CITY OF BISMARCK ENGINEERING DEPARTMENT

STANDARDS, PROCEDURES & REQUIREMENTS FOR CAD DRAWINGS

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TABLE OF CONTENTS PAGE

1. GENERAL REQUIREMENTS 1

2. DRAWING SET UP AND ORGANIZATION 1

3. BORDERS AND TITLE BLOCKS 2

4. AERIAL PHOTOS 2

5. SURVEY DATA 3

6. LAYERS AND LINETYPES 3

7. BLOCKS, SYMBOLS AND DETAILS 3

8. TEXT 4

9. STATIONING AND DIMENSIONING AND LABELING 4

10. PRINTING AND PREPARING FINAL PLANS 6

11. EASEMENT DRAWINGS 6

12. ATTACHMENTS AND SAMPLE DRAWINGS 7

1. GENERAL REQUIREMENTS

The requirements listed in this document are used by the City of Bismarck Engineering Department to ensure uniformity of plans and ease of use of all cad files utilized by the department staff. Consultants doing design work for the Engineering Department or for a 3-way contract by a developer should adhere to these requirements unless specifically noted next to the item in this document. Consultants may utilize their existing standards for anything not specifically covered in this document. Any project that is NDDOT funded shall adhere to NDDOT plan requirements. Comments, questions or requests for exceptions to these standards should be directed to Aaron Renner at arenner@bismarcknd.gov.

2. DRAWING SETUP AND ORGANIZATION

- Drawings shall utilize current versions of AutoCad and/or Civil 3D.
- Horizontal Datum shall be NAD 83 (86 Adjustment) Based on the City of Bismarck monuments and adjusted to ground distance. Vertical Datum shall be NGVD 29. Drawing units shall be in international feet.
- Drawing files are to be created and stored in accordance with the Folder Contents Key handout and the Naming Conventions handouts. (This does not apply to consultants).
- New plan and profile drawings shall utilize the City of Bismarck standard template which will open by default when using Civil 3D. (This does not apply to consultants). The location of the file is W:\Drawings\CAD Standards\Bismarck Standard Template.dwt. The template contains customized styles which control the appearance of Civil 3D objects. Consultants should utilize styles that are equal in appearance to those in the standard template for Alignments, Profiles, Profiles Views and their associated labels. Other styles may still be in development, not used by the department or not relevant to the appearance of the plans in which case consultants may use their own styles. When creating Civil 3D objects, such as alignments, profiles, surfaces, etc., the template will have an object style and label style already associated with them by default. When creating certain objects such as pipe networks, the user will need to choose the appropriate object style and label style from the drop down list.
- A drawing file shall be organized so that all components of the project, including points, alignments, profiles, profile views, plan and profile sheets remain within the main drawing. **Data shortcuts should not be used. External reference files should only be used when it is necessary to preserve the clarity of the main drawing.** Consultants who are submitting cad files to the Engineering Department, either for construction staking or preparation of paving plans, must include all externally referenced files.
- Drawings that are not directly associated with the main drawing such as detail sheets, cover sheets, etc. may be in separate drawing files.
- Layout Sheets should be set up for printing on 11x17 paper.
- Typical plan and profile sheets for water, sewer, storm and paving should be at 1” = 40’ scale.
- Typical sheets for street lighting projects should be at 1” = 100’ scale. Street lighting sheets shall have a plan view and a schematic view. Both views may be on one sheet if space permits or on

separate sheets if necessary. Schematic view does not need to be to scale. See attached street light example drawing. New street light drawings shall utilize the City of Bismarck Street Light Template (This does not apply to consultants). The location of the file is W:\Drawings\CAD Standards\Bismarck Street Light Template.dwt

- Other miscellaneous drawings may be drawn at various standard scales as necessary to show required level of detail.
- Each layout in paper space should contain only one sheet and should be named appropriately.
- North arrow, bar scale, and vertical datum (NGVD29) shall be shown on the upper portion of the sheet.
- Quantities and specification numbers shall be listed in the lower right portion of each sheet in the space provided. This is not required on 3-way projects, because the department does not track quantities on these projects.
- Construction notes, manhole details, typical sections, and service line information should be shown on the upper right side of the sheet where space is available. Manhole/inlet details and other details may be shown on a separate sheet if there is not enough space on the plan and profile sheet.
- Individual sheets should match the look and layout of the attached sample drawings as closely as possible.

3. BORDERS AND TITLE BLOCKS

- Standard borders including title blocks are found in the W:\Drawings\CAD Standards folder.
- Descriptions for plan and profile sheet titleblocks should be described as "X" number of feet from the center of the nearest intersection. Example:

BOULEVARD AVENUE
100' WEST OF 3RD STREET TO 300' EAST OF 4TH STREET

4. AERIAL PHOTOS

- Aerial photos may be used for drawing purposes. The photos are located in the X:\Orthos\2013 Ortho\MrSids folder. They should not be used on final plans unless authorized by the City Engineer.
- Aerial photos are named by section, township & range ie: 1398024.sid. There is also an aerial photo of the entire City named Bismarck.sid. This file is very large and may cause issues on some computers.
- When aerial photos are inserted into the drawing they will not line up with the survey points because the photos are in state plane grid coordinates and the survey points are in ground coordinates. The photos can be moved to match up with the survey points. The survey points should not be moved.

5. SURVEY DATA

- Under most circumstances the survey points should not be moved, unless necessary to correct a survey error.
- See attachments for a list of survey codes and descriptions.

6. LAYERS AND LINETYPES

- For most projects the majority of the necessary layers, linetypes, colors, etc. are set up in the Bismarck standard template. If new layers need to be created, common abbreviations or easily understandable names should be used. See attached standard linetypes legend.
- Layer names shall be set up using the following relevant prefixes: Consultants may use their own layer naming conventions, but linetypes and pen settings shall correspond to the settings in the Bismarck Standard Template.dwt or the Bismarck Street Light Template.dwt files.
- Symbols should be on a separate layer from the utility it is related to. Example: valves and hydrant should be on a separate layer from the watermain. Profile lines should also be on a separate layer from the the plan view layers.

Type of facility	Prefix
Existing	e-
Proposed	p-
Future	f-
Profile	prof-

See attachments for a list of layers, linetypes, line thickness, settings, etc.

7. BLOCKS, SYMBOLS AND DETAILS

- The standard symbol blocks are found in the W:\Drawings\symbols folder. See attachments for a list of blocks and symbols.
- Blocks for above ground features such as valves, manholes, hydrants, etc. should be placed on the appropriate layer with the –sym (symbol) suffix. Blocks will automatically scale to the correct size.
- Standard details which are part the City of Bismarck construction specifications can be found in the W:\Drawings\Standard Details folder.
- Miscellaneous details which are not part the City of Bismarck construction specifications, but which may be used or modified for plan production can be found in the W:\Drawings\CAD Standards.

8. TEXT

- Text should be all caps, with no obliquing.
- Consultants may set up multiple text styles, but all styles shall use the Romans.shx font for all plan and profile sheets.
- Text should generally be in model space, but paper space may be preferential in certain situations.
- See attachments for sample drawings showing text heights. (Paper space text height x viewport scale = model space text height)

9. STATIONING, DIMENSIONING AND LABELING

GENERAL PROJECT STATIONING, DIMENSIONING AND LABELING

- Stationing should generally run from west to east and south to north and north arrow should generally be oriented up or to the right of the plan sheet, although this may not be feasible for all projects.
- In most cases stationing should begin at the centerline of the intersection with 0+00, or continued forward from existing plans.
- Plan view stationing based on the centerline shall be shown at block corners or property lines near the beginning and end of a sheet and also at any PC, PT, or transition point.
- Centerline stationing and curve information shall be shown.
- In the event that a proposed alignment does not follow the street stationing, such as a storm sewer pipe that begins at a street and outfalls through an easement, the stationing for the proposed outfall alignment should also make use of a station equation that references the adjacent street centerline stationing. The stationing for the outfall alignment should always begin at the lowest end of the pipe.
- Storm and sanitary sewer pipes should be drawn and measured from center of structure to center of structure. If pipes are drawn manually and/or trimmed at each manhole location, the user should draw an additional line from center to center to accurately reflect the correct pipe length. This line may be frozen or set not to plot.
- Front lot dimensions should be shown for all lots. Lot dimensions should be verified with the recorded plat. If part of the lot is in a curve, both the tangent length and the curve length shall be shown. References to a curve chart may be used to specify additional curve information, but the length of the curve shall be shown along the front property line.
- All proposed and existing utilities shall have a dimension to the nearest property line or easement line. Width of the easement shall also be dimensioned. Location of proposed utilities by coordinates should not be used.
- All streets shall be dimensioned from face of curb to face of curb along with the right-of-way width.

