1 - 16'x8' TEE
1 - 8' G.V.
1 - 8' PLUG
5 L.F. 8' W.L.

NOTE:
1. INSTALL BLUE EMS PAD ALONG WATER LINE EVERY 250', CHANGES IN DIRECTION, WATER VALVES, AND SERVICE CONNECTIONS.
2. 6" TO 12" WATER LINES SHALL BE CLASS 200 DR 14. 16" WATER LINE SHALL BE CLASS 200 DR 18.

EX. CONC. PVMT.

30" S.S. FORCE MAIN

16" RCP

8" W.L. BY OTHERS

15' WATER EASEMENT

STA 10+ AIR RELEASE VALVE

CURVE SIGN

32+00 31+00 30+00 29+00 28+00

11+00 12+00 13+00 14+00

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
VOL. 4168, PG. 317
D.R.R.C.T.

ROCKWALL ECONOMIC DEVELOPMENT CORPORATION
INST. No. 20130000499975
D.R.R.C.T.

N. BUTLER
ABSTRACT NO. 20

DAVID HARR
ABSTRACT NO. 102

APPROX. LOCATION SURVEY LINE

0 20 40 60

* BENCHMARKS *

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561.99 FT.

BM B: AN "X" CUT ON SOUTHEAST CORNER OF SIDEWALK NEXT TO HEADWALL ON WEST SIDE OF JOHN KING BLVD ±1,700' NORTH OF I-30.
563.49 FT.

OFFSITE WATER LINE "W-4"

T.O.P. ELEV. 559.27 559.21 559.03 558.85 558.67 558.49 558.31 558.13 557.94 557.67 557.37

570 560 550

STA 10+12.80 W.L. 'W-4'
T.O.P. = 559.35
INSTALL: 1- 16' 11.25° BEND ROTATED

STA 10+26.00 W.L. 'W-4'
T.O.P. = 559.30
INSTALL: 1- 16'x8' TEE
1- 16' BUTTERFLY VALVE

STA 11+15.00 W.L. 'W-4'
T.O.P. = 558.98
INSTALL: 1- 16'x8' TEE
1- 16' BUTTERFLY VALVE

16" W.L. T.O.P.@-0.36%

N.G. ℄

PVC 13+85.00
ELEV: 558.00

50 VC
R=21038.50

PVI 14+10.00
ELEV: 557.91

PVT 14+35.00
ELEV: 557.76

EXIST. 30" S.S.F.M.

STA 10+18.00 W.L. 'W-4'
T.O.P. = 559.08
INSTALL: 1- 2" AIR RELEASE VALVE PER CITY STD. DETAILS

STA 14+06.00 W.L. 'W-4'
T.O.P. = 557.91
INSTALL: 1- 16'x8' TEE

10+00 11+00 12+00 13+00 14+00 15+00

REVISIONS			
NO	DESCRIPTION	DATE	BY
1	CHANGED WATER LINE FROM 12" TO 16"	4/16/14	PLG
2	CHANGED 16" G.V. TO BUTTERFLY VALVES	4/21/14	PLG
3	CHANGED 8"x8" TEE TO 16"x8" TEE, 8" G.V. & 8" PLUG TO 16" B.F.V.	8/13/14	PLG

PREPARED BY:
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JOHN KING BOULEVARD
FROM AIRPORT ROAD
TO JUSTIN ROAD
OFFSITE WATER LINE "W-4"
PLAN & PROFILE
STA 10+00 TO 15+00

STATE OF TEXAS
PHILIP L. GRAHAM
94719
LICENSED
PROFESSIONAL ENGINEER
8/13/15

LAST SHEET EDIT
DATE 4/21/2015
WA# 13096

SHEET NO.
U103

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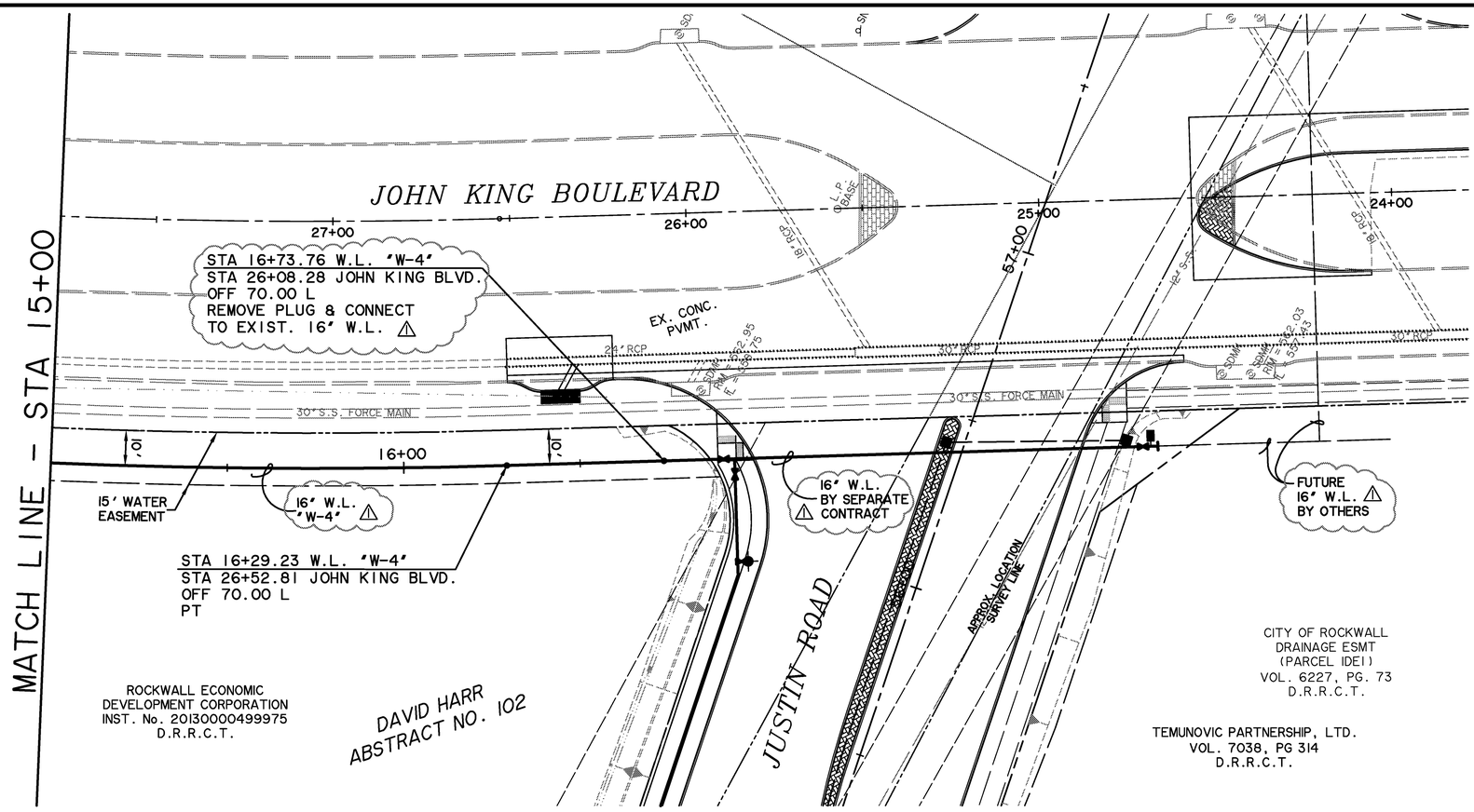

CAUTION 11

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563.49 FT.

