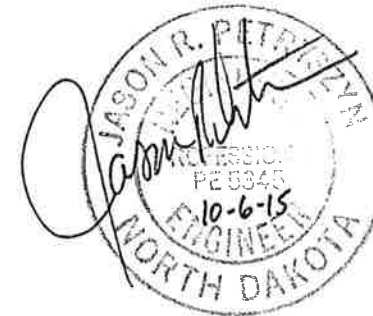


CITY OF MANDAN

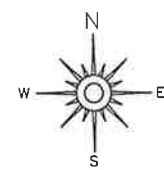
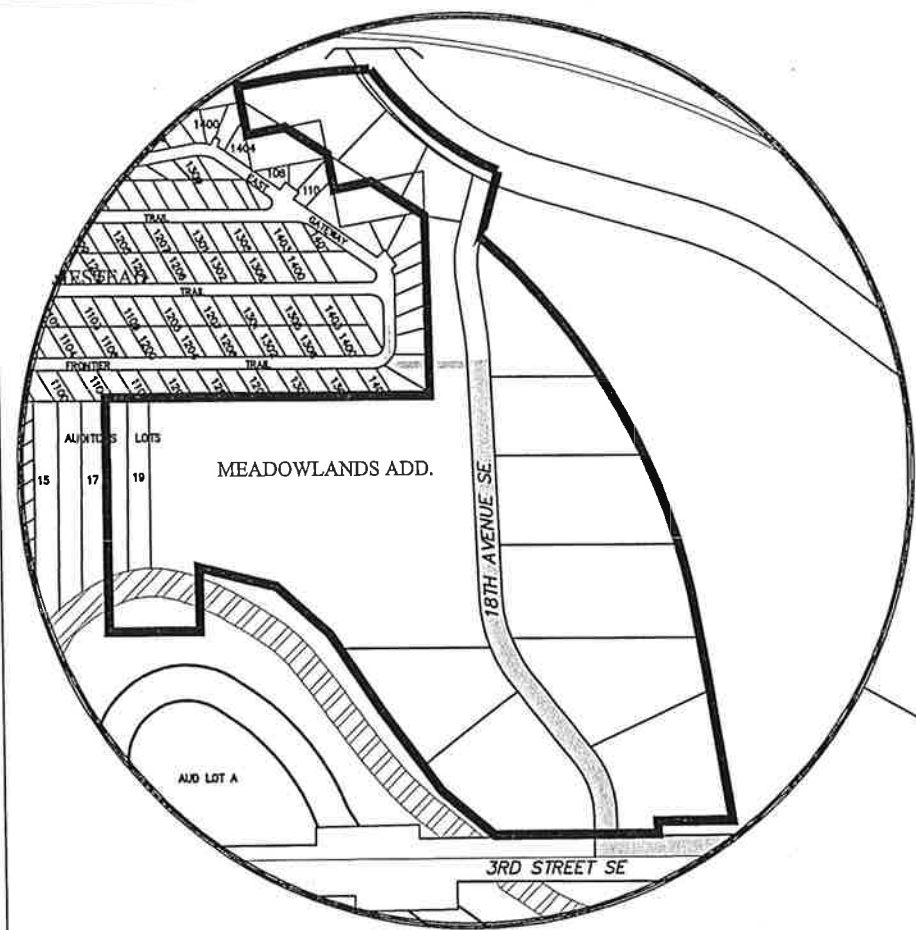
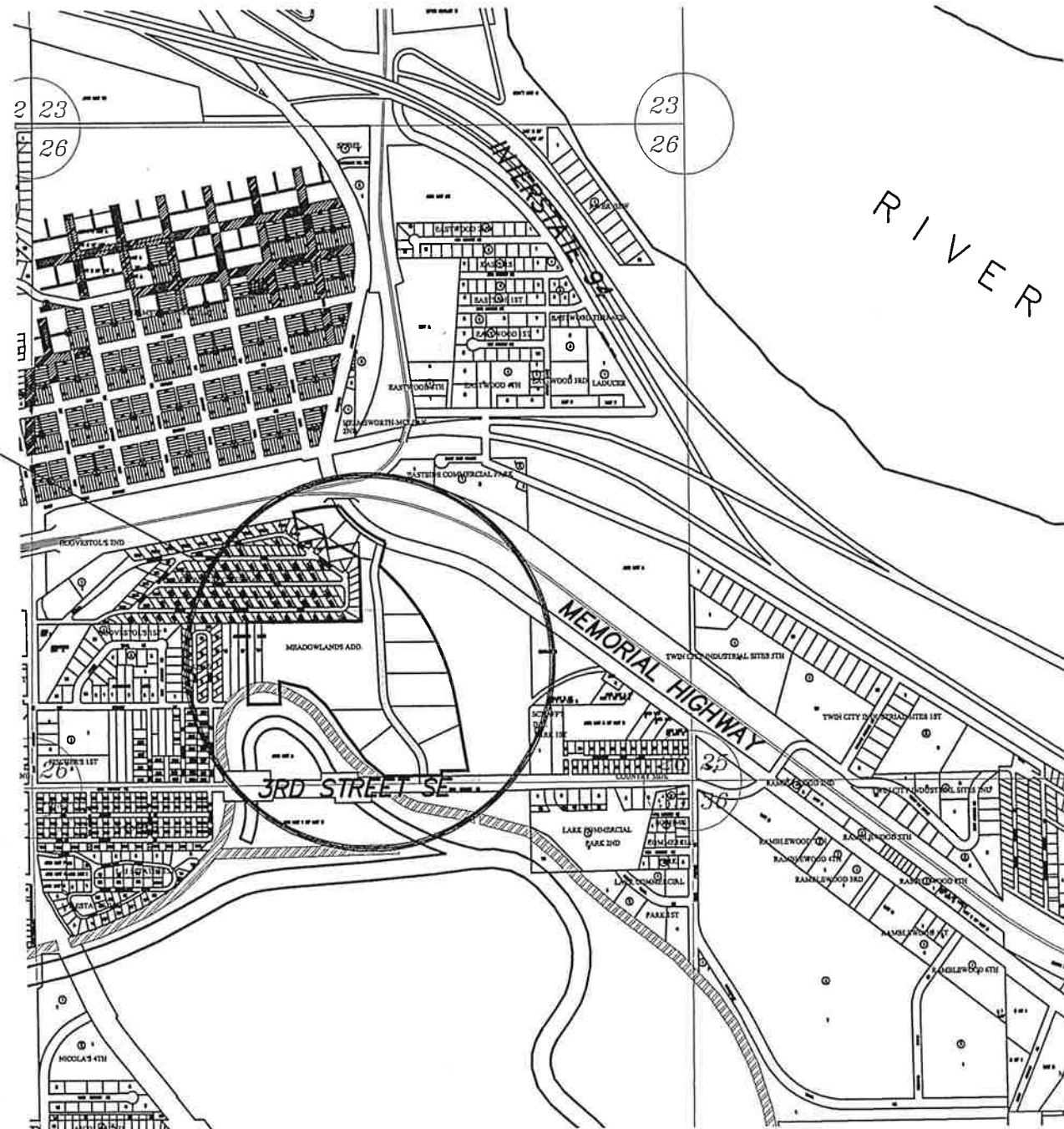
DESIGN ENGINEER'S CERTIFICATE

I, JASON PETRYSZYN, A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF NORTH DAKOTA, HEREBY CERTIFY THAT THE PLANS FOR WATER & SANITARY SEWER IMPROVEMENT PROJECT NO. 2015-10, MANDAN, NORTH DAKOTA WERE PREPARED UNDER MY SUPERVISION AND ARE COMPLETE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.



APPROXIMATE QUANTITIES

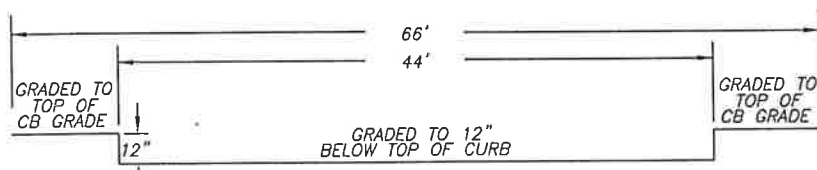
San. Sewer Items	Quantity
8" Sanitary Sewer	1,403 LF
8" x 6" Wye Branch	14 EA
Bedding Material	343 TON
Rock Excavation	50 CY
Telesive Sewer Main	1,403 LF
48" Concrete Manhole	5 EA
6" Sewer Service Pipe	613 LF
6" 45' Bend	12 EA
6" 22.5' Bend	2 EA
Existing Manhole Connection	1 LS
8" Cleanout	1 EA
Dewatering	1,403 LF
Watermain Items	Quantity
Bedding Material	600 TON
Rock Excavation	50 CY
Ductile Iron Fittings	Incidental
6" PVC Watermain	50 LF
8" PVC Watermain	1,977 LF
6" Gate Valve & Box	5 EA
8" Gate Valve & Box	5 EA
6" Hydrant	5 EA
8" Hydrant	1 EA
2" Copper Water Serv. Pipe	224 LF
2" Water Serv. Connection	4 EA
2" Ball Valve Curb Stop And 2" Box	4 EA
Meter Manhole	1 EA
8" WM Site Work	1 LS
Dewatering	800 LF
Storm Sewer Items	Quantity
Bedding Material	500 TON
Rock Excavation	50 CY
24" Storm Sewer Pipe	223 LF
30" Storm Sewer Pipe	669 LF
22.5"x36.25" Arch Storm Sewer Pipe	187 LF
36" Storm Sewer Pipe	17 LF
72" Concrete Manhole	2 EA
84" Concrete Manhole	2 EA
96" Concrete Manhole	1 EA
108" Concrete Manhole	1 EA
Type 72" Inlet	3 EA
Type 108" Inlet	3 EA
Dewatering	1,096 LF



NOT TO SCALE
OCTOBER 6, 2015

SHEET INDEX

- 1 TITLE PAGE
- 2-5 18TH AVENUE SE
- 6-7 WATERMAIN ALONG 3RD ST.
- 8 SANITARY SEWER ESMT



RIGHT OF WAY GRADING DETAIL
EXISTING 66' ROUGH GRADED SECTION
AT TIME OF CONSTRUCTION

WARRANTY / DISCLAIMER

The designs represented in these plans are in accordance with established practices of civil engineering. However, neither Swenson, Hagen & Co. nor its personnel can or do warranty these plans as constructed except in the specific cases where Swenson, Hagen & Co personnel inspect and control the physical construction on a full time basis.