- Parcel/Lot lines and information, including lot dimensions, lot and block numbers, subdivision and street names shall be shown. Rehabilitation projects in older areas of town should utilize parcel lines and property addresses instead of lot lines and lot numbers as many of the original lot lines have since changed and are no longer relevant.
- The MC elevation and the size of the radius of any intersection shall be labeled in the plan view. This applies to any project that depicts proposed street grades.
- Vertical PI labels should be linked to the profile line and labeled in model space. Vertical PI's should begin and end at the BC or EC of the intersection radius, (not the property line).
- A profile line should never end in a vertical curve. It should always end at a vertical PI.
- Plan sheets shall show a quantity begin and end station. This is not required on 3-way projects, because the Engineering Department does not track quantities for these projects.

CUL-DE-SAC STATIONING

- Stationing of cul-de-sacs shall utilize a station equation at the beginning of the curve of the cul-de-sac of x+xx.xx=0+00 CDS (where x = the main alignment stationing). The cul-de-sac stationing shall continue along the length of the curb. The end of the cul-de-sac should also have a station equation of y+yy.yy=x+xx.xx (where y = the total length of the cul-de-sac curb and x = the main alignment stationing). Points of curves and reverse curves should be stationed. The stationing shall be located along the r/w line, but shall be based on the actual curb length of the cul-de-sac. The station and elevation at the high point of the cul-de-sac shall also be labeled.
- See attached water and sewer or paving example drawings.

WATER, SEWER & SERVICE LINE STATIONING

- Water and sewer appurtenances shall be labeled as shown on the sample sheets with the water being directly below the plan view and the sewer being directly above the plan view. The sewer manhole and cleanouts shall utilize the centerline stationing.
- Stationing of sewer service wyes shall be based on the length of each sewer run starting at the downstream manhole. Example: A sewer service wye that is located 40' from the downstream manhole, the station of that wye should be listed as 0+40. Service line information should be shown in a chart on the sheet which it is located.
- See attached water and sewer example drawing.

10. PRINTING AND PREPARING FINAL PLANS

- When printing drawings, one of the standard .ctb files should be used. The .ctb files are optimized for the HP5550 color printer. This printer should be used for printing final drawings. When using other printers with these .ctb files the line weights may appear different. The location of the files is W:\Drawings\CAD Standards\Plot Styles\
- Water, sewer, storm sewer and paving sheets shall use the 11x17 Standard.ctb file.

- Street light plan sheets should use the 11x17 Street Lights.ctb file
- The "Plot Stamp On" box should be checked. All sheets shall have a plot stamp positioned horizontally in the lower left corner of the sheet. It shall include the filename, date, time, user name and page size. The location of the file is W:\Drawings\CAD Standards\inches.pss
- When printing the final plans for the City Engineer's signature the HP5550 color printer and 11x17, 28 lb. color paper should be used. This is located below the HP5550 color printer. This is heavier paper designed to last longer than standard paper.
- Once the plans are stamped and signed the cad user shall insert a digital stamp on to each sheet of the plans with the name of the engineer and the date the plans were signed. The digital stamp shall be placed on the "engineer's stamp" layer. The digital stamps for each engineer are located in the W:\Drawings\CAD Blocks\ folder. Once the digital stamp is on each sheet, the user shall print a .pdf of each sheet and then combine the sheets into a multipage .pdf file. The file should then be saved in the appropriate folder as specified in the "Folder Contents Key". A copy of the file should also be saved to the L:\Engineering\Current Construction Plans\(project number)\folder so that it can be accessed by other departments.
- Once the plans are finalized, the cad user shall save a copy of the cad drawing to the L:\AcadDwgs\Utilities\(project year)\ New (year) folder. This only applies to projects that contain underground utilities such as water, sewer or storm sewer. This is to allow the GIS department to put the projects that are currently under construction into GIS. The cad file should be cleaned up and WBLOCKED to only include the property lines and the proposed pipes, structures, and appurtenances that are being installed, (mainline only, no service lines). The sizes of the pipe as well the names of the street should also be labeled. The drawing may need to be saved back to and older version in order to be compatible with GIS software. Engineering Department staff will be responsible for cleaning up drawings received from consultants.

11. EASEMENT DRAWINGS

- Easement drawings shall utilize the 8.5x14 Easement.dwg template and the 8.5x14 Easement.ctb file.
- Easement drawings should be printed on 8.5x14 paper with left justification, to allow a 1" margin on the right side of the document, which is required for recording, by the County Recorder's Office. See attached easement example drawing.

12. ATTACHMENTS AND SAMPLE DRAWINGS

- See the following pages for symbol legends, standard linetypes and sample drawings. Although the sample drawings can't accommodate every type of situation, they should be used as a guideline for which items should and should not be shown on a particular type of plan. These plans are utilized by current users as well as City maintenance personnel. These guidelines help ensure that those users will have adequate information while not having to sort through unnecessary information to locate and operate the proposed utilities.

		LTSCALE SHOULD BE SET TO 0.5					
Name	**Color**	**Linetype**	**Lineweight**	**Transparency**	**Plot Style**	**Plot**	**Description**
0	white	Continuous	LineWeight025	0	Color_7	TRUE	0
aerial-photo	white	Continuous	LineWeight025	0	Color_7	TRUE	aerial-photo
alignment	red	Continuous	LineWeight013	0	Color_1	TRUE	alignment
alignment-cl-sta	cyan	Continuous	LineWeight020	0	Color_4	TRUE	alignment-cl-sta
assembly	white	Continuous	LineWeight015	0	Color_7	TRUE	assembly
corridor	white	Continuous	LineWeight015	0	Color_7	TRUE	corridor
corridor-section	white	Continuous	LineWeight015	0	Color_7	TRUE	corridor-section
C-ROAD-CORR	blue	Continuous	LineWeight050	0	Color_5	TRUE	Roadways: corridor
C-ROAD-CORR-PATT	150	Continuous	ByLineWeightDefault	0	Color_150	FALSE	Roadways: corridor patterns
C-ROAD-FEAT	182	Continuous	ByLineWeightDefault	0	Color_182	TRUE	Roadways: feature line
C-ROAD-LINK	150	Continuous	ByLineWeightDefault	0	Color_150	TRUE	Roadways: corridor and section links
C-ROAD-MARK	212	Continuous	ByLineWeightDefault	0	Color_212	TRUE	Roadways: corridor and section marks
C-ROAD-SHAP	32	Continuous	ByLineWeightDefault	0	Color_32	TRUE	Roadways: corridor and section shapes
C-ROAD-SHAP-PATT	white	Continuous	ByLineWeightDefault	0	Color_7	TRUE	Roadways: corridor and section shapes hatching
C-TOPO-FEAT	92	Continuous	ByLineWeightDefault	0	Color_92	TRUE	C-TOPO-FEAT
Defpoints	white	Continuous	LineWeight025	0	Color_7	FALSE	Defpoints
dim	red	Continuous	LineWeight013	0	Color_1	TRUE	dimensions
easement	red	HIDDEN2	LineWeight013	0	Color_1	TRUE	easement
e-asphalt	8	HIDDEN2	LineWeight005	0	Color_8	TRUE	e-asphalt
e-buildings	8	HIDDEN2	LineWeight005	0	Color_8	TRUE	e-buildings
e-cable-tv	8	Cable --TV---	LineWeight005	0	Color_8	TRUE	e-cable-tv
e-cable-tv-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-cable-tv-sym
e-conduit	8	HIDDEN2	LineWeight005	0	Color_8	TRUE	e-conduit
e-curb-sdwk-concrete	8	HIDDEN2	LineWeight005	0	Color_8	TRUE	e-curb-sdwk-concrete
e-dirt-drive	8	HIDDEN	LineWeight005	0	Color_8	TRUE	e-dirt-drive
e-electric-overhead	8	Overhead---OH---	LineWeight005	0	Color_8	TRUE	e-electric-overhead
e-electric-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-electric-sym
e-electric-underground	8	Electric ----E----	LineWeight005	0	Color_8	TRUE	e-electric-underground
e-fence	8	FENCE-Barbed Wire --X--	LineWeight005	0	Color_8	TRUE	e-fence
e-fiber-optic	8	Fiber Optic --FO--	LineWeight005	0	Color_8	TRUE	e-fiber-optic
e-gas	8	Gas ----G----	LineWeight005	0	Color_8	TRUE	e-gas
e-gas-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-gas-sym
e-gravel	8	HIDDEN	LineWeight005	0	Color_8	TRUE	e-gravel
e-ground breaklines	8	Continuous	LineWeight005	0	Color_8	TRUE	e-ground breaklines
e-mailbox	8	Continuous	LineWeight005	0	Color_8	TRUE	e-mailbox
engineers stamp	white	Continuous	LineWeight025	0	Color_7	TRUE	engineers stamp
e-plan-view-text	8	Continuous	LineWeight005	0	Color_8	TRUE	existing misc plan view text
e-railroad	8	TRACKS	LineWeight005	0	Color_8	TRUE	e-railroad
e-san	8	Sanitary --S--	LineWeight005	0	Color_8	TRUE	e-san
e-san-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-san-sym
e-signs	8	Continuous	LineWeight005	0	Color_8	TRUE	e-signs
esmt	red	Continuous	LineWeight013	0	Color_1	TRUE	esmt
e-sprinklers	8	Continuous	LineWeight005	0	Color_8	TRUE	e-sprinklers
e-storm	8	Storm --ST--	LineWeight005	0	Color_8	TRUE	e-storm
e-storm-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-storm-sym
e-street-light	8	Lights ----L----	LineWeight005	0	Color_8	TRUE	e-street-light
e-street-light-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-street-light-sym
e-telephone	8	Telephone ----T----	LineWeight005	0	Color_8	TRUE	e-telephone
e-telephone-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-telephone-sym
e-traffic-signal	8	Traffic Signal Wire --TS--	LineWeight005	0	Color_8	TRUE	e-traffic-signal
e-traffic-signal-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-traffic-signal-sym
e-trees	9	Continuous	LineWeight000	0	Color_9	TRUE	e-trees
e-water-curbstop	8	Continuous	LineWeight005	0	Color_8	TRUE	e-water-curbstop
e-watermain	8	Water --W--	LineWeight005	0	Color_8	TRUE	e-watermain
e-waters-edge	8	Continuous	LineWeight005	0	Color_8	TRUE	e-waters-edge
e-water-sym	8	Continuous	LineWeight005	0	Color_8	TRUE	e-water-sym