NOTE:
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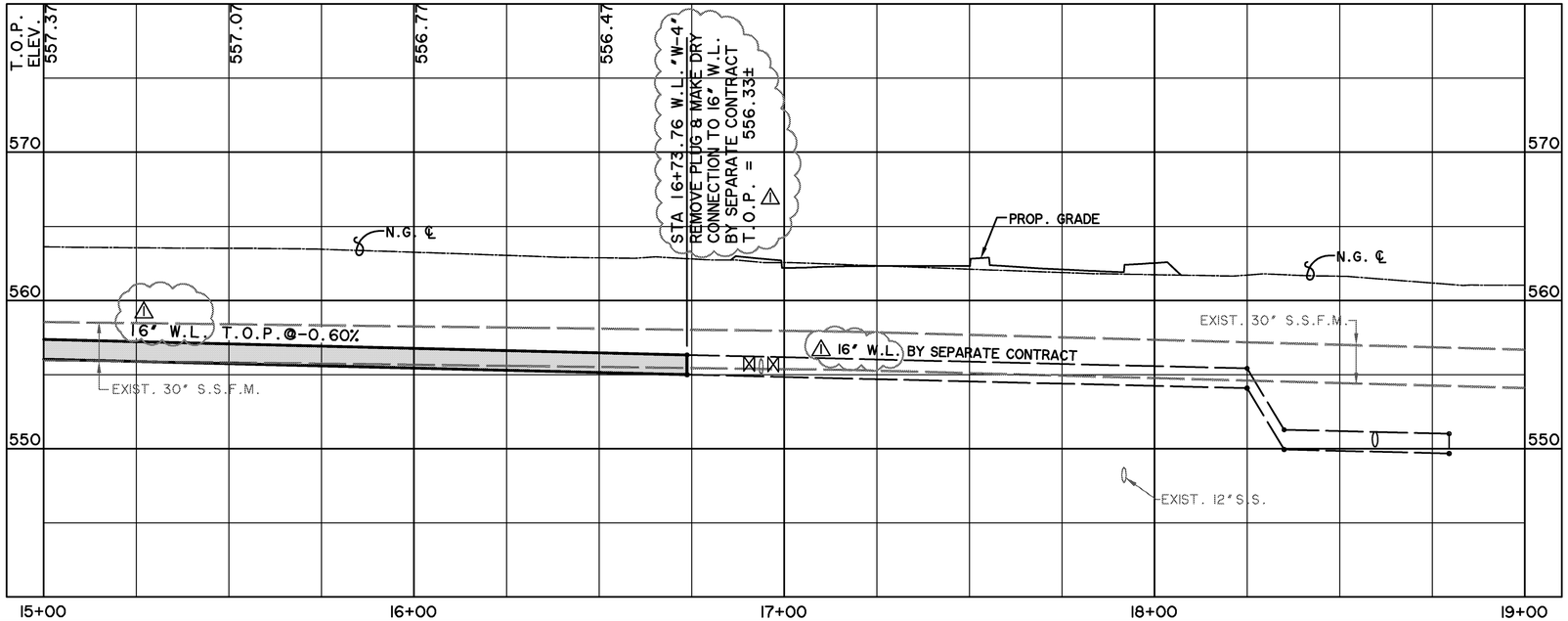
2. 6" TO 12" WATER LINES SHALL BE CLASS 200 DR 14. 16" WATER LINE SHALL BE CLASS 200 DR 18. ⚠

OFFSITE WATER LINE "W-4"



RECORD PLANS
MAY 1, 2015

REVISIONS

NO	DESCRIPTION	DATE	BY
⚠	CHANGED WATER LINE FROM 12" TO 16"	4/16/14	PLG

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STATE OF TEXAS
PHILIP L. GRAHAM
84719
LICENSED
PROFESSIONAL ENGINEER
4/21/2015

LAST SHEET EDIT DATE 4/21/2015
W.A.# 13096

SHEET NO.
U104

JOHN KING BOULEVARD
FROM AIRPORT ROAD
TO JUSTIN ROAD
OFFSITE WATER LINE "W-4"
PLAN & PROFILE
STA 15+00 TO END

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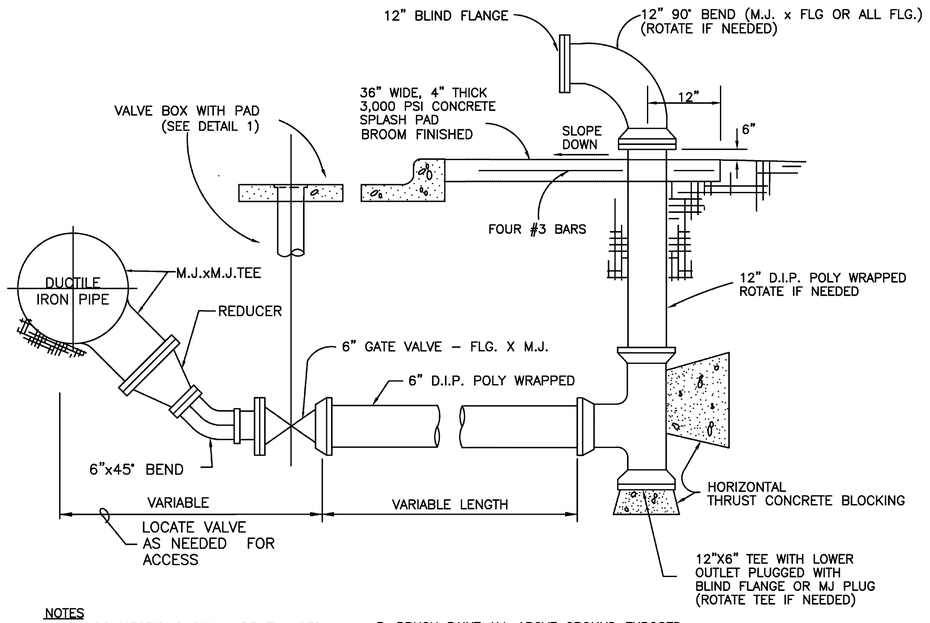
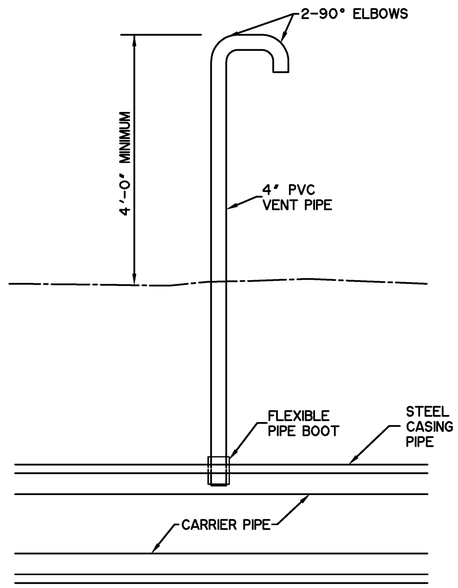


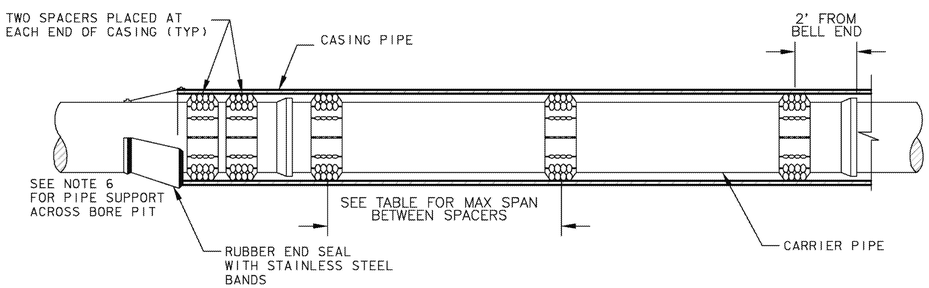
NOTES

1. ALL CONNECTIONS SHALL BE FLANGED OR MJ RESTRAINED WITH APPROVED RETAINER GLANDS OR THRUST RESTRAINT DEVICES.
2. ALL PIPING TO BE DUCTILE IRON WITH ALL BURIED VALVE, PIPE & FITTINGS TO BE POLY–WRAPPED.
3. BRUSH PAINT ALL ABOVE GROUND EXPOSED FITTINGS AND PIPE WITH TWO COATS OF FLYNT READY MIXED ALUMINUM PAINT OF GREENVILLE, TEXAS 1–800–473–5698. SILVER COLOR ONLY.
4. APPLY TO PVC MAIN BY TURNING DOWN TEE AND INSTALLING A 45 DEGREE BEND. MUST BE APPROVED BY ENGINEER OR INSPECTOR.
5. INSTALL RISER AT RIGHT-OF-WAY.