SAFETY NOTICE TO CONTRACTOR

In accordance with generally accepted construction practices the Contractor will be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal business hours.

UTILITY NOTICE TO CONTRACTOR

The location of existing underground utilities are shown in an approximate way only and have not been independently verified by the Owner or its representatives. The Contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the Contractor's failure to exactly locate and preserve any and all underground utilities. Underground locates can be made by using the "One Call" number 1-800-795-0555.

WATER, SANITARY SEWER & STORM SEWER IMPROVEMENT PROJECT NO. 2015-10
MEADOWLANDS ADDITION

SWENSON, HAGEN & COMPANY P.C.
 1001 13th Avenue
 Bismarck, North Dakota 58501
 Phone: (701) 223-2600
 Fax: (701) 223-2606
 Services:
 Surveying
 Land Planning
 Civil Engineering
 Landscape & Site Design
 Construction Management



DRAWN BY: SK
 CHECK BY: JP
 DATE: _____
 FILE DESC: _____
 COMPUTER FILE: _____
 SURVEY FILE: _____

Sheet No.
 1 of 8

Sta. 2+15.41, 4.05' Rt.
=San. Sewer Sta. 3+91.07 Bk.
Manhole No. 5

CONSTRUCTION NOTES

1. Backfill shall be Class "A".
2. Grading shall be by others prior to construction.

Lot	Block	6" Sewer Service	6" 45' Bend	6" 22.5' Bend	8" x 6" Wye Branch	Sewer Service Invert @ Cop	2" Water Service Pipe	2" Curb Stop & Box	Water Service Invert @ C.S.
1	1	40.0	1	1	33.6	56.0	1	1	33.4
*1	1	54.8	1	1	34.1	56.0	1	1	36.0
1	2	45.8	1	1	34.0	---	---	---	---
TOTAL	141	1	2	3	---	112	2	2	---

*South Service

SANITARY SEWER MANHOLE SCHEDULE

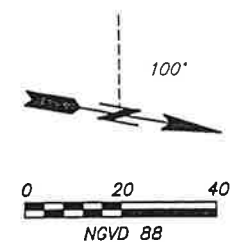
MANHOLE NUMBER	5
CASTING ELEV.	42.03
TOP P.C. SECTION	40.99
INVERT ELEV. (a)	33.62
LENGTH P.C. SECTION	7.37

WATERMAIN MANHOLE SCHEDULE

MANHOLE NUMBER	1
CASTING ELEVATION	47.93
TOP P.C. SECTION	46.89
INVERT ELEV. (a)	39.54
INVERT ELEV. (b)	39.54
BOTTOM OF MANHOLE	38.54

APPROXIMATE WYE LOCATIONS

STATION	DIRECTION	LOT	BLOCK
FROM MANHOLE NO. 4 TO MANHOLE NO. 5			
2+78.8	SW	1	1
3+76.1	SW	1	1
3+81.1	E	1	2



CENTERLINE CURVE DATA

CURVE	RADIUS	LENGTH	TANGENT	DELTA
C1	250.00'	167.12'	86.82'	38°18'06"



18TH AVENUE SE

3RD STREET SE TO
340' NORTH OF 3RD STREET SE

WATER, SEWER & STS IMP. PROJ. NO. 2015-10
SHEET NO. 2 OF 8 SHEETS
MANDAN, N.D. OCTOBER 6, 2015

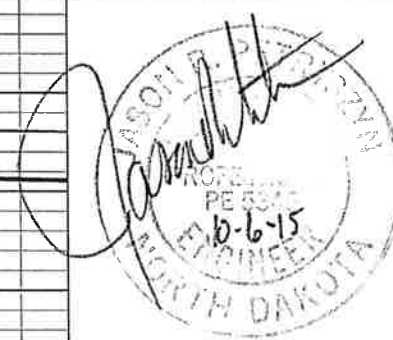
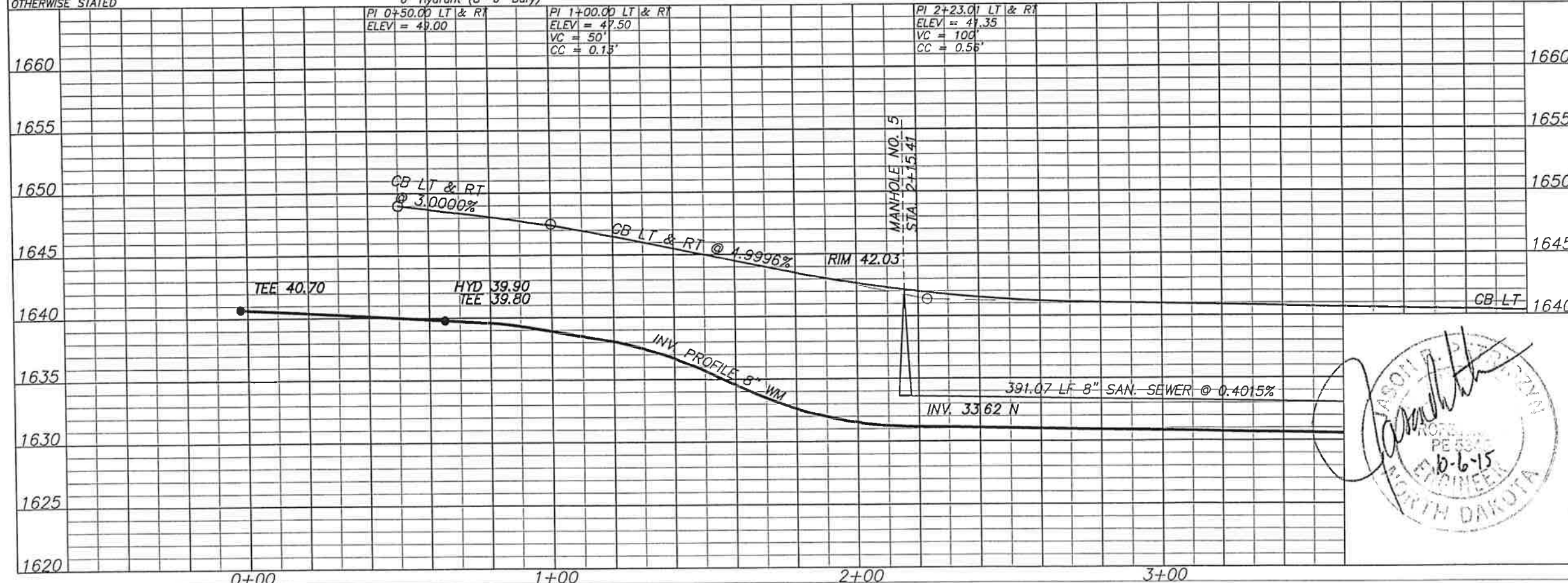
NOTE:
ALL WATER MAIN IS 23' RIGHT
OF CENTERLINE UNLESS
OTHERWISE STATED

Sta. 0+65.00
8" x 6" Tee
3.00 LF 6" WM
6" Gate Valve & Box
7.00 LF 6" WM
6" Hydrant (8"-6" Bury)

PI 0+50.00 LT & RT
ELEV = 49.00

PI 1+00.00 LT & RT
ELEV = 47.50
VC = 50'
CC = 0.15'

PI 2+23.01 LT & RT
ELEV = 47.35
VC = 100'
CC = 0.56'



Sta. 6+05.65, 4.93' Lt.
 =San. Sewer Sta. 2+02.94 Bk.
 =San. Sewer Sta. 0+00.00 Ahd.
 Manhole No. 4

CONSTRUCTION NOTES

1. Backfill shall be Class "A".
2. Grading shall be by others prior to construction.
3. Contractor shall be required to place concrete in the bottom of the manhole/inlet of which are constructed one foot lower than plan invert. Form concrete flowlines to match plan inverts. Soid work shall be considered incidental to other Bid Items.