excavation-material	white	Continuous	LineWeight025	0	Color_7	TRUE	excavation-material
excavation-material-table	white	Continuous	LineWeight025	0	Color_7	TRUE	excavation-material-table
f-curb-sdwk	yellow	DOT2	LineWeight015	0	Color_2	TRUE	f-curb-sdwk
grading	white	Continuous	LineWeight009	0	Color_7	TRUE	grading
lot-dimension	red	Continuous	LineWeight013	0	Color_1	TRUE	lot dimensions
lots	yellow	Continuous	LineWeight015	0	Color_2	TRUE	lot lines
p	white	Continuous	LineWeight025	0	Color_7	TRUE	p
parcels	yellow	Continuous	LineWeight015	0	Color_2	TRUE	parcel lines
p-asphalt	magenta	Continuous	LineWeight020	0	Color_6	TRUE	p-asphalt
p-conduit	100	HIDDEN2	LineWeight018	0	Color_100	TRUE	p-conduit
p-curb-sdwk-concrete	cyan	Continuous	LineWeight020	0	Color_4	TRUE	p-curb-sdwk-concrete
plat-text	white	Continuous	LineWeight030	0	Color_7	TRUE	lot & block numbers & street names
p-plan-view-text	cyan	Continuous	LineWeight020	0	Color_4	TRUE	proposed plan view text
prof-e-grd-cl	red	HIDDEN	LineWeight020	0	Color_1	TRUE	prof-e-grd-cl
prof-e-grd-lt	cyan	HIDDEN2	LineWeight013	0	Color_4	TRUE	prof-e-grd-lt
prof-e-grd-rt	yellow	HIDDEN2	LineWeight009	0	Color_2	TRUE	prof-e-grd-rt
prof-e-san	8	HIDDEN2	LineWeight020	0	Color_8	TRUE	prof-e-san
prof-e-san-text	8	Continuous	LineWeight013	0	Color_8	TRUE	prof-e-san-text
prof-e-storm	8	HIDDEN2	LineWeight020	0	Color_8	TRUE	prof-e-storm
prof-e-storm-text	8	Continuous	LineWeight013	0	Color_8	TRUE	prof-e-storm-text
prof-e-top-of-curb	white	HIDDEN	LineWeight020	0	Color_7	TRUE	prof-e-top-of-curb
prof-e-top-of-curb-text	8	Continuous	LineWeight013	0	Color_8	TRUE	prof-e-top-of-curb-text
prof-e-water	8	HIDDEN2	LineWeight020	0	Color_8	TRUE	prof-e-water
prof-e-water-text	8	Continuous	LineWeight013	0	Color_8	TRUE	prof-e-water-text
prof-grid	8	Continuous	LineWeight005	0	Color_8	TRUE	minor profile grid lines
profile	yellow	Continuous	LineWeight025	0	Color_2	TRUE	profile
profile-label	white	Continuous	LineWeight025	0	Color_7	TRUE	profile-label
profile-view	white	Continuous	LineWeight025	0	Color_7	TRUE	profile-view
prof-p-centerline	red	Continuous	LineWeight040	0	Color_1	TRUE	prof-p-centerline
prof-p-san	green	Continuous	LineWeight040	0	Color_3	TRUE	prof-p-san
prof-p-san-text	green	Continuous	LineWeight020	0	Color_3	TRUE	prof-p-san-text
prof-p-storm	magenta	Continuous	LineWeight040	0	Color_6	TRUE	prof-p-storm
prof-p-storm-hatch	magenta	Continuous	LineWeight005	0	Color_6	TRUE	prof-p-storm-hatch
prof-p-storm-text	magenta	Continuous	LineWeight020	0	Color_6	TRUE	prof-p-storm-text
prof-p-top-of-curb	blue	Continuous	LineWeight040	0	Color_5	TRUE	prof-p-top-of-curb
prof-p-top-of-curb-text	blue	Continuous	LineWeight020	0	Color_5	TRUE	prof-p-top-of-curb-text
prof-p-water	140	Continuous	LineWeight060	0	Color_140	TRUE	prof-p-water
prof-p-water-text	140	Continuous	LineWeight020	0	Color_140	TRUE	prof-p-water-text
prof-sheet	white	Continuous	LineWeight025	0	Color_7	TRUE	sheet border & major profile grid lines
prof-sheet-text-small	red	Continuous	LineWeight013	0	Color_1	TRUE	prof-sheet-text-small
property address-owners name	8	Continuous	LineWeight005	0	Color_8	TRUE	property address-owners name
p-san	green	DASHED	LineWeight013	0	Color_3	TRUE	p-san
p-san-sym	green	Continuous	LineWeight015	0	Color_3	TRUE	p-san-sym
p-san-text	green	Continuous	LineWeight020	0	Color_3	TRUE	p-san-text
p-storm	magenta	DIVIDEX2	LineWeight013	0	Color_6	TRUE	p-storm
p-storm-perf-pipe	magenta	Continuous	LineWeight025	0	Color_6	TRUE	p-storm-perf-pipe
p-storm-sym	magenta	Continuous	LineWeight015	0	Color_6	TRUE	p-storm-sym
p-storm-text	magenta	Continuous	LineWeight020	0	Color_6	TRUE	p-storm-text
p-straw-wattles	magenta	ZIGZAP	LineWeight015	0	Color_6	TRUE	p-straw-wattles
p-street-lights	200	Continuous	LineWeight050	0	Color_200	TRUE	p-street-lights
pts-asphalt	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-asphalt
pts-bldg	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-bldg
pts-cable-tv	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-cable-tv
pts-concrete	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-concrete
pts-curb	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-curb
pts-electric	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-electric
pts-fence	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-fence
pts-fiber optic	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-fiber optic
pts-gas	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-gas

pts-GPS	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-GPS
pts-gravel	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-gravel
pts-ground	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-ground
pts-gutter	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-gutter
pts-mailbox	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-mailbox
pts-misc	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-misc
pts-monitoring-well	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-monitoring-well
pts-pictures	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-pictures
pts-railroad	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-railroad
pts-retain-wall	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-retain-wall
pts-riprap	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-riprap
pts-san	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-san
pts-signs	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-signs
pts-soil-boring	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-soil-boring
pts-sprinklers	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-sprinklers
pts-stake	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-stake
pts-storm	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-storm
pts-street-lights	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-street-lights
pts-survey	red	Continuous	LineWeight013	0	Color_1	TRUE	pts-survey
pts-telephone	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-telephone
pts-traffic-signal	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-traffic-signal
pts-trees	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-trees
pts-watermain	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-watermain
pts-waterways	white	Continuous	LineWeight009	0	Color_7	TRUE	pts-waterways
p-water-curbstop	150	Continuous	LineWeight015	0	Color_150	TRUE	p-water-curbstop
p-watermain	140	Continuous	LineWeight050	0	Color_140	TRUE	p-watermain
p-water-sym	150	Continuous	LineWeight015	0	Color_150	TRUE	p-water-sym
p-water-text	140	Continuous	LineWeight020	0	Color_140	TRUE	p-water-text
sample-lines	white	Continuous	ByLineWeightDefault	0	Color_7	TRUE	sample-lines
section-view	white	Continuous	LineWeight020	0	Color_7	TRUE	section-view
section-view-label	white	Continuous	LineWeight020	0	Color_7	TRUE	section-view-label
sheet-text-large	white	Continuous	LineWeight025	0	Color_7	TRUE	large sheet text - headings, titleblock text
sheet-text-small	red	Continuous	LineWeight013	0	Color_1	TRUE	small sheet text - charts, notes, etc
tin	8	Continuous	LineWeight005	0	Color_8	TRUE	tin
tin-label	8	Continuous	LineWeight005	0	Color_8	TRUE	tin-label
viewport	yellow	Continuous	LineWeight015	0	Color_2	FALSE	viewport
wyeplat-text	red	Continuous	LineWeight013	0	Color_1	TRUE	wyeplat-text
x-section-existing	white	HIDDEN	LineWeight015	0	Color_7	TRUE	x-section-existing
x-section-label	white	Continuous	LineWeight013	0	Color_7	TRUE	x-section-label
x-section-proposed	blue	Continuous	LineWeight040	0	Color_5	TRUE	x-section-proposed