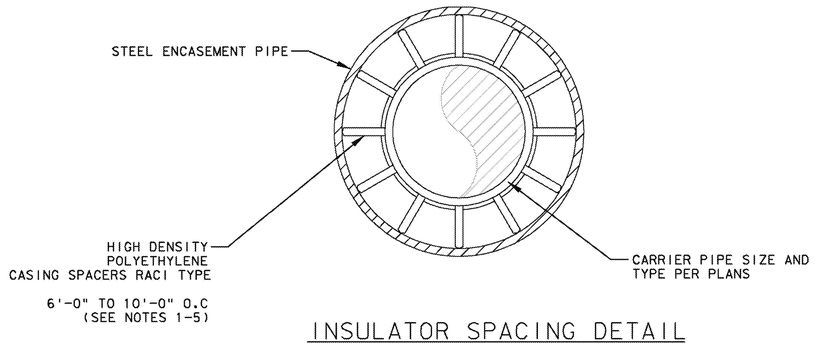
BLOW OFF DETAIL
N.T.S.



CASING PIPE VENT
N.T.S.



PIPE INSULATOR DETAIL
NOT TO SCALE



INSULATOR SPACING DETAIL
NOT TO SCALE

BORE CASING PIPE DETAIL
N.T.S.

CASING SPACER NOTES:

1. THE CASING SPACERS SHALL BE OF PROJECTION TYPE THAT HAS A MINIMUM NUMBER OF PROJECTIONS AROUND THE CIRCUMFERENCE TOTALING THE NUMBER OF DIAMETER INCHES (16" PIPE, MIN. 16 PROJECTIONS). ⚠
2. CASING SPACERS SHALL HAVE A MAXIMUM SPACING SPAN AS SHOWN ON DETAIL. THE SPAN BETWEEN SPACERS SHALL RESULT IN CONSERVATIVE LONG TERM SAFETY FACTOR PROVIDED TOTAL LOAD PER SPACER DOES NOT EXCEED THE MAXIMUM LOAD FOR PIPE FULL OF LIQUID PER SPACER LISTED IN THE LITERATURE PER CLASS SPACER USED.
3. SPACERS SHALL HAVE A MINIMUM HEIGHT THAT CLEARS THE PIPE BELL OR AS OTHERWISE INDICATED ON THE PLANS.
4. CASING SPACERS SHALL USE DOUBLE BACKED TAPE PROVIDED WITH THE SPACERS, TO FASTEN TIGHTLY ONTO THE CARRIER PIPE, SO THAT THE SPACERS DO NOT MOVE DURING INSTALLATION.
5. SPACERS SHALL BE RACI HIGH DENSITY POLYETHYLENE OR CITY APPROVED EQUAL.
6. ALL CARRIER PIPE INSTALLED BY JACK AND BORE SHALL BE SUPPORTED BY QUARTER POINT CRADLE OF 2000 PSI CONCRETE ACROSS THE BORING PIT AND TO THE FIRST JOINT IN THE DITCH SECTION. ALL VOIDS WILL BE GROUTED WITH A 1:7 MINIMUM PROPORTIONED MIX WITH FIVE PERCENT (5%) TO FORTY PERCENT (40%) AIR ENTRAINMENT, AND WILL BE CONSIDERED A PART OF THE UNIT PRICE OF THE BORING OPERATION.

REVISIONS			
NO.	DESCRIPTION	DATE	BY
⚠	REVISED SPACER NOTE 1	4/16/14	PLG

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JOHN KING BOULEVARD
FROM AIRPORT ROAD
TO JUSTIN ROAD
OFFSITE WATER LINE
WATER SYSTEM DETAILS

STATE OF TEXAS
PHILIP L. GRAHAM
94719
LICENSED
PROFESSIONAL
ENGINEER
5/1/2015

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SHEET NO. U201

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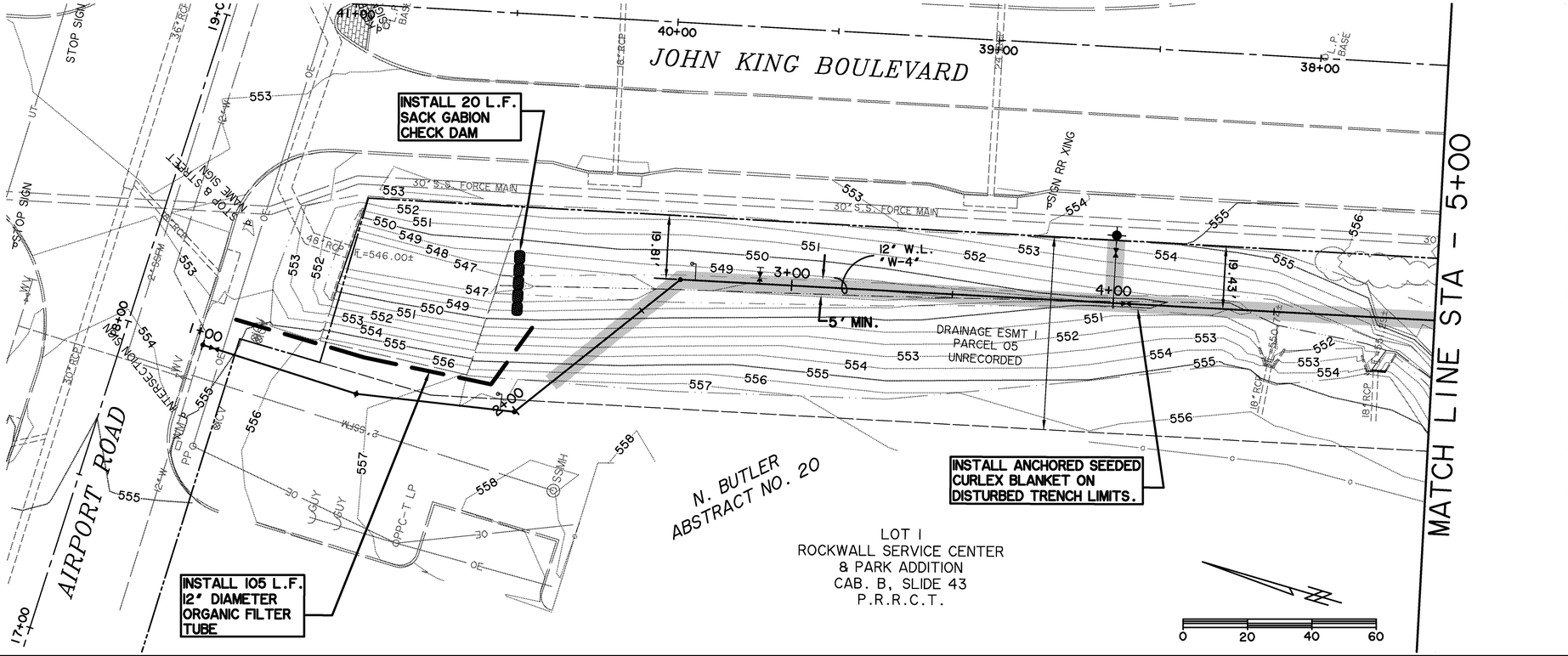
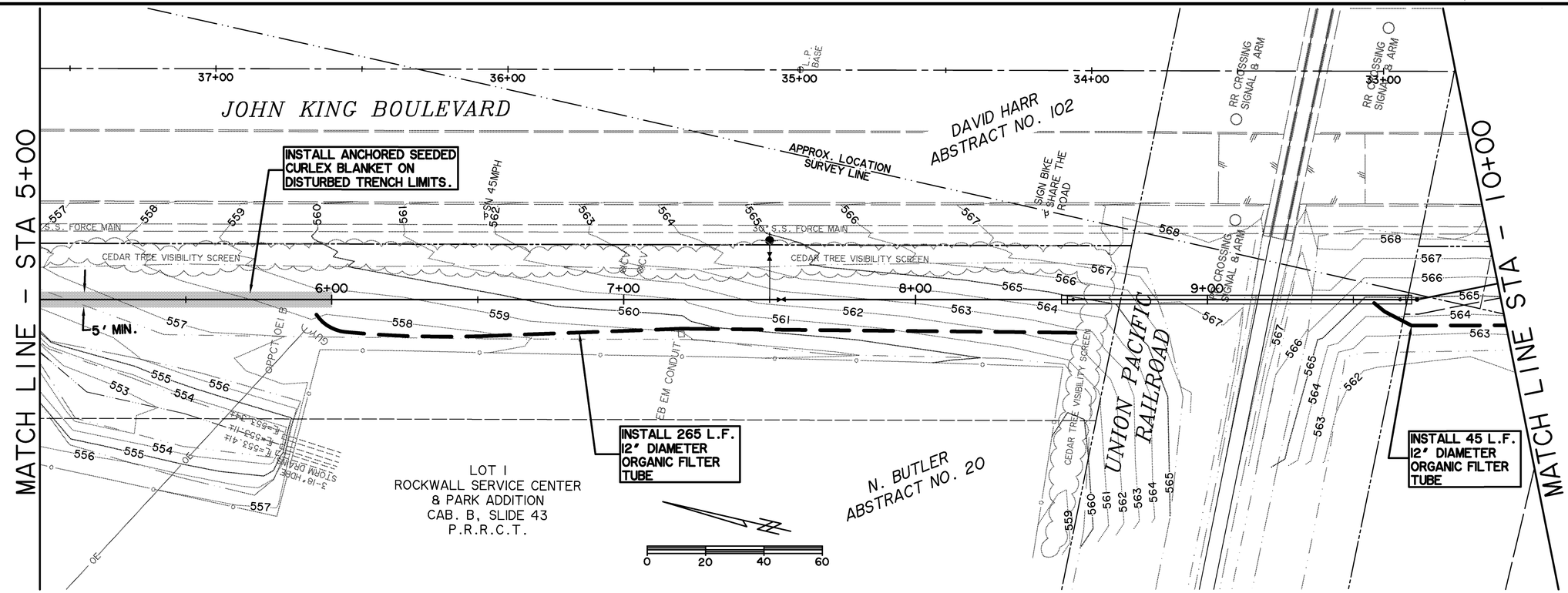
MAY 1, 2015