Lot	Block	6" Sewer Service	6" x 45" Bend	8" x 6" Wye Branch	Sewer Service Invert @ Cop	2" Cu. Water Service Pipe	2" Water Service Connection	2" Curb Stop & Box	Water Service Invert @ C.S.
1	1	40.1	1	1	33.1	56.0	1	1	32.8
2	1	41.9	1	1	32.3	56.0	1	1	32.2
2	2	45.8	1	1	32.7	---	---	---	---
2	2	45.9	1	1	33.0	---	---	---	---
*2	2	46.0	1	1	33.4	---	---	---	---
TOTAL	220	5	5	---	112	2	2	---	---

*South Service

SANITARY SEWER MANHOLE SCHEDULE

MANHOLE NUMBER	4
CASTING ELEV.	39.45
TOP P.C. SECTION	38.41
INVERT ELEV. (a)	31.95
INVERT ELEV. (b)	32.05
LENGTH P.C. SECTION	6.46

STORM SEWER INLET SCHEDULES

INLET NUMBER	*INLET NO. 1	*INLET NO. 2
MANHOLE SIZE	2' x 9"	108"
CASTING TYPE	R-3295-3 TYPE "V" GRATE	R-3295-3 TYPE "V" GRATE
RIM/GUTTER ELEV.	39.00	39.00
TOP P.C. SECTION	38.21	37.46
INVERT (a)	35.50	35.28
INVERT (b)	---	35.38
LENGTH P.C. SECTION	2.71	2.18

*Manhole/Inlet shall be required to be constructed one foot lower than plan invert.

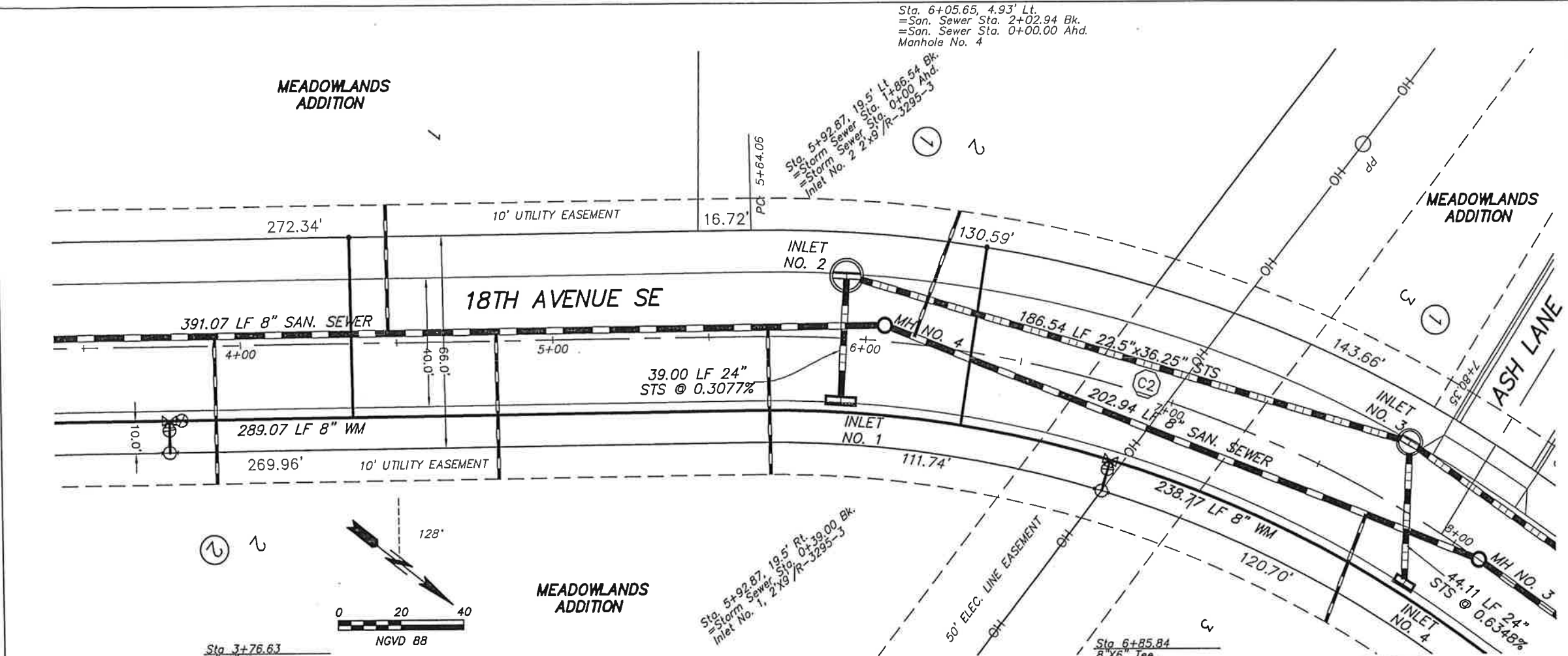
APPROXIMATE WYE LOCATIONS

STATION	DIRECTION	LOT	BLOCK
FROM MANHOLE NO. 3 TO MANHOLE NO. 4			
1+92.9	SW	2	1
FROM MANHOLE NO. 4 TO MANHOLE NO. 5			
0+37.5	NE	2	2
1+24.4	NE	2	2
1+58.8	SW	1	1
2+14.4	NE	2	2



18TH AVENUE SE
 340' NORTH OF 3RD STREET SE TO
 40' SOUTH OF ASH LANE

WATER, SEWER & STS IMP. PROJ. NO. 2015-10
 SHEET NO. 3 OF 8 SHEETS
 MANDAN, N.D. OCTOBER 6, 2015



NOTE:
 ALL WATER MAIN IS 23' RIGHT
 OF CENTERLINE UNLESS
 OTHERWISE STATED

Sta. 3+76.63
 8" x 6" Tee
 3.00 LF 6" WM
 6" Gate Valve & Box
 7.00 LF 6" WM
 6" Hydrant (10'-0" Bury)

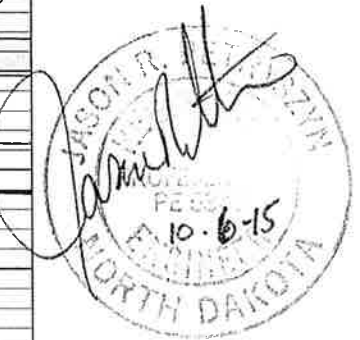
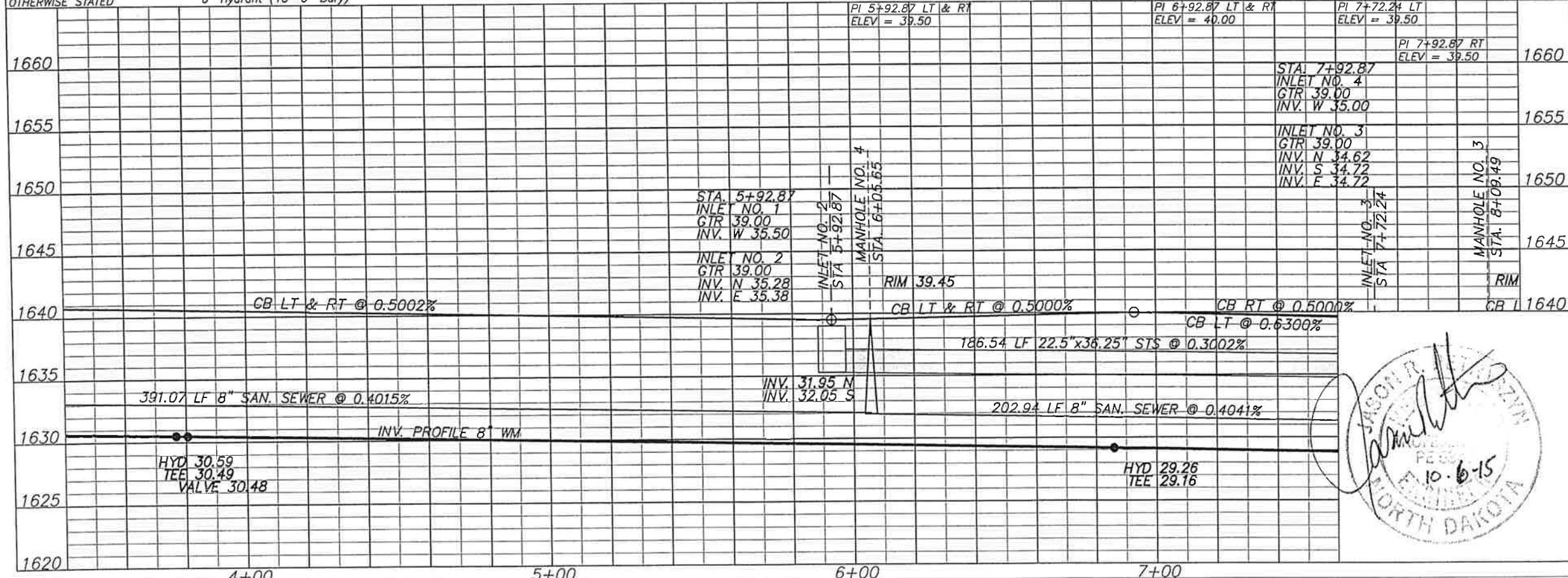
Sta. 3+80.63
 8" Gate Valve
 & Box

Sta. 5+92.87, 19.5' Lt.
 =Storm Sewer Sta. 0+39.00 Bk.
 Inlet No. 1, 2 x 9 / R-3295-3

Sta. 6+85.84
 8" x 6" Tee
 3.00 LF 6" WM
 6" Gate Valve & Box
 7.00 LF 6" WM
 6" Hydrant (10'-6" Bury)

CENTERLINE CURVE DATA

CURVE	RADIUS	LENGTH	TANGENT	DELTA
C2	400.00'	253.34'	131.08'	36°17'19"



Sta. 8+09.49, CL
=San. Sewer Sta. 2+62.85 Bk.
=San. Sewer Sta. 0+00.00 Ahd.
Manhole No. 3

Sta. 10+72.33, CL
=San. Sewer Sta. 2+62.85 Bk.
=San. Sewer Sta. 0+00.00 Ahd.
Manhole No. 2

CENTERLINE CURVE DATA				
CURVE	RADIUS	LENGTH	TANGENT	DELTA
C2	400.00'	253.34'	131.08'	36°17'19"

CONSTRUCTION NOTES

1. Backfill shall be Class "A".
2. Grading shall be by others prior to construction.
3. Contractor shall be required to place concrete in the bottom of the manhole/inlet of which are constructed one foot lower than plan invert. Form concrete flowlines to match plan inverts. Said work shall be considered incidental to other Bid Items.