EXISTING	SYMBOL NAME	PROPOSED
	e–bush.dwg	
	e–catch basin.dwg	
	e–cleanout.dwg	
(24") (36") (72") (108")	e–curb inlet.dwg	
	e–curbstop.dwg	
	e–electric meter.dwg	
	e–gas valve.dwg	
	e–gate valve.dwg	
	e–guard post.dwg	
	e–guy wire.dwg	
	e–hydrant.dwg	
	e–light pole.dwg	
	e–mailbox single.dwg	
	e–mailbox govt.dwg	
	e–manhole.dwg	
	e–power pole.dwg	
	e–sign.dwg	
TC	e–traffic control box.dwg	
	e–tree deciduous.dwg	
	e–tree evergreen.dwg	
	e–utility junction box.dwg	
	e–utility pedestal.dwg	
	p–curbstop.dwg	
	p–gate valve.dwg	
	p–pressure reducing valve.dwg	PRV
	p–hyd.dwg	
	p–inlet.dwg	(36") (72") (108")
	p–manhole.dwg	

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EXISTING	STANDARD LINETYPES	PROPOSED
S	Sanitary sewer	Pipe Inside Diameter
W	Watermain	
ST	Storm sewer	Pipe Inside Diameter
E	Electric	
G	Gas	
T	Telephone	
TV	Cable TV	
FO	Fiber Optic	
OH	Overhead Power	
L	Street Lights	
TS	Traffic Signal Wire	
×	Fence—Barbed Wire	
□ □	Fence—Wood	
○ ○	Fence—Chain Link	
	Straw Wattle	(0.15 ltscale)
	Curb & Gutter	
	Sidewalk, Concrete	
	Asphalt	
	Gravel	
	Property Line	
	Easement	

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STREET LIGHT PLAN VIEW SYMBOLS & LINETYPES

EXISTING	SYMBOL NAME	PROPOSED
	e–light pole.dwg	
	e–pad mounted feedpoint.dwg	
	e–street light junction box.dwg	
	p–street light pole.dwg	
	p–pad mounted feedpoint.dwg	
	p–street light junction box.dwg	

STANDARD LINETYPES

	street light wire	
	conduit	

STANDARD LABELS

pole type	BR
unit number–pole number	1-5
length of wire	153'
number of conductors	3
conductor size	No. 2
centerline of driveway & width	35'

STREET LIGHT SCHEMATIC VIEW SYMBOLS & LINETYPES

EXISTING	SYMBOL NAME	PROPOSED
R	contactor–relay.dwg	R
	ground rods.dwg	
	e–light pole.dwg	
	p–street light pole.dwg	

STANDARD LINETYPES FOR SCHEMATICS

neutral wire	
power conductor	

NOTES:

DUE TO STREET LIGHT PLANS BEING AT A SMALLER SCALE THAN OTHER PLANS, SYMBOLS AND LINETYPES SHALL BE DIFFERENT FROM OTHER PLAN TYPES.

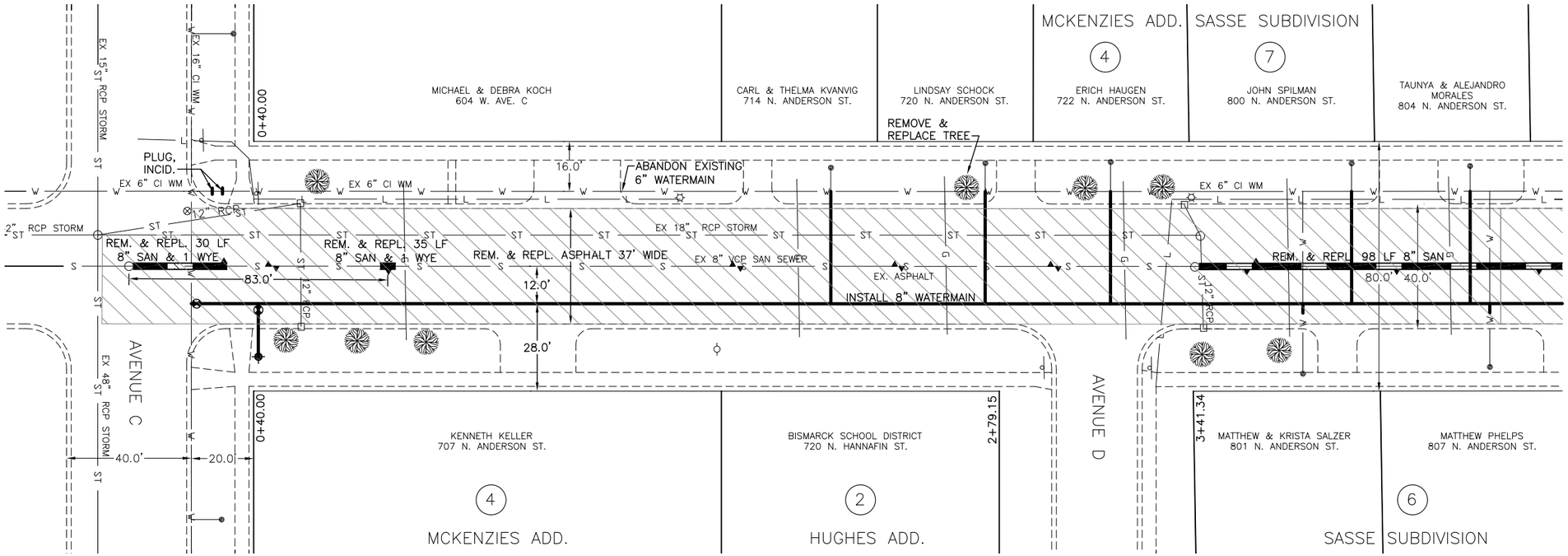
CONDUCTOR SIZE IS ASSUMED TO BE NO. 4 UNLESS OTHERWISE LISTED.

CONDUIT IS NOT SHOWN UNDER DRIVEWAYS FOR CLARITY.

GROUND CONDUCTOR IS NOT SHOWN ON THE WIRING SCHEMATIC FOR CLARITY.