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JOHN KING BOULEVARD
FROM AIRPORT ROAD
TO JUSTIN ROAD
OFFSITE WATER LINE
EROSION CONTROL PLAN
BEGINNING TO STA 10+00

STATE OF TEXAS
PHILIP L. GRAHAM
94719
LICENSED
PROFESSIONAL ENGINEER
5/1/2015

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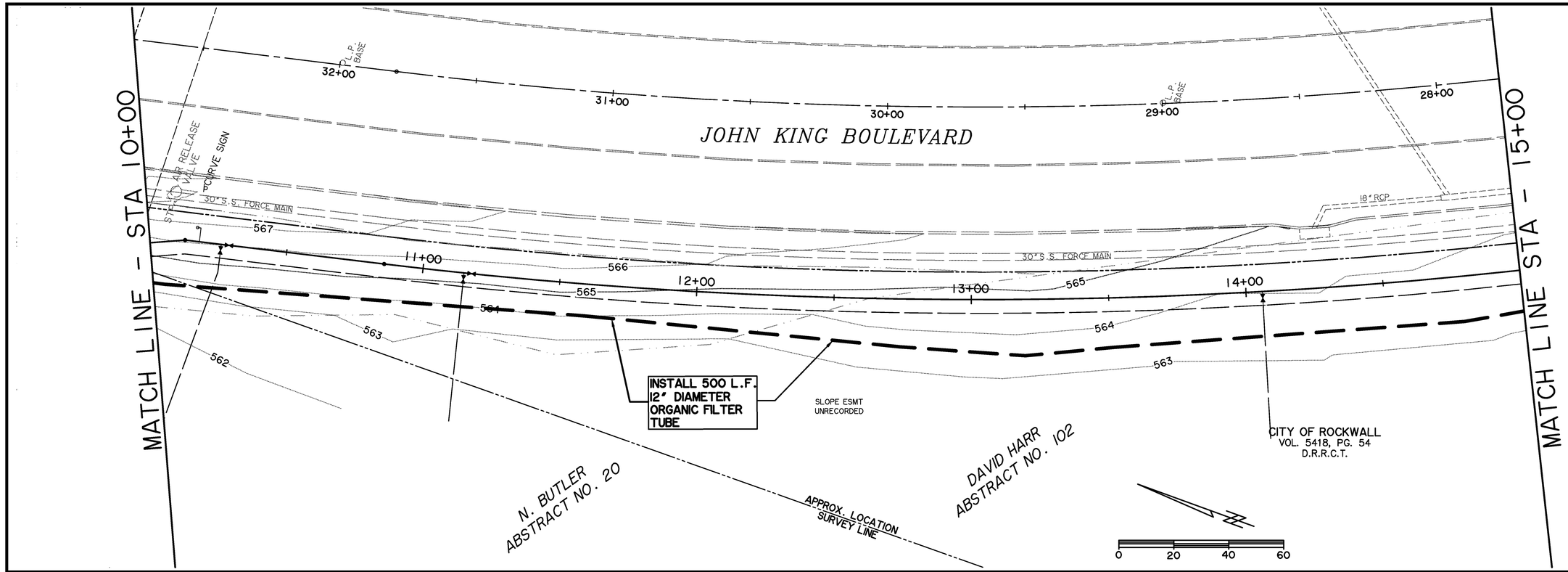

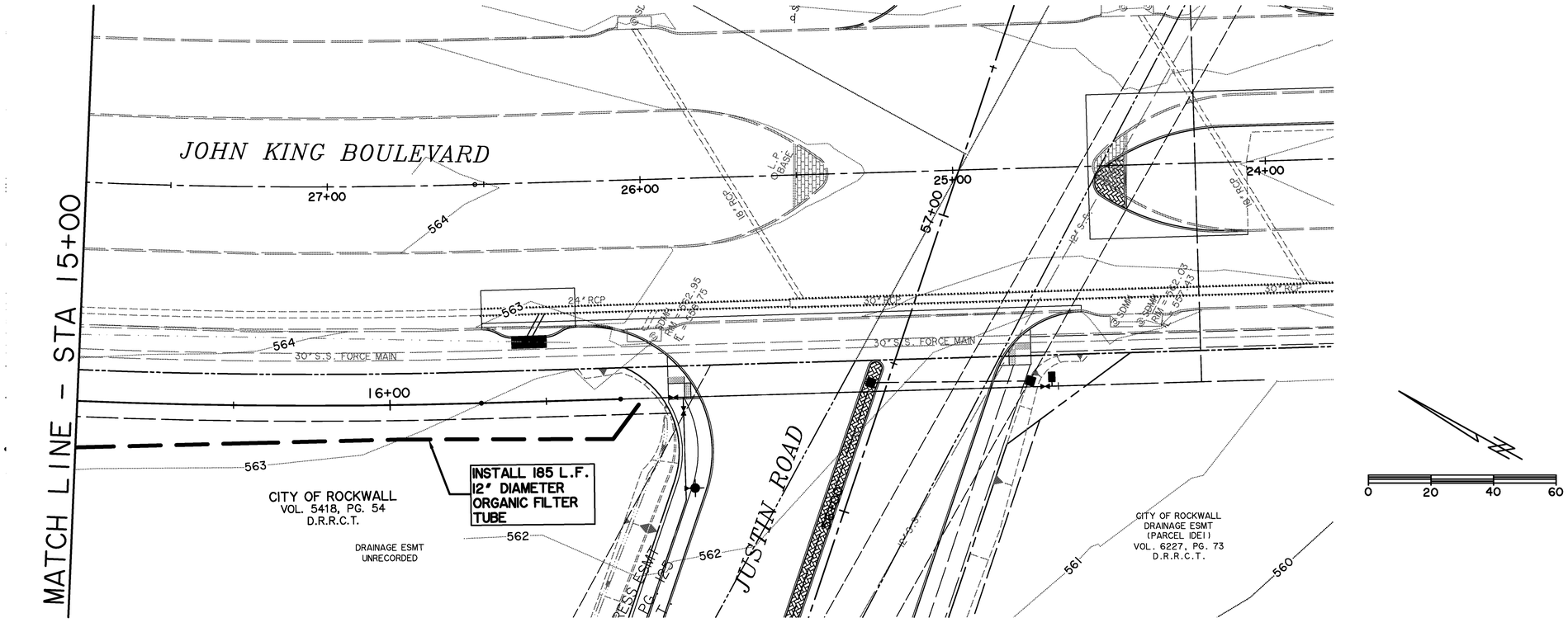

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MAY 1, 2015

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JOHN KNG BOULEVARD FROM AIRPORT ROAD TO JUSTIN ROAD
OFFSITE WATER LINE EROSION CONTROL PLAN
STA 10+00 TO END