Lot	Block	6" Sewer Service	6" x 6" Bend	Sewer Service Invert @ Cap
3	2	42.9	1	31.2
*3	2	36.3	1	31.7
4	2	43.0	1	30.0
*4	2	43.0	1	30.5
TOTAL		166	4	--

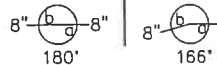
*South Service

STORM SEWER INLET SCHEDULES

INLET NUMBER	INLET NO. 5	INLET NO. 6	MH NO. 1
MANHOLE SIZE	72"	2' x 6'	96"
CASTING TYPE	R-3295-2 TYPE "V" GRATE	R-3295-2 TYPE "V" GRATE	R-1733 W/ SOLID COVER
RIM/GUTTER ELEV.	39.00	39.00	39.30
TOP P.C. SECTION	37.46	38.21	37.59
INVERT (a)	33.85	33.91	33.70
INVERT (b)	33.95	34.01	33.80
INVERT (c)	--	--	33.80
INVERT (d)	--	--	33.80
LENGTH P.C. SECTION	3.61	4.30	3.89

SANITARY SEWER MANHOLE SCHEDULE

MANHOLE NUMBER	2	3
CASTING ELEV.	39.90	39.44
TOP P.C. SECTION	38.86	38.40
INVERT ELEV. (a)	29.87	31.03
INVERT ELEV. (b)	29.97	31.13
LENGTH P.C. SECTION	8.99	7.37



STORM SEWER INLET SCHEDULES

INLET NUMBER	INLET NO. 3	INLET NO. 4
MANHOLE SIZE	*84"	2' x 6'
CASTING TYPE	R-3295-2 TYPE "V" GRATE	R-3295-2 TYPE "V" GRATE
RIM/GUTTER ELEV.	39.00	39.00
TOP P.C. SECTION	37.54	38.21
INVERT (a)	34.62	35.00
INVERT (b)	34.72	--
INVERT (c)	34.72	--
LENGTH P.C. SECTION	2.92	3.21

*Manhole/Inlet shall be required to be constructed one foot lower than plan invert.

APPROXIMATE WYE LOCATIONS

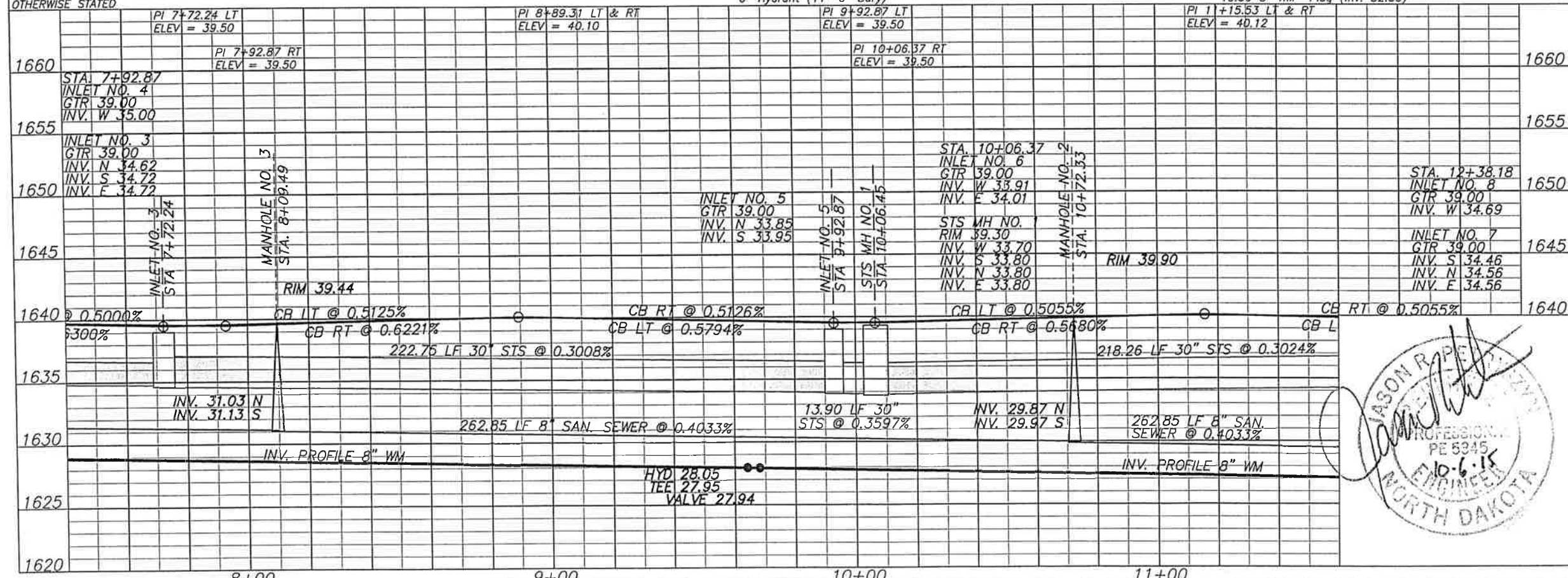
STATION	DIRECTION	LOT	BLOCK
FROM MANHOLE NO. 1 TO MANHOLE NO. 2			
1+92.8	E	4	2
FROM MANHOLE NO. 2 TO MANHOLE NO. 3			
0+29.0	E	4	2
2+07.8	E	3	2
FROM MANHOLE NO. 3 TO MANHOLE NO. 4			
0+39.0	E	3	2

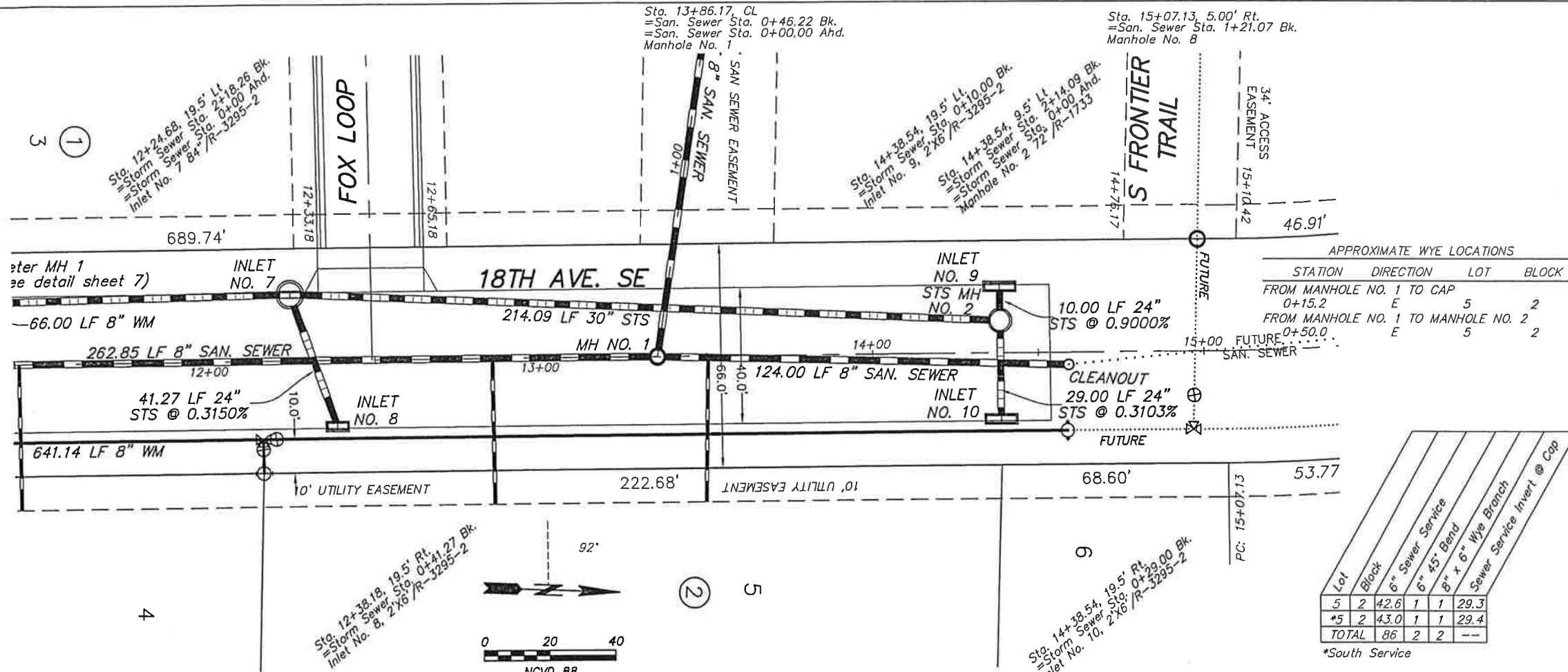


18TH AVENUE SE
40' SOUTH OF ASH LANE TO
100' SOUTH OF FOX LOOP

WATER, SEWER & STS IMP. PROJ. NO. 2015-10
SHEET NO. 4 OF 8 SHEETS
MANDAN, N.D. OCTOBER 6, 2015

NOTE:
ALL WATER MAIN IS 23' RIGHT
OF CENTERLINE UNLESS
OTHERWISE STATED





- CONSTRUCTION NOTES**
1. Backfill shall be Class "A".
 2. Grading shall be by others prior to construction.
 3. Contractor shall be required to place concrete in the bottom of the manhole/inlet of which are constructed one foot lower than plan invert. Form concrete flowlines to match plan inverts. Said work shall be considered incidental to other Bid Items.