CITY OF BISMARCK (FIELD CODE LIST)---Updated 4-7-2014			
CODE	**DESCRIPTION**	**CODE**	**DESCRIPTION**
APA***	APPROACH ASPHALT	LE***	UNDERGROUND ELECTRIC
APC***	APPROACH CONCRETE	LG***	UNDERGROUND GAS
APD***	APPROACH DIRT	LP***	UNDERGROUND TELEPHONE
APG***	APPROACH GRAVEL	LFO***	UNDERGROUND FIBER OPTIC
BC	BUILDING CORNER	MBG	MAILBOX GOVERNMENT
BFE	BUILDING FLOOR ELEV	MBS	MAILBOX SINGLE
BG	BRIDGE	MHAR	AIR RELEASE MANHOLE
BL***	BUILDING LINE	MHG	MANHOLE GAS
BMHYD	BENCHMARK HYDRANT	MHP	MANHOLE TELEPHONE
BPA***	BIKE PATH ASPHALT	MHSAN	MANHOLE SANITARY
BPC***	BIKE PATH CONCRETE	MHSANI	MANHOLE INV SANITARY
BPG	BIKE PATH GRAVEL	MHST	MANHOLE STORM
BSCH	BACKSIGHT CHECK	MHSTI	MANHOLE INV STORM
BU	BUSH (SHRUB)	NAIL	NAIL
BURW***	BUSH ROW	PEDC	PEDESTAL CABLE
CATB	CATCH BASIN	PEDE	PEDESTAL ELECTRIC
CB	TOP OF CURB	PEDP	PEDESTAL TELEPHONE
CLSAN	CLEAN-OUT SANITARY	PLA***	ASPHALT PARKING LOT
CMP	CORRUGATED METAL PIPE	PLC***	CONCRETE PARKING LOT
CMPI	CORRUGATED METAL PIPE INV	PLG***	GRAVEL PARKING LOT
CS	CURB STOP	PP	POWER POLE
CW	CROSSWALK	RCP	REINFORCE CONCRETE PIPE
DC	DROP CURB	RCPI	REINFORCE CONCRETE PIPE INV
DRA***	DRIVEWAY ASPHALT	RDA***	ROAD ASPHALT (CENTERLINE)
DRC***	DRIVEWAY CONCRETE	RDC***	ROAD CONCRETE (CENTERLINE)
DRG***	DRIVEWAY GRAVEL	RDG***	ROAD GRAVEL (CENTERLINE)
ELM	ELECTRIC METER	RIP	RIPRAP
EC***	EDGE OF CONCRETE	RM	ROW MARKER
ET***	EDGE OF TIMBER	RR	RAILROAD
WE***	EDGE OF WATER	RW***	RETAINING WALL
FC	FENCE CORNER	SANV	SANITARY FORCEMAIN VALVE
FLB***	FENCE BARBED WIRE	SB	SOIL BORING HOLE
FLC***	FENCE CHAINED LINK	SHA***	SHOULDER ASPHALT
FLW***	FENCE LINE WOOD	SHG***	SHOULDER GRAVEL
G	GROUND	SI	SIGN
GASV	GAS VALVE	SP	SPRINKLER
GD	GUTTER DRIVEWAY SPANDREL	STL	STREET LIGHT
GP	GUARD POST	STW***	STREET LIGHT WIRE
GPS	GPS MONUMENT	SW	SIDEWALK
GRL***	GUARD RAIL	TCB	TRAFFIC CONTROL BOX
GT	GUTTER (FLOWLINE)	TD	TREE DECIDUOUS
GV	GATE VALVE	TE	TREE EVERGREEN
GW	GUY WIRE	TRW***	TREE ROW
HYD	HYDRANT	TOE***	TOE OF SLOPE
IN	INLET (FLOWLINE)	TOP***	TOP OF SLOPE
IP	IRON PIN	TSP	TRAFFIC SIGNAL POLE
JBC	JUNCTION BOX CABLE TV	TSW***	TRAFFIC SIGNAL WIRE
JBE	JUNCTION BOX ELECTRIC	UD	UNDERDRAIN
JBL	JUNCTION BOX STREET LIGHT	VG	VALLEY GUTTER CONCRETE
JBP	JUNCTION BOX TELEPHONE	WE***	WATERS EDGE
LRW***	UNDERGROUND WATER LINE	Z	NO CODE
LC***	UNDERGROUND CABLE		

(Codes with *** can include line work) W:SURVEY_CODELIST_UPDATED2014



CONSTRUCTION NOTES

BACKFILL SHALL BE CLASS "A".

CONNECTION TO EXISTING UTILITIES SHALL BE CONSIDERED INCIDENTAL TO OTHER BID ITEMS.

CAST IRON OR DUCTILE IRON FITTINGS SHALL BE CONSIDERED INCIDENTAL TO THE PRICE BID FOR THE WATERMAIN

THE CONTRACTOR SHALL PLUG ALL EXPOSED ENDS OF THE WATERMAIN TO BE ABANDONED WITH CONCRETE AND REMOVE ALL EXISTING VALVE BOXES AND HYDRANT HEADS ON THE ABANDONED LINE, INCIDENTAL TO OTHER BID ITEMS

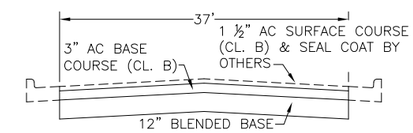
THE CONTRACTOR SHALL VERIFY THE EXISTING ELEVATION OF ALL CONNECTIONS AND CROSSINGS SHOWN ON THE PLANS, PRIOR TO MAKING THE CONNECTIONS, IN ORDER TO ADJUST GRADE OF THE WATERMAIN GRADUALLY IF NEEDED AND MINIMIZE THE USE OF VERTICAL BENDS.

THE PROFILE OF THE NEW WATERMAIN WILL BE 8.3 FEET BELOW THE EXISTING GRADE AND WILL BE ADJUSTED BY THE ENGINEER IF CONFLICTS ARISE WITH EXISTING SERVICE LINES.

▲ – INDICATES ASSUMED SANITARY SEWER WYE LOCATIONS.

0 20 40
NGVD 29

CAUTION
UTILITY LOCATIONS ARE APPROXIMATE. CONTRACTOR IS RESPONSIBLE FOR VERIFYING LOCATION PRIOR TO EXCAVATION.



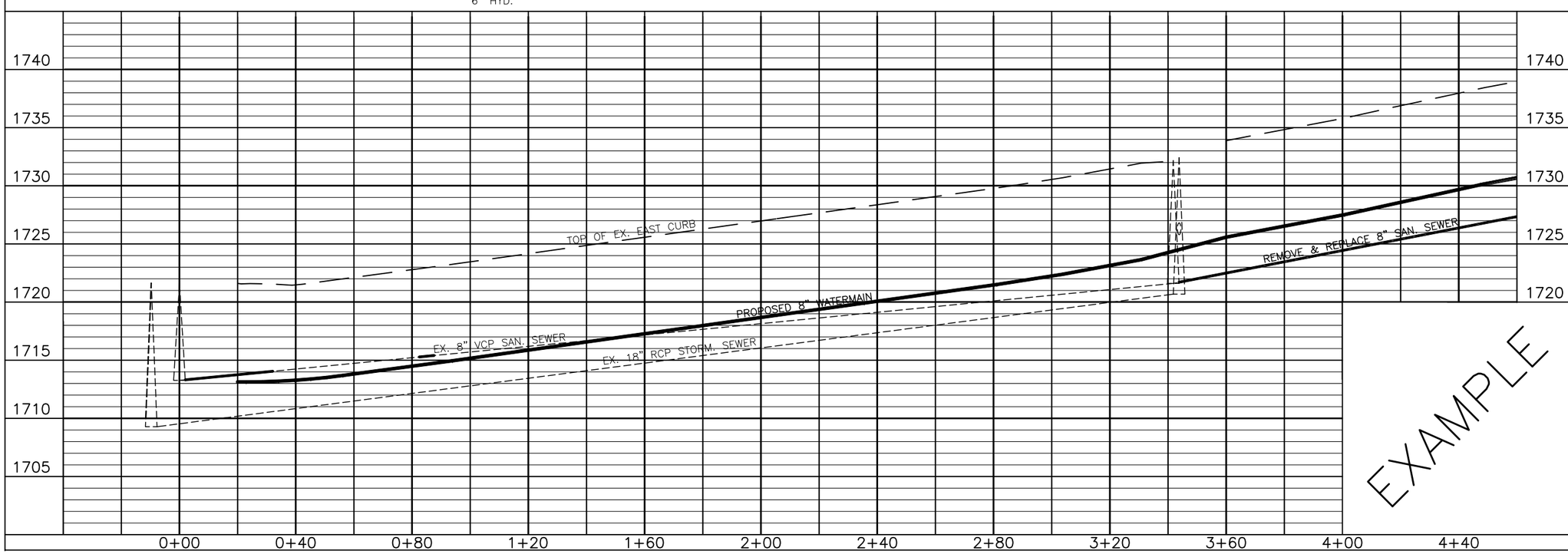
TYPICAL PAVEMENT SECTION
NOT TO SCALE

BEGIN WATERMAIN QUANTITIES
STA 0+20

STA 0+20
16"X8" TAPPING SLEEVE & VALVE

STA 0+41.5
8"X6" TEE
2 LF 6" WM.
6" GATE VALVE & BOX
15 LF 6" WM.
6" HYD.

END WATERMAIN QUANTITIES
STA 4+40



EXAMPLE

APPROXIMATE QUANTITIES

SPEC NO.	WATERMAIN ITEMS	QUANTITY
204–3.1A	SUBGRADE PREP. (1' DEEP)	1120 SY
304–6.1B	AC STABILIZED BASE (CLASS B)	278 TON
402–4.2	BITUMINOUS TACK COAT	50 GAL
406–4.1	ASPHALT REMOVAL	1738 SY
501–4.5	SAWING CONCRETE	15 LF
601–4.1	4" CONCRETE SIDEWALK	88 SF
601–4.3	SIDEWALK REMOVAL	88 SF
601–4.5	DETECTABLE WARNING PANELS	8 SF
602–4.1	6" CONCRETE DRIVEWAY	95 SF
602–4.3	DRIVEWAY REMOVAL	95 SF
603–5.3	STANDARD CURB & GUTTER	109 LF
603–5.6	CURB & GUTTER REMOVED	109 LF
801–4.60	BEDDING MATERIAL	115 TON
801–4.61	SUBCUT GRAVEL	5 TON
801–4.62	ROCK EXCAVATION	5 CY
901–4.10	6" WATERMAIN	17 LF
901–4.11	8" WATERMAIN	420 LF
901–4.51	6" GATE VALVE & BOX	1 EA
901–4.70	6" HYDRANT	1 EA
901–4.86	16"X8" TAPPING SLEEVE & VALVE	1 EA
1209–4.12	1" COPPER WATER SERVICE PIPE	186 LF
1209–4.41	1" WATER SERVICE CONNECTION	7 EA
SP NO. 16	GEO. REINFORCEMENT FABRIC	25 SY
SP NO. 18	BLENDED BASE	579 CY
SP NO. 19	REMOVE & REPLACE TREE	1 EA