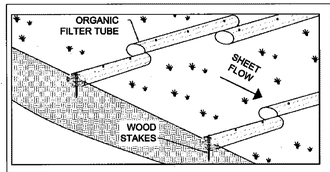
STATE OF TEXAS
PHILIP L. GRAHAM
94719
LICENSED PROFESSIONAL ENGINEER
5/1/2015

LAST SHEET EDIT DATE 4/21/2015
WA# 13096

SHEET NO.
E102

3.6 Organic Filter Tubes

Sediment Control



Description: Organic filter tubes are comprised of an open weave, mesh tube that is filled with a filter material (compost, wood chips, straw, coir, aspen fiber, or a mixture of materials). The tube may be constructed of geosynthetic material, plastic, or natural materials. Organic filter tubes are also called fiber rolls, fiber logs, wattles, mulch socks, and/or coir rolls. Filter tubes detain flow and capture sediment as linear controls along the contours of a slope or as a perimeter control down-slope of a disturbed area.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- 9 inch minimum tube diameter when filled
- 3 inch minimum embedment in soil
- 18 inch minimum overlap at ends of tubes
- Spacing based on drainage area and slope
- Must be staked on soil and secured with rockbags on pavement
- Turn ends of tube lines upslope a minimum of 10 feet

ADVANTAGES / BENEFITS:

- Effective means to treat sheet flow over a short distance
- Relatively easy to install
- May be used on steep slopes
- Can provide perimeter control on paved surfaces or where soil type prevents embedment of other controls

DISADVANTAGES / LIMITATIONS:

- Difficult to remove when wet and/or filled with sediment
- Relatively small effective areas for sediment capture

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Repair eroded areas underneath the organic filter tubes
- Re-align and stake tubes that are dislodged by flow
- Remove sediment before it reaches half the height of the exposed tube

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ◒ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

Fe=0.50-0.75
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ◒ Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *None*

3.6.1 Primary Use

Organic filter tubes are long, flexible controls that are used along a line of constant elevation (along a contour) on slopes. They are used as perimeter controls down slope of disturbed areas and on side slopes where stormwater may runoff the area. The tubes maintain sheet flow, slow velocities, and capture sediment. When used on slopes, they also shorten the slope length and protect the slope from erosion.

3.6.2 Applications

Organic filter tubes include a wide variety of tube and filter materials. Organic filter tubes are used as a perimeter sediment barrier, similar to silt fence, for development projects and linear projects, such as roadways and utilities. They work well on individual residential lots and on lots being re-developed, where space may be limited. Organic filter tubes are most effective with coarse to silty soil types. Additional controls may be needed to remove fine silts and clay soils suspended in stormwater.

Organic filter tubes can be used on paved surfaces where it's not possible to stake a silt fence. Applications on paved surfaces include perimeter controls for soil stockpiles, pavement repair areas, utility trenching, and building demolition. When compost filter material is used in tubes on pavement, the material has the added benefit removing some oil and grease from stormwater runoff.

Applications on slopes include temporary sediment control during construction and erosion control of the disturbed soil on the slope. Organic filter tubes may be used to control sheet flow on slopes when final stabilization measures are being applied and established.

Organic filter tubes may also be used for inlet protection and, in limited cases, as check dams in small drainage swales. Refer to *Section 3.4 Inlet Protection* and *Section 2.1 Check Dam* for the design criteria to use organic filter tubes in these applications.

3.6.3 Design Criteria

General Criteria

- Filter tubes should be installed along the contour.
- Tubes shall be staked with 2 inch by 2 inch wooden stakes at a maximum spacing of 4 feet. Rebar or similar metal stakes may be used instead of wooden stakes.
- When placed on pavement, sand or rock bags shall be placed abutting the down-slope side of the tubes to prevent runoff from dislodging the tubes. At a minimum, bags shall be placed one foot from each end of the tube and at the middle of the tube.
- Filter tubes shall be embedded a minimum of three inches when placed on soil. Placement on rock shall be designed as placement on pavement.
- The end of tubes shall overlap a minimum of 18 inches when multiple tubes are connected to form a linear control along a contour or a perimeter.
- The last 10 feet (or more) at the ends of a line of tubes shall be turned upslope to prevent bypass by stormwater. Additional upslope lengths of tubes may be needed every 200 to 400 linear feet, depending on the traverse slope along the line of tubes.
- The most common sizes of tubes are 9 and 12 inch diameter; however, tubes are available in sizes up to 24 inch diameter. The designer shall specify a diameter based on the site application. Tubes less than 9 inches in diameter when filled shall not be used.
- Manufactured organic filter tube products shall have documentation of a minimum 75 percent soil retention using ASTM D7351 Standard Test Method for Determination of Sediment Retention Device Effectiveness in Sheet Flow Applications.

- When using manufactured tubes, the manufacturer's recommendations for diameter and spacing based on slope, flow velocities, and other site conditions shall be followed when they are more stringent than the design criteria in this section.
- When used as a perimeter control on grades of 10:1 or less, criteria in the following table shall be used as a guide for the size and installation rate of the organic filter tube.

Table 3.1 Perimeter Control Applications*

Drainage Area (Max)	*Max Flow Length to the Tube*	*Tube Diameter (Min)*
1/3 Acre per 100 feet	145 feet	18 inches
1/4 Acre per 100 feet	110 feet	15 inches
1/5 Acre per 100 feet	85 feet	12 inches
1/8 Acre per 100 feet	55 feet	9 inches

(Source: Modified and expanded from City of Plano Fact Sheet SP-13)
*Applicable on grades of 10:1 or flatter.

- When installing organic filter tubes along contours on slopes, criteria in the following table shall be used as a general guide for size and spacing of the tubes. Actual tube diameter and spacing shall be specified by the designer. The designer shall consider the tube manufacturers recommendations, the soil type, flow volume on the slope, required performance life, and erosion control measures that may be used in conjunction with the tubes.

Table 3.2 Maximum Spacing for Slope Protection

	Tube Diameter (Min)			
Slope (H:V)	*9 inches*	*12 inches*	*18 inches*	*24 inches*
5:1 to 10:1	35 feet	40 feet	55 feet	60 feet
4:1	30 feet	40 feet	50 feet	50 feet
3:1	25 feet	35 feet	40 feet	40 feet
2:1	20 feet	25 feet	30 feet	30 feet
1:1	10 feet	15 feet	20 feet	20 feet

(Source: Modified and expanded from Iowa Statewide Urban Design and Specifications Standards for Filter Socks)

Tube Material

- The designer shall specify the type of mesh based on the required life of the tube. At a minimum, the mesh shall have a rated life of one year under field conditions.
- If the tubes will be left onsite as part of the final stabilization, they must be constructed of 100 percent biodegradable jute, coir, sisal or similar natural fiber or 100 percent UV photodegradable plastic, polyester or geosynthetic material.
- Mesh tubes may be oval or round in cross-section.
- Mesh for the tubes shall be open and evenly woven. Size of weave openings shall be specified based on filter material. Openings may range from ½ inch for Erosion Control Compost to 2 inches for straw and coir.
- Mesh should not exceed ½ inch in diameter.