SANITARY SEWER MANHOLE SCHEDULE

MANHOLE NUMBER	1
CASTING ELEV.	40.08
TOP P.C. SECTION	39.04
INVERT ELEV. (a)	28.71
INVERT ELEV. (b)	28.81
INVERT ELEV. (c)	28.81
LENGTH P.C. SECTION	10.33

APPROXIMATE WYE LOCATIONS

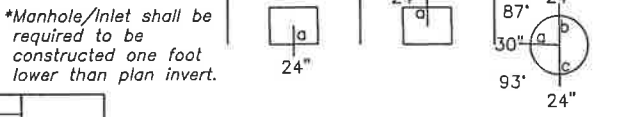
STATION	DIRECTION	LOT	BLOCK
FROM MANHOLE NO. 1 TO CAP			
0+15.2	E	5	2
FROM MANHOLE NO. 1 TO MANHOLE NO. 2			
0+50.0	E	5	2

STORM SEWER INLET SCHEDULES

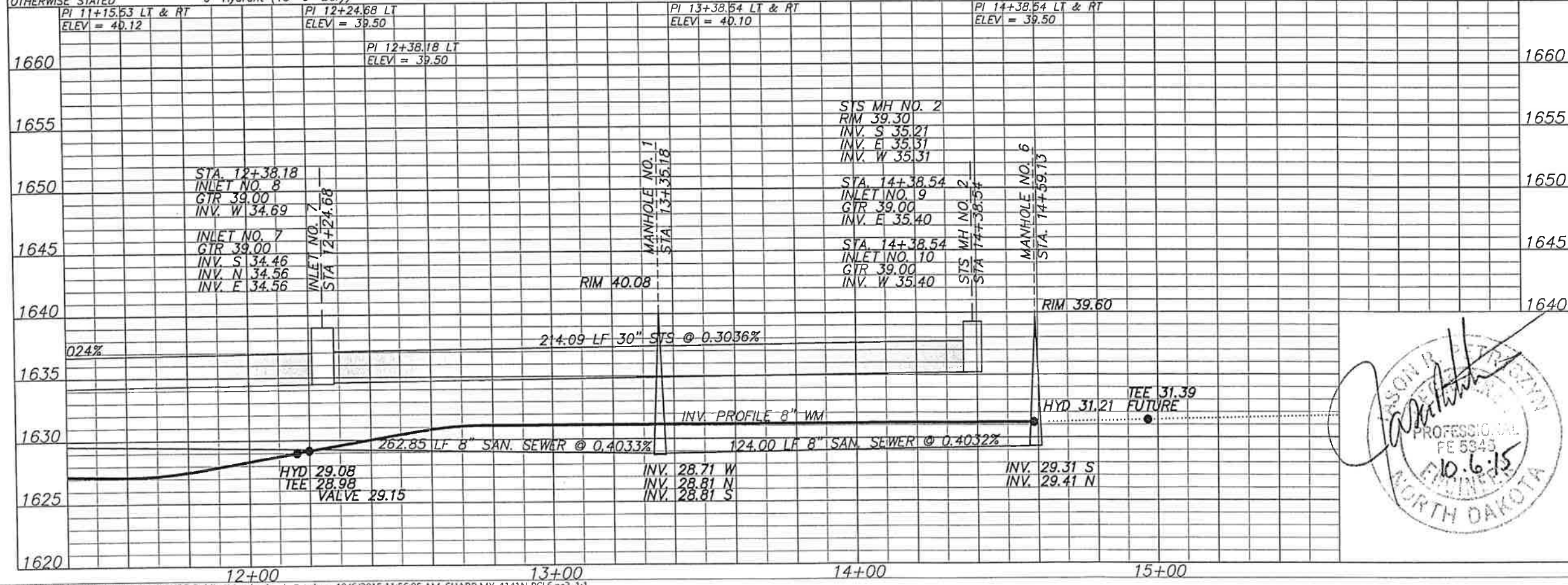
INLET NUMBER	*INLET NO. 9	*INLET NO. 10	*MH NO. 2
MANHOLE SIZE	2' x 9"	2' x 9"	72"
CASTING TYPE	R-3295-3	R-3295-3	R-1733
RIM/GUTTER ELEV.	39.00	39.00	39.30
TOP P.C. SECTION	38.21	38.21	38.05
INVERT (a)	35.40	35.40	35.21
INVERT (b)	---	---	35.31
INVERT (c)	---	---	35.31
LENGTH P.C. SECTION	2.81	2.81	2.84

Lot	Block	6" Sewer Service	6" 45' Bend	8" x 6" Wye Branch	Sewer Service Invert @ Cap
5	2	42.6	1	1	29.3
*5	2	43.0	1	1	29.4
TOTAL	86	2	2	---	---

*South Service

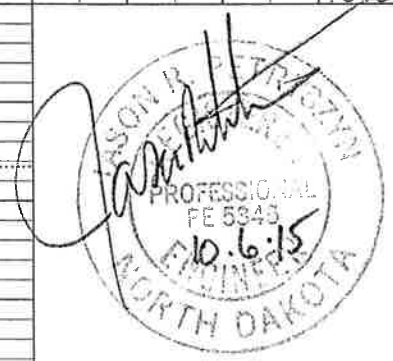


NOTE:
ALL WATER MAIN IS 23' RIGHT OF CENTERLINE UNLESS OTHERWISE STATED



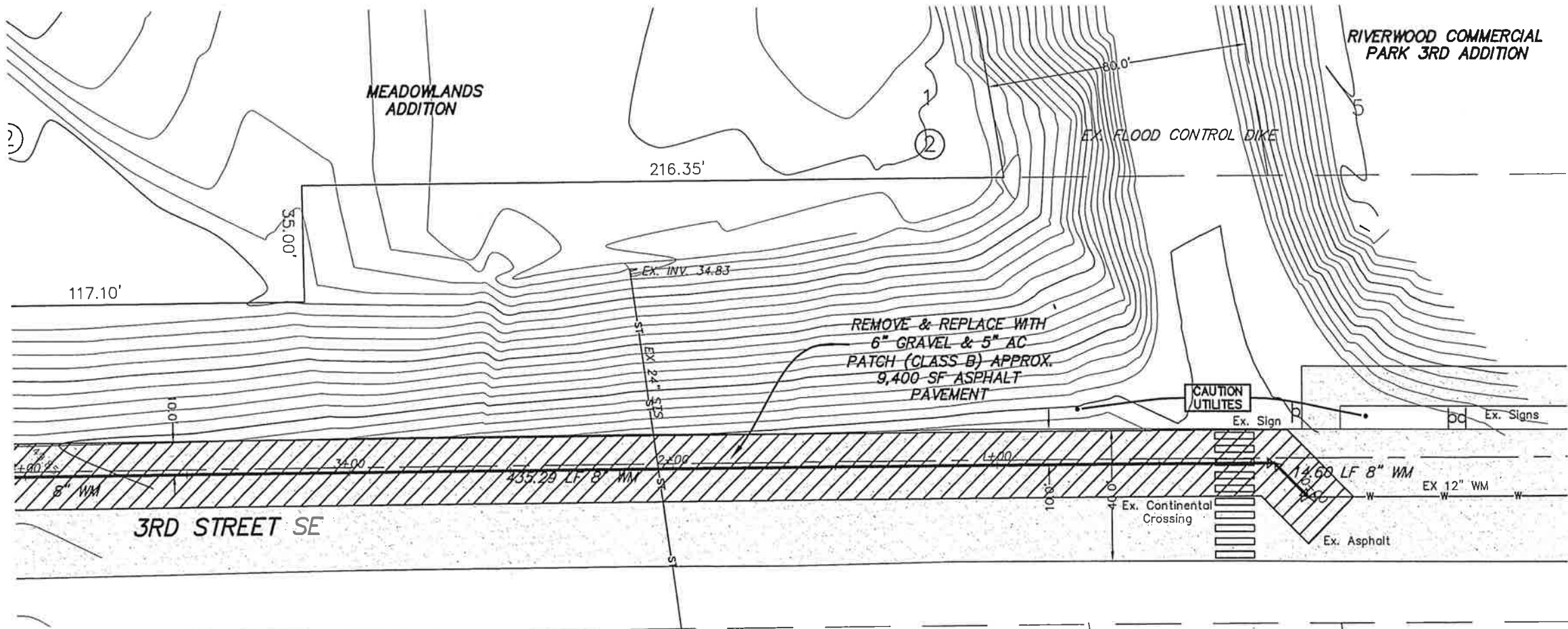
STORM SEWER INLET SCHEDULES

INLET NUMBER	INLET NO. 7	INLET NO. 8
MANHOLE SIZE	*84"	2' x 6"
CASTING TYPE	R-3295-2	R-3295-2
RIM/GUTTER ELEV.	39.00	39.00
TOP P.C. SECTION	37.54	38.21
INVERT (a)	34.46	34.69
INVERT (b)	34.56	---
INVERT (c)	34.56	---
LENGTH P.C. SECTION	3.08	3.52