SPEC NO.	SANITARY SEWER ITEMS	QUANTITY
801–4.60	BEDDING MATERIAL	21 TON
SP NO. 8	8" SANITARY SEWER PIPE	133 LF
SP NO. 9	WYE BRANCHES	3 EA

Bismarck Engineering Department

ANDERSON STREET

AVENUE C TO 130' NORTH OF AVENUE D
WATER UTILITY PROJECT NO. 13–92
UNIT NO. 1
SHEET NO. 6 OF 20 SHEETS
BISMARCK, N.D. DATE: 5/28/2013

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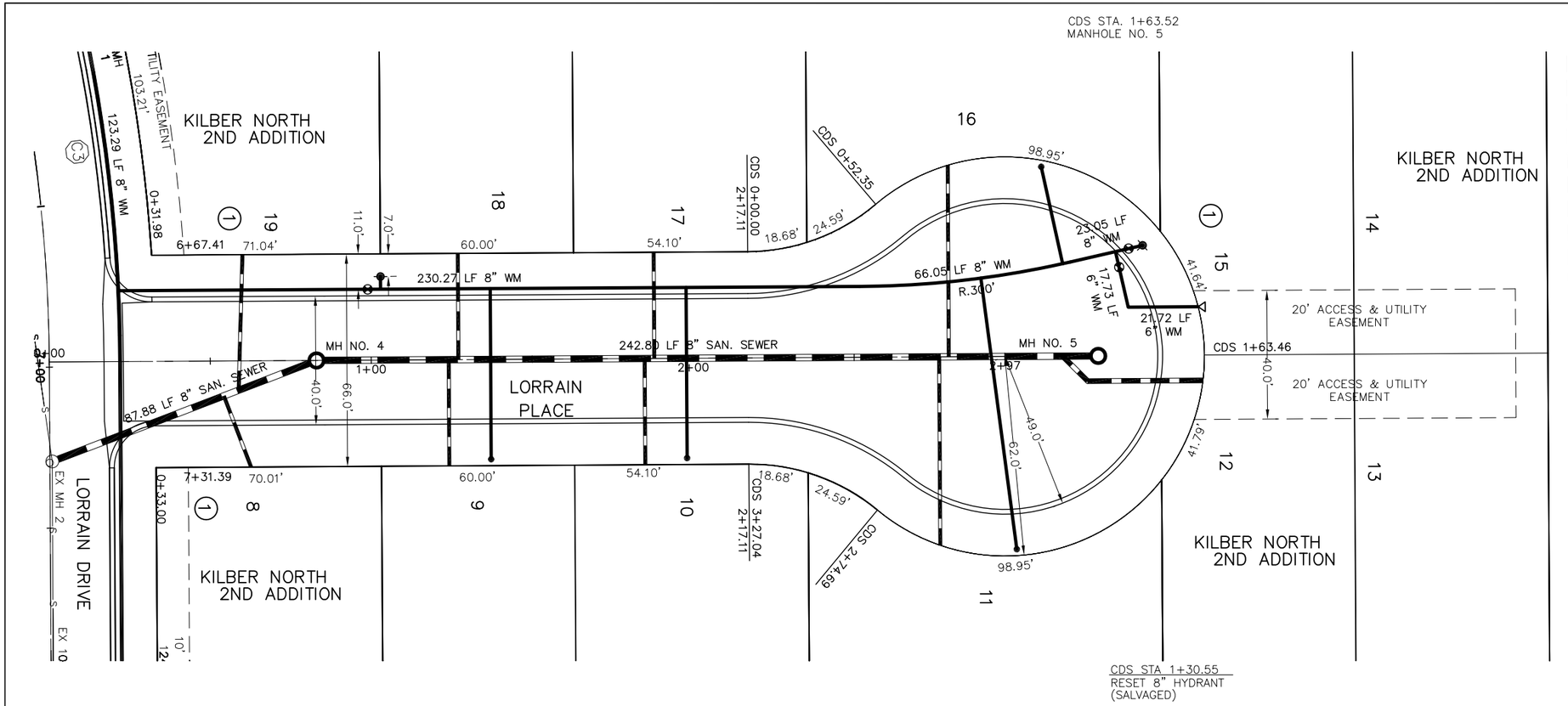
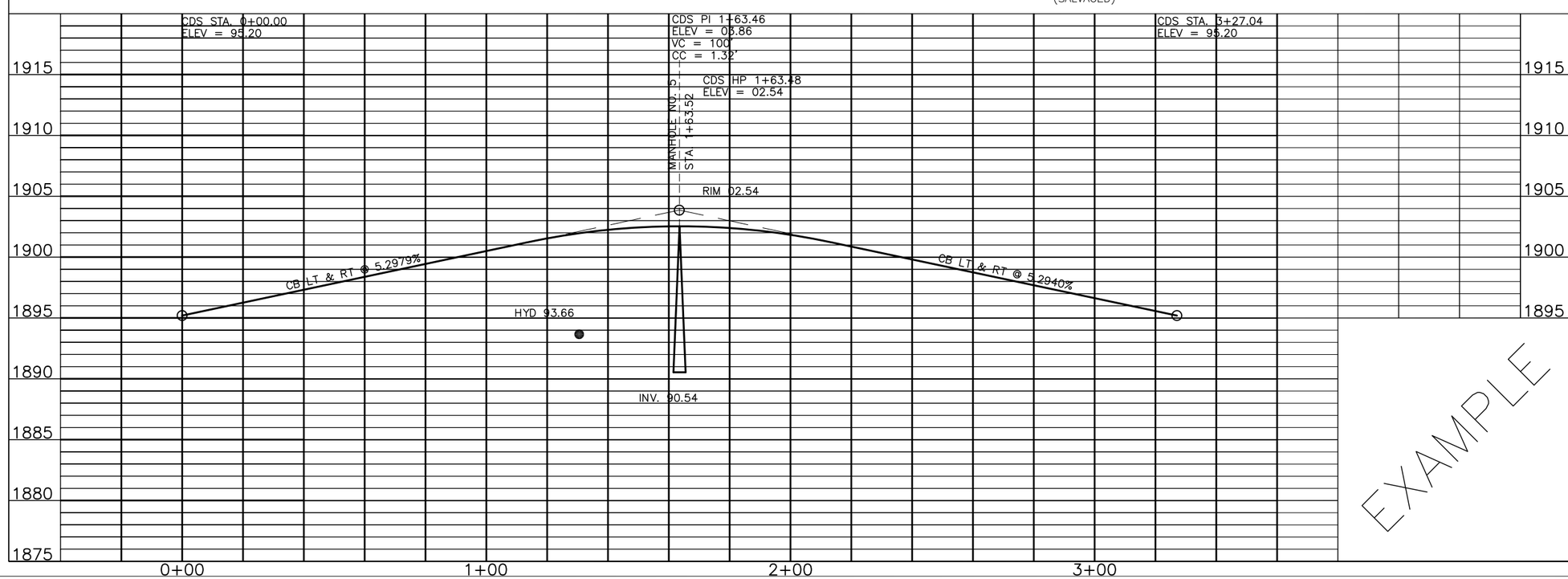
CONSTRUCTION NOTES

1. BACKFILL SHALL BE CLASS "A".
2. GRADING SHALL BE BY OTHERS PRIOR TO CONSTRUCTION.





EXAMPLE

SWENSON, HAGEN & COMPANY P.C.
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Hydrology
Land Planning
Civil Engineering
Landscape & Site Design
Construction Management
909 Basin Avenue
Bismarck, North Dakota 58504
sheng@swensonhagen.com
Phone (701) 223 - 2600
Fax (701) 223 - 2686

Bismarck Engineering Department

LORRAIN PLACE

CUL–DE–SAC
WATER, SANITARY SEWER & STORM SEWER
IMPROVEMENT PROJECT NO. 13–312
UNIT NO. 2
SHEET NO. 8 OF 11 SHEETS
BISMARCK, N.D. DATE: 5/6/2013