Filter Material

- Different filter materials have different properties and will affect sheet flow differently. The designer shall specify the type of material to be used (or excluded) on a particular site.
- Straw filter material shall be Certified Weed Free Forage. The straw must be in good condition, air-dried, and not rotten or moldy.

- Compost shall conform to the requirements for Erosion Control Compost in TxDOT Special Specification 1001 Compost (2004). Compost may provide some oil and grease removal; however, the large percentage of fines in compost will result in less filtering and more ponding of stormwater.
- Wood chips shall be 100 percent untreated chips and free of inorganic debris, such as plastic, glass, metal, etc. Wood chip size shall not be smaller than 1 inch and shall not exceed 3 inches in diameter. Shavings shall not be more than 5% of the total mass.

3.6.4 Design Guidance and Specifications

Specifications for Erosion Control Compost to be used as filter material may be found in Item 161 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT 2004) and TxDOT Special Specification 1001 Compost (2004).

3.6.5 Inspection and Maintenance Requirements

Organic filter tubes should be inspected regularly (at least as often as required by the TPDES Construction General Permit). The filter tube should be checked to ensure that it is in continuous contact with the soil at the bottom of the embedment trench. Closely check for rill erosion that may develop under the filter tubes. Eroded spots must be repaired and monitored to prevent reoccurrence. If erosion under the tube continues, additional controls are needed.

Staking shall be checked to ensure that the filter tubes are not moving due to stormwater runoff. Repair and re-stake slumping filter tubes. Tubes that are split, torn or unraveling shall be repaired or replaced.

Check the filter tube material to make sure that it has not become clogged with sediment or debris. Clogged filter tubes usually lead to standing water behind the filter tube after the rain event. Sediment shall be removed from behind the filter tube before it reaches half the height of the exposed portion of the tube.

When sediment control is no longer needed on the site, the tubes may be split open and the filter material may be used for mulching during establishment of vegetation for final stabilization if it meets the criteria in *Section 2.5 Mulching*.

3.6.6 Example Schematics

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be site adapted by the designer. In addition, dimensions and notes appropriate for the application must be added by the designer.

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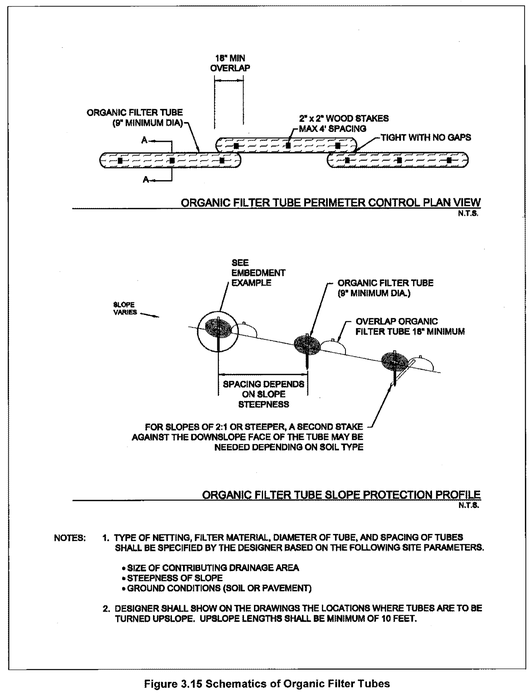


Figure 3.15 Schematics of Organic Filter Tubes

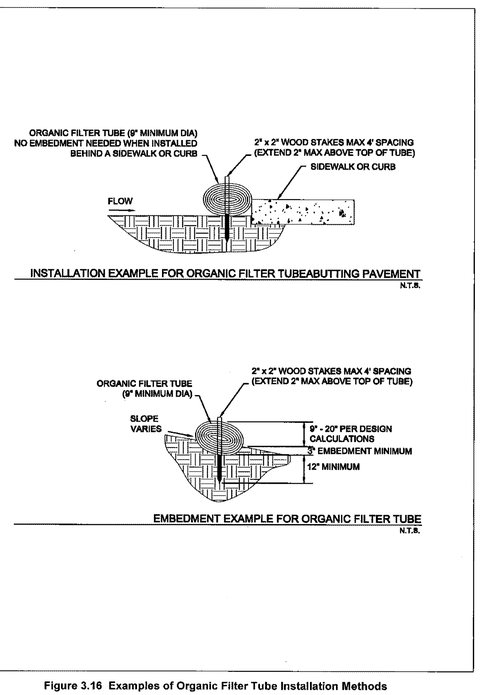
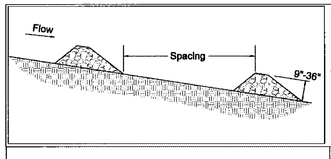


Figure 3.16 Examples of Organic Filter Tube Installation Methods

2.1 Check Dam

Erosion Control



Description: Check dams are small barriers consisting of loose rock, rock bags, or organic filter tubes placed across a drainage swale or ditch. They reduce the velocity of small concentrated flows, provide a limited barrier for sediment and reduce the potential for erosion of the swale or ditch.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- Heights between 9 inches and 36 inches
- Top of the downstream dam should be at the same elevation as the toe of the upstream dam

ADVANTAGES / BENEFITS:

- Reduced velocities in long drainage swales or ditches
- May be used with other channel protection measures
- Provides some sediment removal

DISADVANTAGES / LIMITATIONS:

- Cannot be used in live stream channels
- Minor ponding upstream of the check dams
- Extensive maintenance or replacement of the dams required after heavy flows or high velocity flows
- Mowing hazard from loose rocks if all rock is not removed at end of construction

MAINTENANCE REQUIREMENTS:

- Inspect regularly
- Remove silt when it reaches approximately ⅓ the height of the dam or 12 inches, whichever is less

TARGETED POLLUTANTS

- ◒ Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ◒ Floatable Materials
- ○ Other Construction Wastes

APPLICATIONS

- **Perimeter Control**
- **Slope Protection**
- **Sediment Barrier**
- **Channel Protection**
- **Temporary Stabilization**
- **Final Stabilization**
- **Waste Management**
- **Housekeeping Practices**

Fe=0.30-0.50
(*Depends on soil type*)

IMPLEMENTATION CONSIDERATIONS

- ◒ Capital Costs
- ● Maintenance
- ○ Training
- ◒ Suitability for Slopes > 5%

Other Considerations:

- *None*

2.1.1 Primary Use

Check dams are used in long drainage swales or ditches to reduce erosive velocities. They are typically used in conjunction with other channel protection techniques such as vegetation lining and turf reinforcement mats. Check dams provide limited treatment to sediment-laden flows. They are more useful in reducing flow velocities to acceptable levels for stabilization methods. Check dams may be used in combination with stone outlet sediment traps, where the check dams prevent erosion of the swale while the sediment trap captures sediment at the downstream end of the swale.

2.1.2 Applications

Check dams are typically used in swales and drainage ditches along linear projects such as roadways. They can also be used in short swales down a steep slope, such as swales down a highway embankment, to reduce velocities. Check dams shall not be used in live stream channels.

Check dams should be installed before the contributing drainage area is disturbed, so as to mitigate the effects on the swale from the increase in runoff. If the swale itself is graded as part of the construction activities, check dams are installed immediately upon completion of grading to control velocities in the swale until stabilization is completed.

2.1.3 Design Criteria

General Criteria

- Typically, the dam height should be between 9 inches and 36 inches, depending on the material of which they are made. The height of the check dam shall always be less than one-third the depth of the channel.
- Dams should be spaced such that the top of the downstream dam is at the same elevation as the toe of the upstream dam. On channel grades flatter than 0.4 percent, check dams should be placed at a distance that allows small pools to form between each check dam.
- The top of the side of the check dam shall be a minimum of 12 inches higher than the middle of the dam. In addition, the side of the dams shall be embedded a minimum of 18 inches into the side of the drainage ditch, swale or channel to minimize the potential for flows to erode around the side of the dam.
- Larger flows (greater than 2-year, 24-hour design storm) must pass the check dam without causing excessive upstream flooding.
- Check dams should be used in conjunction with other sediment reduction techniques prior to releasing flow offsite.
- Use geotextile filter fabric under check dams of 12 inches in height or greater. The fabric shall meet the following minimum criteria:
  - Tensile Strength, ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles, 250-lbs.
  - Puncture Rating, ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products, 135-lbs.
  - Mullen Burst Rating, ASTM D3786 Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, 420-psi.
  - Apparent Opening Size, ASTM D4751 Test Method for Determining Apparent Opening Size of a Geotextile, U.S. Sieve No. 20 (max).
- Loose, unconfined soil, wood chips, compost, and other material that can float or be transported by runoff shall not be used to construct check dams.