18TH AVENUE SE
100' SOUTH OF FOX LOOP TO
60' NORTH OF S FRONTIER TRAIL

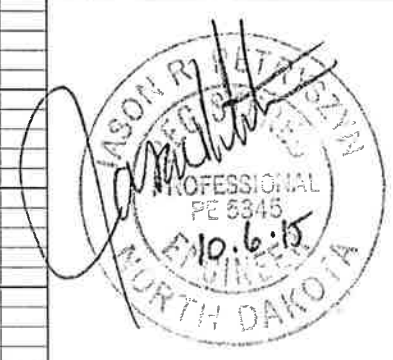
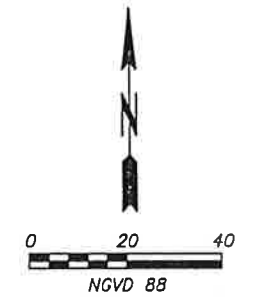
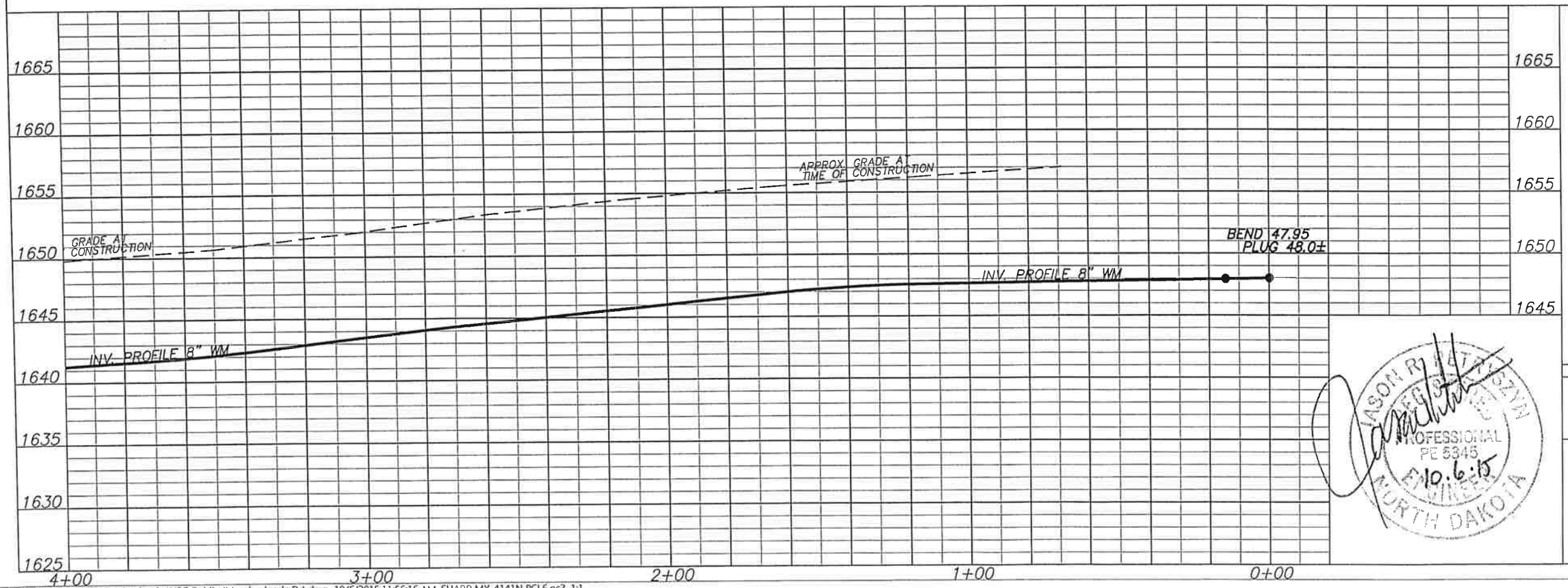
WATER, SEWER & STS IMP. PROJ. NO. 2015-10
SHEET NO. 5 OF 8 SHEETS
MANDAN, N.D. OCTOBER 6, 2015



- CONSTRUCTION NOTES**
1. Backfill shall be Class "A".
 2. Grading shall be by others prior to construction.
 3. Connection to existing 12" watermain shall be considered incidental to "B" watermain" bid item.
 4. Location and elevation of existing watermain is approximate. Contractor to verify before connection.
 5. Contractor shall maintain 7.5' of cover overtop of all watermain.
 6. Contractor shall coordinate street closure with City of Mandan Public Works one week prior to beginning work. Traffic control shall be in place before beginning work. Contractor shall saw cut pavement and remove asphalt offsite. Contractor shall restripe continental crossing. Contractor shall provide 6" gravel base on 3rd Street. Asphalt patch shall be 5" (Class B) on 3rd Street. Existing signs shall be salvaged and reinstalled. Contractor shall be required to seed and mulch all disturbed areas. All said work to connect and install 8" watermain shall be considered incidental to "B" Watermain Site work" bid item. All 8" watermain pipe shall be bid under "B" PVC Watermain", including watermain pipe on 3rd Street. As an alternate, the contractor may elect to bore the 8" watermain along 3rd Street SE. Any and all work to complete this shall be considered incidental to "B" Watermain Site Work" bid item.