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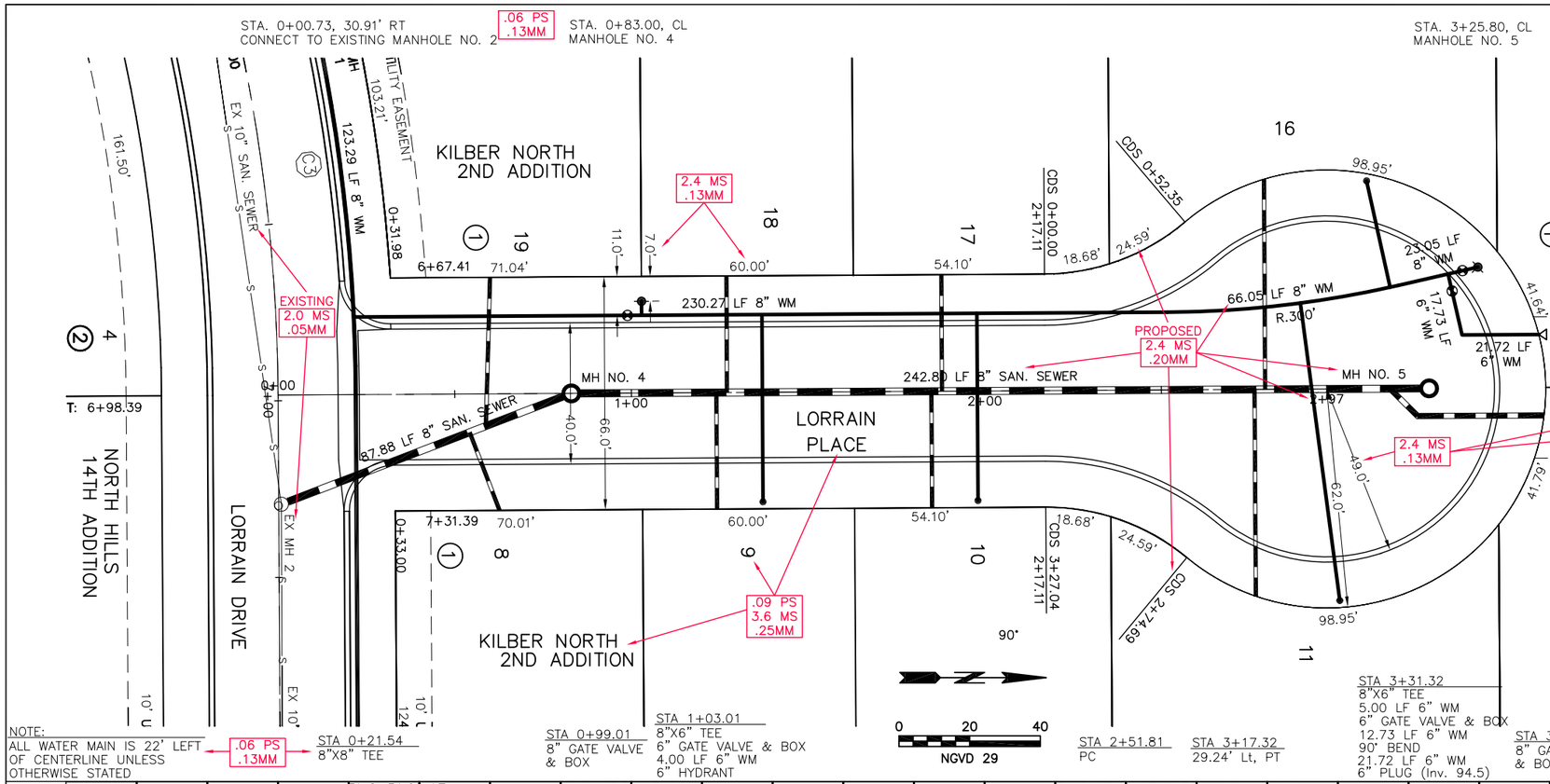


CONSTRUCTION NOTES

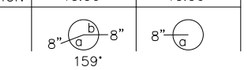
1. BACKFILL SHALL BE CLASS "A".
2. GRADING SHALL BE BY OTHERS PRIOR TO CONSTRUCTION.
3. CONNECTION TO EXISTING MANHOLE NO. 2 SHALL BE CONSIDERED INCIDENTAL TO "8" SANITARY SEWER" BID ITEM.

LOT	BLOCK	4" SEWER SERVICE	4" 45° BEND	4" 22.5° BEND	8" X 4" WYE BRANCH	SEWER SERVICE INVERT @ CAP	1" CU. WATER SERVICE PIPE	1" WATER SERVICE CONNECTION	1" CURB STOP & BOX	WATER SERVICE INVERT @ C.S.
8	1	23.7	1	--	1	76.4	--	--	--	--
9	1	33.0	1	--	1	79.5	53.0	1	1	83.5
10	1	33.0	1	--	1	83.0	53.0	1	1	86.7
11	1	58.5	1	--	1	88.5	85.0	1	1	92.0
16	1	59.5	1	--	1	88.7	30.8	1	1	92.8
17	1	33.0	1	--	1	83.2	--	--	--	--
18	1	33.0	1	--	1	79.7	--	--	--	--
19	1	42.1	--	1	1	76.7	--	--	--	--
TOTAL		316	7	1	8	--	222	4	4	--

.06 PS
.13MM

SANITARY SEWER MANHOLE SCHEDULE

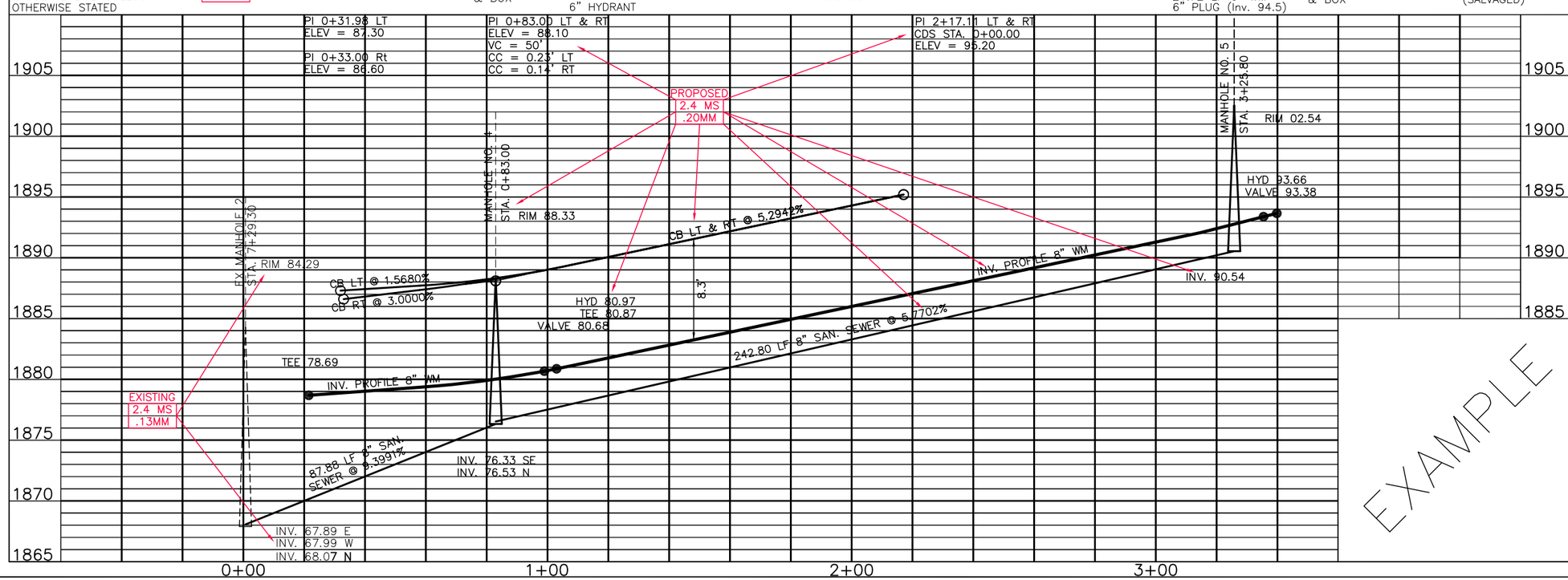
MANHOLE NUMBER	4	5
CASTING ELEV.	88.33	02.54
TOP P.C. SECTION	87.29	01.50
INVERT ELEV. (a)	76.33	90.54
INVERT ELEV. (b)	76.53	/
LENGTH P.C. SECTION	10.96	10.96



LOT	BLOCK	6" SEWER SERVICE	6" 45° BEND	8" X 6" WYE BRANCH	SEWER SERVICE INVERT @ CAP
12	1	47.0	1	1	91.5
TOTAL		47.0	1	1	--

APPROXIMATE WYE LOCATIONS

STATION	DIRECTION	LOT	BLOCK
FROM EX. MANHOLE NO. 2 TO MANHOLE NO. 4			
0+57.1	NE	8	1
0+62.0	W	19	1
FROM MANHOLE NO. 4 TO MANHOLE NO. 5			
0+41.1	E	9	1
0+44.1	W	18	1
1+01.9	E	10	1
1+04.9	W	17	1
1+93.4	E	11	1
1+96.4	W	16	1
2+31.6	NE	12	1



EXAMPLE

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Civil Engineering
Landscape & Site Design
Construction Management