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JOHN KNG BOULEVARD
FROM AIRPORT ROAD
TO JUSTIN ROAD

OFFSITE WATER LINE
EROSION CONTROL DETAILS

STATE OF TEXAS
PHILIP L. GRAHAM
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PROFESSIONAL ENGINEER
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Rock Check Dams

- Stone shall be well graded with stone size ranging from 3 to 6 inches in diameter for a check dam height of 24 inches or less. The stone size range for check dams greater than 24 inches is 4 to 8 inches in diameter.
- Rock check dams shall have a minimum top width of 2 feet with side slopes of 2:1 or flatter.

Rock Bag Check Dams

- Rock bag check dams should have a minimum top width of 16 inches.
- Bag length shall be 24 inches to 30 inches, width shall be 16 inches to 18 inches and thickness shall be 6 inches to 8 inches and having a minimum weight of 40 pounds.
- Minimum rock bag dam height of 12 inches would consist of one row of bags stacked on top of two rows of bag. The dam shall always be one more row wide than it is high, stacked pyramid fashion.
- Bags should be filled with pea gravel, filter stone, or aggregate that is clean and free of deleterious material.
- Sand bags shall not be used for check dams, due to their propensity to break and release sand that is transported by the concentrated flow in the drainage swale or ditch.
- Bag material shall be polypropylene, polyethylene, polyamide or cotton burlap woven fabric, minimum unit weight 4-ounces-per-square-yard, Mullen burst strength exceeding 300-psi as determined by ASTM D3786, Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method, and ultraviolet stability exceeding 70 percent.
- PVC pipes may be installed through the dam to allow for controlled flow through the dam. Pipe should be schedule 40 or heavier polyvinyl chloride (PVC) having a nominal internal diameter of 2 inches.

Sack Gabion Check Dams

- Sack gabion check dams may be used in channels with a contributing drainage area of 5 acres or less.
- Sack gabions shall be wrapped in galvanized steel, woven wire mesh. The wire shall be 20 gauge with 1 inch diameter, hexagonal openings.
- Wire mesh shall be one piece, wrapped around the rock, and secured to itself on the downstream side using wire ties or hog rings.
- Sack gabions shall be staked with ¼ inch rebar at a maximum spacing of three feet. Each wire sack shall have a minimum of two stakes.
- Stone shall be well graded with a minimum size range from 3 to 6 inches in diameter.

Organic Filter Tube Check Dams

- Organic filter tubes may be used as check dams in channels with a contributing drainage area of 5 acres or less.
- Organic filter tubes shall be a minimum of 12 inches in diameter.
- Filter material used within tubes to construct check dams shall be limited to coir, straw, aspen fiber and other organic material with high cellulose content. The material should be slow to decay or leach nutrients in standing water.
- Staking of filter tubes shall be at a maximum of 4 foot spacing and shall alternate through the tube and on the downstream face of the tube.
- Unless superseded by requirements in this section, filter tubes and filter material shall comply with the

criteria in *Section 3.6 Organic Filter Tubes*.

2.1.4 *Design Guidance and Specifications*

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.9 Check Dam (Rock). Specifications are also available in the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT 2004), Item 506.2.A and Item 506.4.C.1.

2.1.5 *Inspection and Maintenance Requirements*

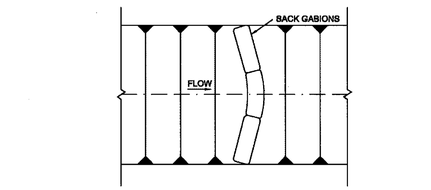
Check dams should be inspected regularly (at least as often as required by the TPDES Construction General Permit). Silt must be removed when it reaches approximately 1/3 the height of the dam or 12 inches, whichever is less. Inspectors should monitor the edges of the dam where it meets the sides of the drainage ditch, swale or channel for evidence of erosion due to bypass or high flows. Eroded areas shall be repaired. If erosion continues to be a problem, modifications to the check dam or additional controls are needed.

Care must be used when taking out rock check dams in order to remove as much rock as possible. Loose rock can create an extreme hazard during mowing operations once the area has been stabilized.

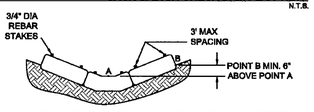
2.1.6 *Example Schematics*

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. They may serve as a starting point for creating a construction detail, but they must be adapted for the site by the designer. Dimensions and notes appropriate for the application must also be added by the designer.



SACK GABION CHECK DAM PLAN VIEW
N.T.S.



SACK GABION CHECK DAM VIEW LOOKING UPSTREAM
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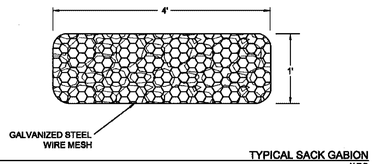


TYPICAL SACK GABION
N.T.S.

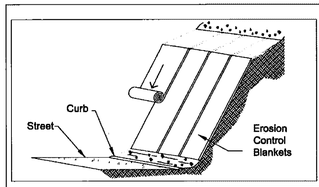
NOTES: ACTUAL DIMENSIONS OF THE CHECK DAMS SHALL BE DESIGNED BASED ON FLOW CONDITIONS IN THE DRAINAGE SWALE OR DITCH. PROVIDE CALCULATIONS THAT DOCUMENT THE FOLLOWING PARAMETERS USED TO DESIGN THE CHECK DAMS.

- **HEIGHT OF CHECK DAMS BASED ON SWALE OR DITCH DIMENSIONS AND FLOW CONDITIONS.**
- **SPACING OF CHECK DAMS BASED ON GRADE OF THE SWALE OR DITCH. TOP OF DOWNSTREAM DAM SHALL BE AT SAME ELEVATION AS TOE OF UPSTREAM DAM.**

Figure 2.3 Schematics of Sack Gabion Check Dams
(Source: Modified from Texas Department of Transportation Detail Sheet EC (2)-93)

2.3 Erosion Control Blankets

Erosion Control



Description: An erosion control blanket (ECB) is a temporary, degradable, rolled erosion control product that reduces soil erosion and assists in the establishment and growth of vegetation. ECBs, also known as soil retention blankets, are manufactured by many companies and are composed primarily of processed, natural, organic materials that are woven, glued, or structurally bound together with natural fiber netting or mesh on one or both sides.

KEY CONSIDERATIONS

DESIGN CRITERIA:

- ECB selected based on slope, flow rate and length of service
- Specify preparation of soil surface to ensure uniform contact with blanket
- Installation and anchoring according to manufacturer's recommendations

ADVANTAGES / BENEFITS:

- Holds seed and soil in place until vegetation is established
- Effective for slopes, embankments and small channels

DISADVANTAGES / LIMITATIONS:

- Not for use on slopes greater than 2:1 or in channels with shear stresses greater than 2.0 pounds per square foot

MAINTENANCE REQUIREMENTS:

- Replace or re-anchor loosened blankets
- Remove sediment deposited on blankets

TARGETED POLLUTANTS

- ● Sediment
- ○ Nutrients & Toxic Materials
- ○ Oil & Grease
- ○ Floatable Materials
- ○ Other Construction Waste

APPLICATIONS

Perimeter Control
Slope Protection
Sediment Barrier
Channel Protection
Temporary Stabilization
Final Stabilization

Waste Management

Housekeeping Practices

Fe=0.90 *(Ground cover)*
Fe=0.65
(Perimeter w/o vegetation)

IMPLEMENTATION CONSIDERATIONS

- ● Capital Costs
- ◒ Maintenance
- ◒ Training
- ● Suitability for Slopes > 5%

Other Considerations:

- *Life expectancy, partial degradation, and mowing/ maintenance issues for ECBs left in place as part of final stabilization*

2.3.1 *Primary Use*

Erosion control blankets (ECBs) are used to hold seed and soil in place until vegetation is established on disturbed areas. They can be used on many types of disturbed areas, but are particularly effective for slopes and embankments and in small drainage swales.