Sta 0+14.60
8" 45° Bend

Sta 0+00.00
12"x8" Reducer
8" 45° Bend



3RD STREET SE
300' WEST OF RIVERWOOD AVE. SE TO
160' EAST OF 18 AVENUE SE

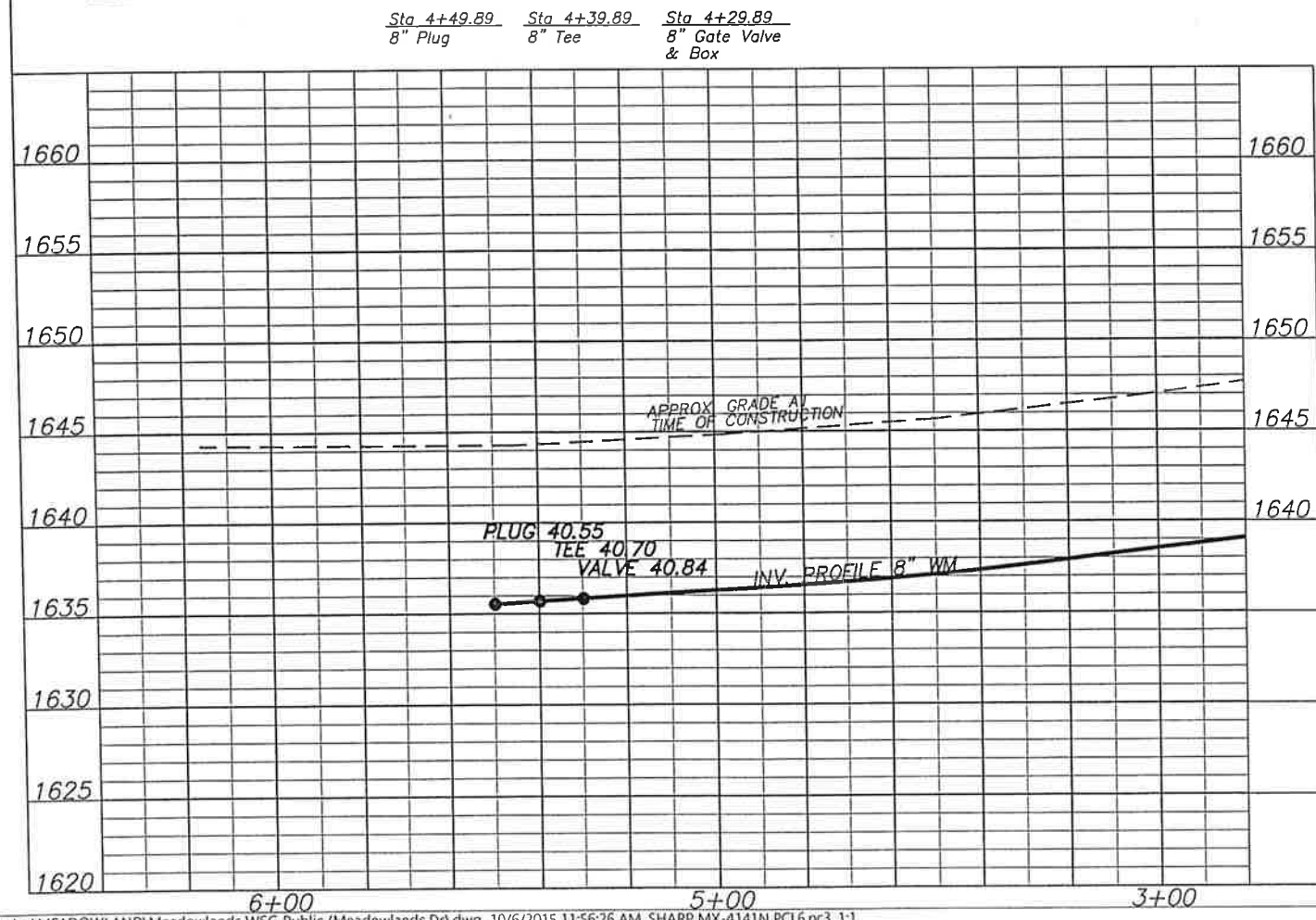
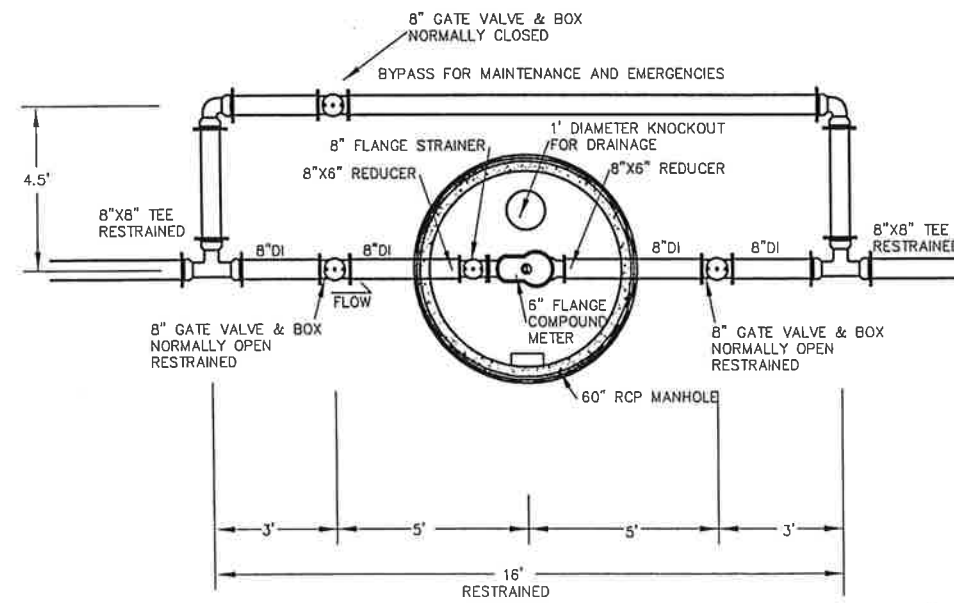
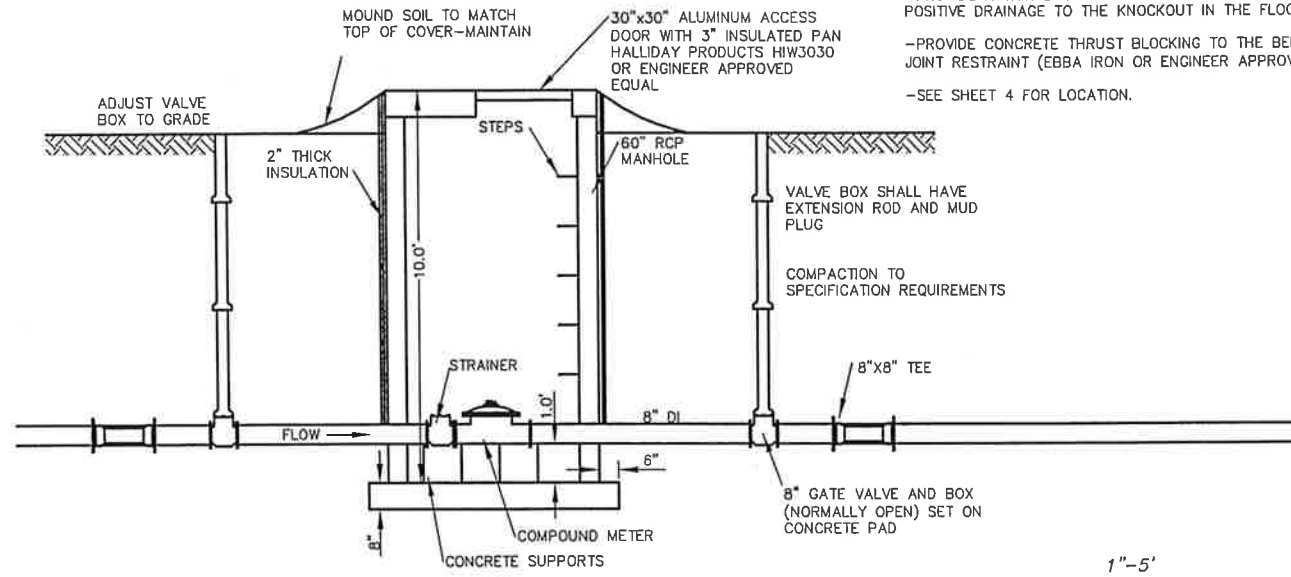
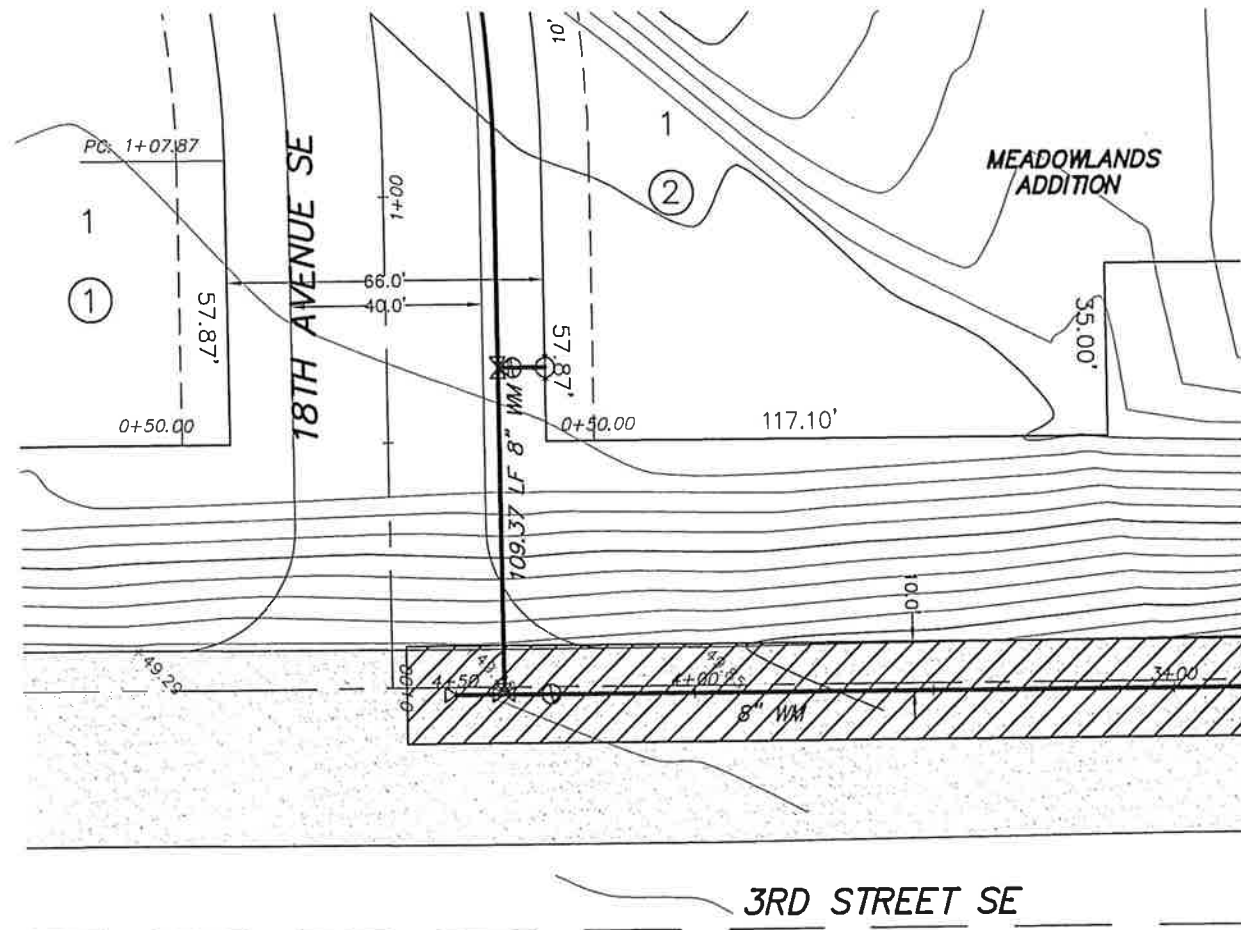
WATER, SEWER & STS IMP. PROJ. NO. 2015-10
SHEET NO. 6 OF 8 SHEETS
MANDAN, N.D. OCTOBER 6, 2015

CONSTRUCTION NOTES

1. Backfill shall be Class "A".
2. Grading shall be by others prior to construction.

NOTES:

- PROVIDE 8" DIAMETER CLASS 52 DUCTILE IRON BETWEEN THE 8"x8" TEES THROUGH THE METER MANHOLE.
- PROVIDE 8" DIAMETER CLASS 150 PVC FOR THE PIPING OF THE BYPASS MAIN.
- CONCRETE MANHOLE SHALL BE PRECAST CONFORMING TO CRETEX STANDARDS AND ASTM C76 AND C655.
- PROVIDE A THIN LIFT OF GROUT ON THE FLOOR ON THE MANHOLE TO PROVIDE POSITIVE DRAINAGE TO THE KNOCKOUT IN THE FLOOR.
- PROVIDE CONCRETE THRUST BLOCKING TO THE BENDS EXCEPT WHERE MECHANICAL JOINT RESTRAINT (EBBA IRON OR ENGINEER APPROVED EQUAL) IS SPECIFIED.
- SEE SHEET 4 FOR LOCATION.



Sta 4+49.89 8" Plug
 Sta 4+39.89 8" Tee
 Sta 4+29.89 8" Gate Valve & Box



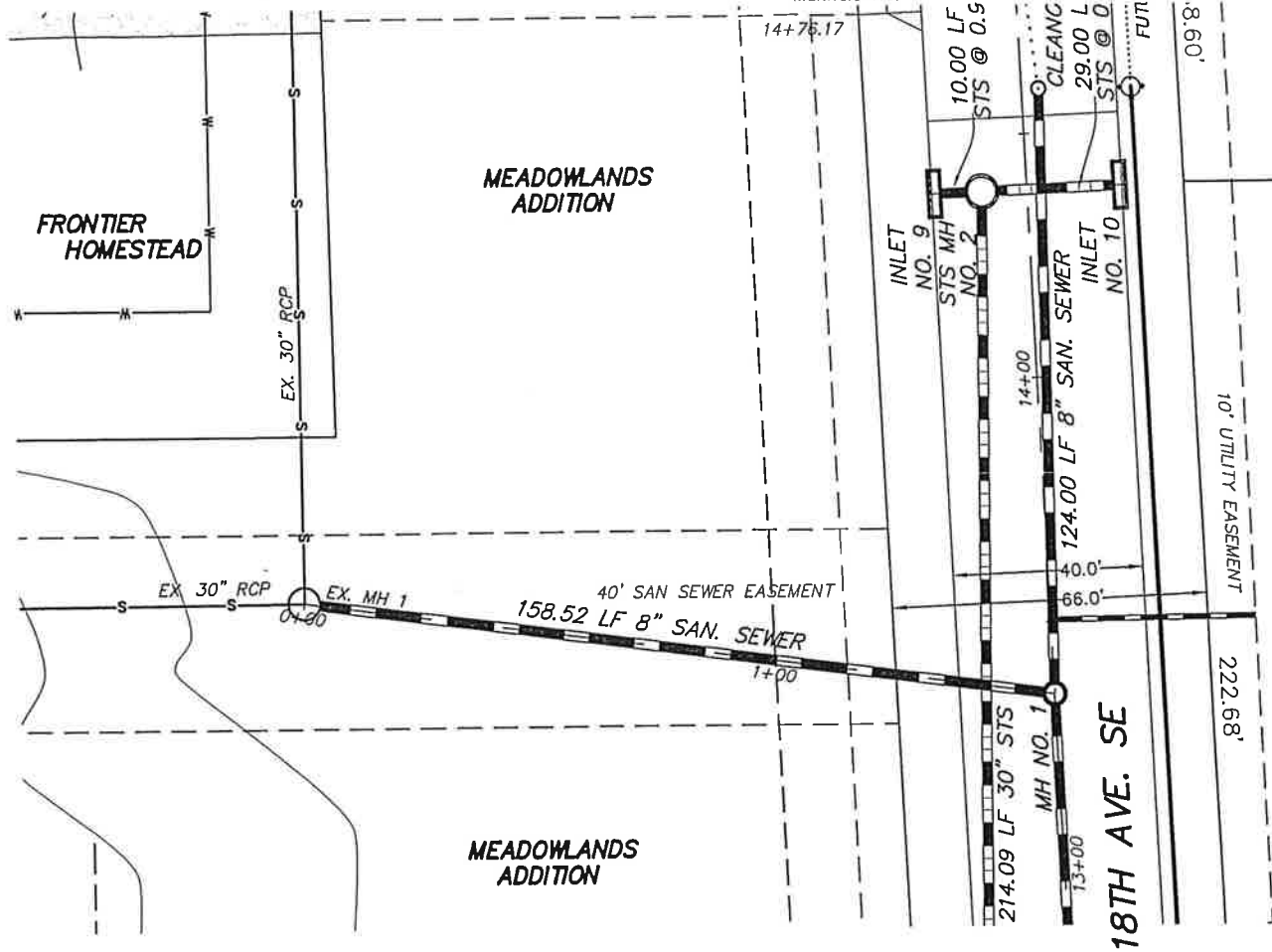
SWENSON, HAGEN & COMPANY P.C.
 909 2nd Avenue
 Mandan, North Dakota 58048
 www.swensonhagen.com
 Phone (701) 323-3800
 Fax (701) 323-3808

3RD STREET SE
 3RD STREET SE TO
 340' NORTH OF 3RD STREET SE

WATER, SEWER & STS IMP. PROJ. NO. 2015-10
 SHEET NO. 7 OF 8 SHEETS
 MANDAN, N.D. OCTOBER 6, 2015

Sta. 0+00.00, CL
 =San. Sewer Sta. 0+00.00 Ahd.
 Existing Manhole No. 1

Sta. 1+58.52, CL
 =San. Sewer Sta. 1+58.52 Bk.
 =San. Sewer Sta. 0+00.00 Ahd.
 Manhole No. 1

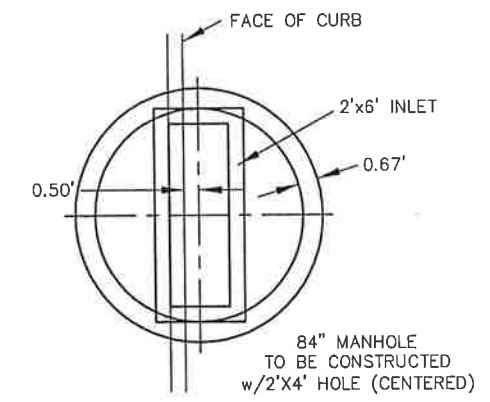


MEADOWLANDS ADDITION

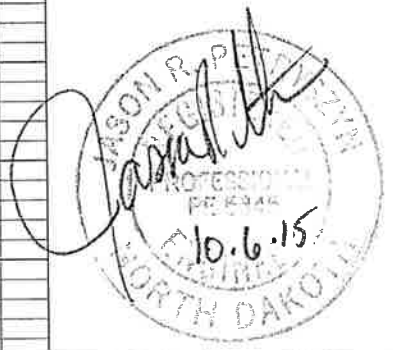
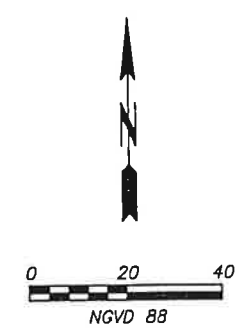
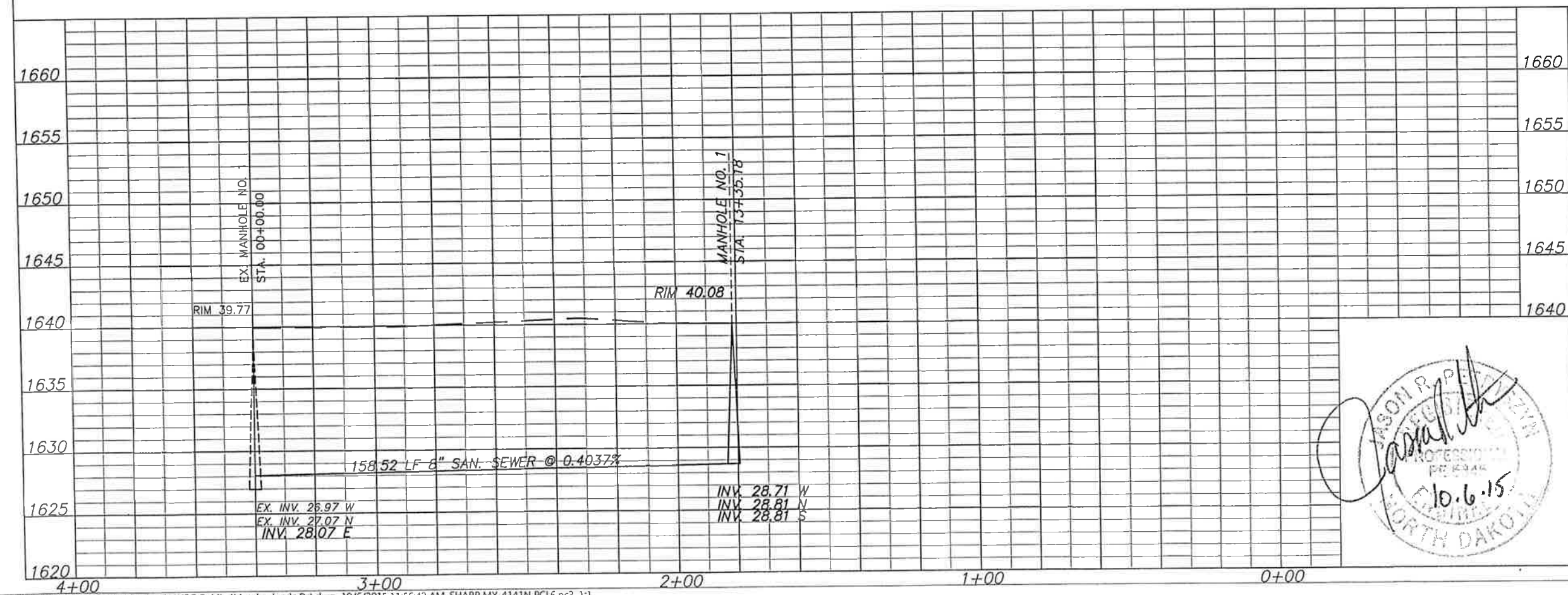
5
 (2)

CONSTRUCTION NOTES

1. Backfill shall be Class "A".
2. Grading shall be by others prior to construction.
3. Contractor shall be required to pump waste water flow during connection to existing manhole no. 1. Break into existing manhole and grout pipe and flowline. Contractor shall notify Mandan Public Works 5 days before work is to commence on manhole connection. Any material, labor and work shall be considered incidental to "Existing Manhole Connection" bid item.



84" MANHOLE W/R-3295-2



SWENSON, HAGEN & COMPANY P.C.
 Surveying
 Hydrology
 Land Planning
 Civil Engineering
 Leveeage & Site Design
 Construction Management

SANITARY SEWER ESMT
 160' WEST OF 18TH AVENUE SE TO
 18TH AVENUE SE
 WATER, SEWER & STS IMP. PROJ. NO. 2015-10
 SHEET NO. 8 OF 8 SHEETS
 MANDAN, N.D. OCTOBER 6, 2015