ECBs seeded for vegetation may be used as a perimeter control. When used in combination with other sediment barriers, such as silt fence or organic filter tubes, blankets may be used as a perimeter control with or without vegetation.

2.3.2 *Applications*

ECBs may be used on many types of disturbed areas but are most applicable on gradual to steep (2:1) cut/fill slopes and in swales and channels with low to moderate flow velocities. In these applications they may provide temporary stabilization by themselves or may be used with seeding to provide final stabilization. ECBs are also used to establish vegetation in channels where velocities are less than 6.0 feet per second.

When seeded for establishment of vegetation, ECBs can be an effective perimeter along the down slope side of linear construction projects (roads and utilities). ECBs with vegetation are also used as perimeter controls for new development, particularly at the front on residential lots in new subdivisions. ECBs are an effective aid in establishing vegetated filter strips.

2.3.3 *Design Criteria*

- The designer shall specify the manufacturer, type of erosion control blanket to be used, and dimensioned limits of installation based on the site topography and drainage.
- The type and class of erosion control blanket must be specified in accordance with the manufacturer's guidance for the slope of the area to be protected, the flow rate (sheet flow on cut/fill slopes) or velocity (concentrated flow in swales) of stormwater runoff in contact in with the ECB, and the anticipated length of service.
- ECBs should meet the applicable "Minimum Performance Standards for TxDOT" as published by TxDOT in its "Erosion Control Report" and/or be listed on the most current annual "Approved Products List for TxDOT" applicable to TxDOT Item 169 Soil Retention Blanket and its Special Provisions.
- ECBs shall be installed vertically down slope (across contours) on cut/fill slopes and embankments and along the contours (parallel to flow) in swales and drainage ditches.
- ECBs designed to remain onsite as part of final stabilization shall have netting or mesh only on one side (the exposed side) of the ECB. The ECB shall be installed with the side that does not have netting or mesh in contact with the soil surface. All materials in the ECB, including anchors, should be 100 percent biodegradable within three years.
- On cut/fill slopes and drainage ditches or swales designed to receive erosion control blankets for temporary or final stabilization, installation of the ECBs shall be initiated immediately after completing grading of the slope or drainage way, and in no case later than 14 days after completion of grading these features. Do not delay installation of ECBs on these highly-erodible areas until completion of construction activities and stabilization of the remainder of the site.
- Unless the ECB is seeded to establish vegetation, perimeter control applications shall be limited to thirty foot wide drainage areas (i.e. linear construction projects) for an 8 foot width of ECB. When seeded for vegetation, use of ECBs for perimeter control shall follow the criteria in the *Section 3.15 Vegetated Filter Strips and Buffers*.
- Prior to the installation of the ECB, all rocks, dirt clods, stumps, roots, trash and any other obstructions that would prevent the ECB from lying in direct contact with the soil shall be removed.

- Anchor trenching shall be located along the top of slope of the installation area, except for small areas with less than 2 percent slope.
- Installation and anchoring shall conform to the recommendations shown within the manufacturer's published literature for the erosion control blanket. Anchors (staples) shall be a minimum of 6 inches in length and 1 inch wide. They shall be made of 11-gauge wire, or equivalent, unless the ECB is intended to remain in place with final stabilization and biodegrade.
- Particular attention must be paid to joints and overlapping material. Overlap along the sides and at the ends of ECBs should be per the manufacturer's recommendations for site conditions and the type of ECB being installed. At a minimum, the end of each roll of ECB shall overlap the next roll by 3 feet and the sides of rolls shall overlap 4 inches.
- After installation, the blankets should be checked for uniform contact with the soil, security of the lap joints, and flushness of the staples with the ground.
- When ECBs are installed to assist with establishing vegetation, seeding shall be completed before installation of the ECB. Criteria for seeding are provided in *Section 2.9 Vegetation*.
- Turf Reinforcement Mats should be used instead of ECBs for permanent erosion control and for stabilizing slopes greater than 2:1.
- ECBs are limited to use in swales and channels that have shear stresses of less than 2.0 pounds per square foot. Turf reinforcement mats shall be used in open channels with higher shear stresses.

2.3.4 *Design Guidance and Specifications*

Specifications for construction of this item may be found in the Standard Specifications for Public Works Construction – North Central Texas Council of Governments, Section 201.15 Erosion Control Blankets and in Item 169 of the Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (TxDOT, 2004).

2.3.5 *Inspection and Maintenance Requirements*

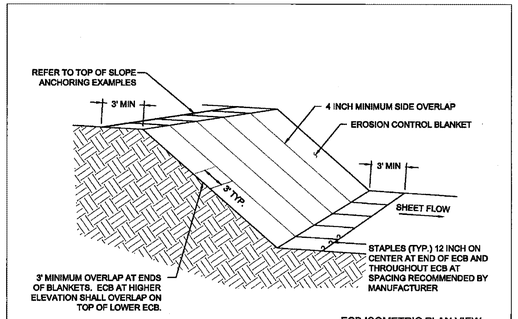
Erosion control blankets should be inspected regularly (at least as often as required by the TPDES Construction General Permit) for bare spots caused by weather or other events. Missing or loosened blankets must be replaced or re-anchored.

Check for excess sediment deposited from runoff. Remove sediment and/or replace blanket as necessary. In addition, determine the source of excess sediment and implement appropriate measures to control the erosion. Also check for rill erosion developing under the blankets. If found, repair the eroded area. Determine the source of water causing the erosion and add controls to prevent its reoccurrence.

2.3.6 *Example Schematics*

The following schematics are example applications of the construction control. They are intended to assist in understanding the control's design and function.

The schematics are **not for construction**. The designer is responsible for working with ECB manufacturers to ensure the proper ECB is specified based on the site topography and drainage. Installation measures should be dictated by the ECB manufacturer and are dependent on the type of ECB installed. Manufacturer's recommendations for overlap, anchoring, and stapling shall always be followed. Criteria shown here are applicable only when they are more stringent than those provided by the manufacturer.



ECB ISOMETRIC PLAN VIEW
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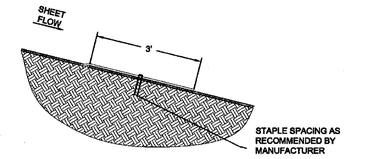
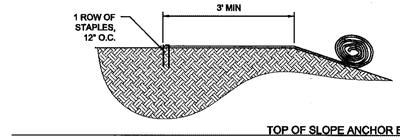


ECB OVERLAP EXAMPLE
N.T.S.

Figure 2.7 Schematics of Erosion Control Blankets

RECORD PLANS
MAY 1, 2015



TOP OF SLOPE ANCHOR EXAMPLE 1
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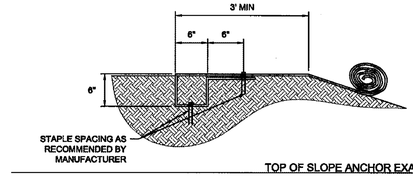

TOP OF SLOPE ANCHOR EXAMPLE 2
N.T.S.

NOTE: ANCHORING METHODS PROVIDED ARE EXAMPLES OF THE TYPE OF ANCHORING THE ECB MANUFACTURER MAY RECOMMEND. THERE ARE MORE THAN A DOZEN DIFFERENT TOP OF SLOPE ANCHORING METHODS BASED ON TYPE OF ECB, TYPE OF SOIL, SPECIFIED PERFORMANCE PERIOD, SLOPE STEEPNESS, ETC. ALWAYS FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR ANCHORING BASED ON THE SITE-SPECIFIC APPLICATION.

Figure 2.8 Anchor Examples for Erosion Control Blankets
(Sources: American Excelsior Company and Western Excelsior Corporation)

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