Bismarck Engineering Department

.12 PS
.25MM

LORRAIN PLACE

LORRAIN DRIVE TO CUL-DE-SAC
WATER, SANITARY SEWER & STORM SEWER
IMPROVEMENT PROJECT NO. 13-312
UNIT NO. 2

.07 PS
.25MM

SHEET NO. 7 OF 11 SHEETS
BISMARCK, N.D. DATE: 5/6/2013

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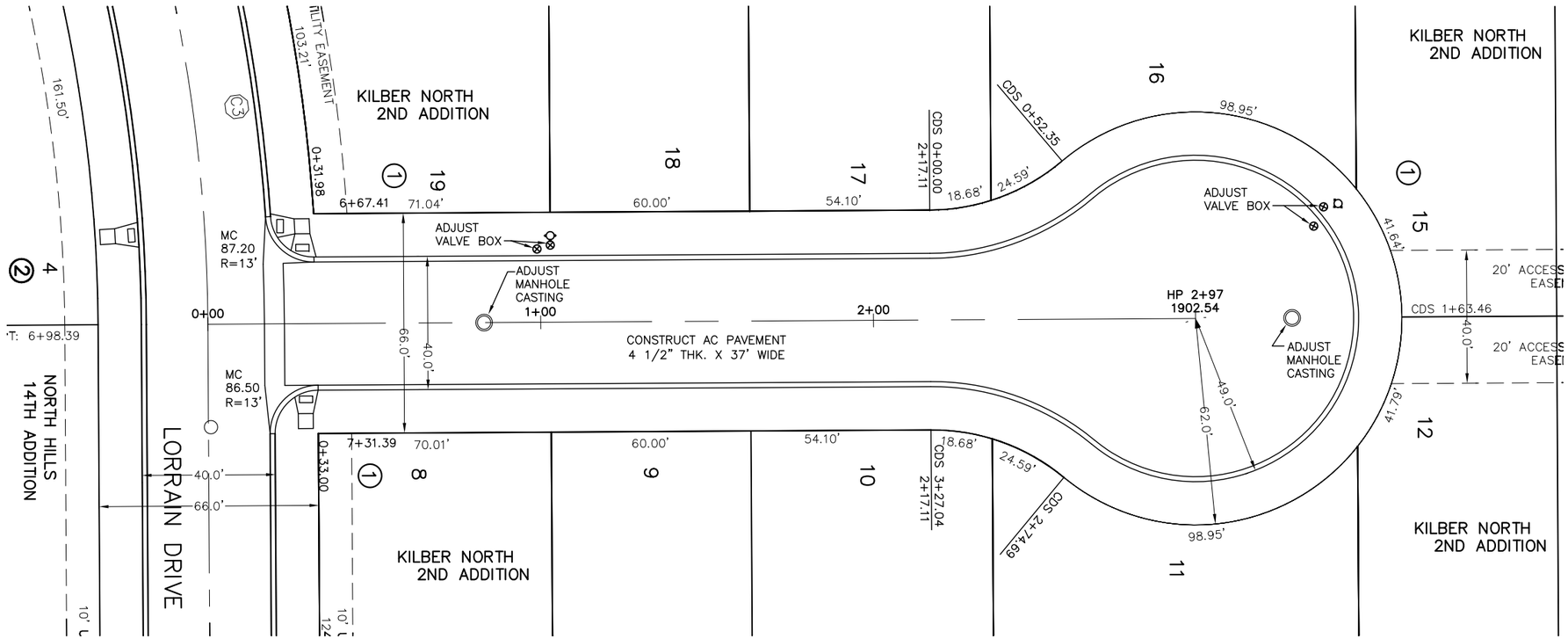
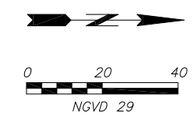
CONSTRUCTION NOTES

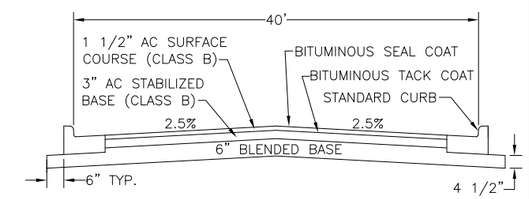
WATER, SANITARY SEWER, STORM SEWER AND FINAL GRADING ARE BY OTHERS.



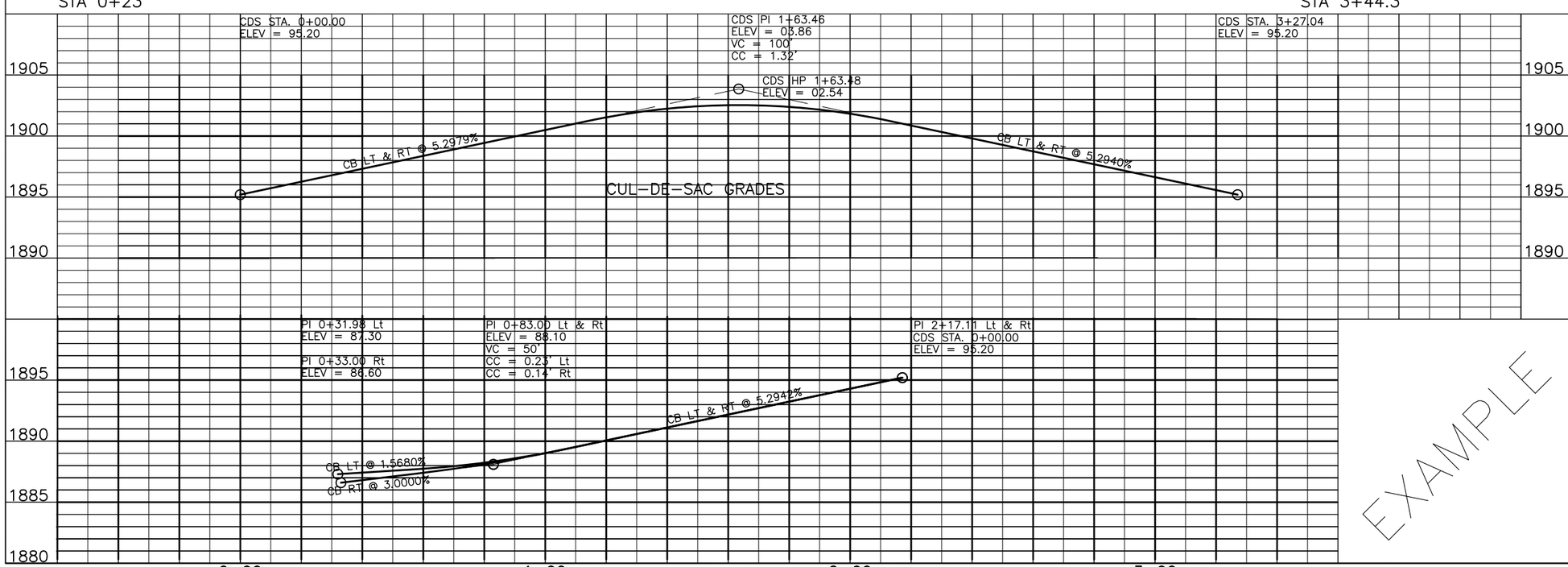
BEGIN PAVEMENT QUANTITIES
STA 0+23

END PAVEMENT QUANTITIES
STA 3+44.3





TYPICAL PAVEMENT SECTION
NOT TO SCALE



APPROXIMATE QUANTITIES

SPEC NO.	PAVING ITEMS	QUANTITY
204-3.1A	SUBGRADE PREPARATION (1')	985 SY
204-3.1B	SUBGRADE PREPARATION (1.5')	985 SY
304-6.1B	AC STABILIZED BASE (CLASS B)	281 TON
401-6.2B	AC SURFACE COURSE (CLASS B)	145 TON
401-6.4	ASPHALT CEMENT	6100 GAL
402-4.2	BITUMINOUS TACK COAT	175 GAL
403-4.1	BITUMINOUS SEAL COAT	1754 SY
403-4.2	BLOTTER SAND	3 TON
601-4.1	4" CONCRETE SIDEWALK	109 SF
602-4.2	8" CONCRETE DRIVEWAY	330 SF
601-4.5	DETECTABLE WARNING PANELS	16 SF
603-5.3	STANDARD CURB & GUTTER	696 LF
603-5.4	CURB & GUTTER (8" GUTTER)	40 LF
1206-4.1	ADJ MH CASTING-ASPH PVMT	2 EA
1206-4.11	ADJ VALVE BOX-ASPH PVMT	1 EA
1206-4.19	ADJ VALVE BOX-UNPAVED AREA	3 EA
SP NO 4	BLENDED BASE	320 CY

EXAMPLE

Bismarck Engineering Department

LORRAIN PLACE

LORRAIN DRIVE TO CUL-DE-SAC
STREET IMPROVEMENT DISTRICT NO. 13-470
UNIT NO. 2
SHEET NO. 16 OF 16 SHEETS
BISMARCK, N.D. DATE: 7/23/2013

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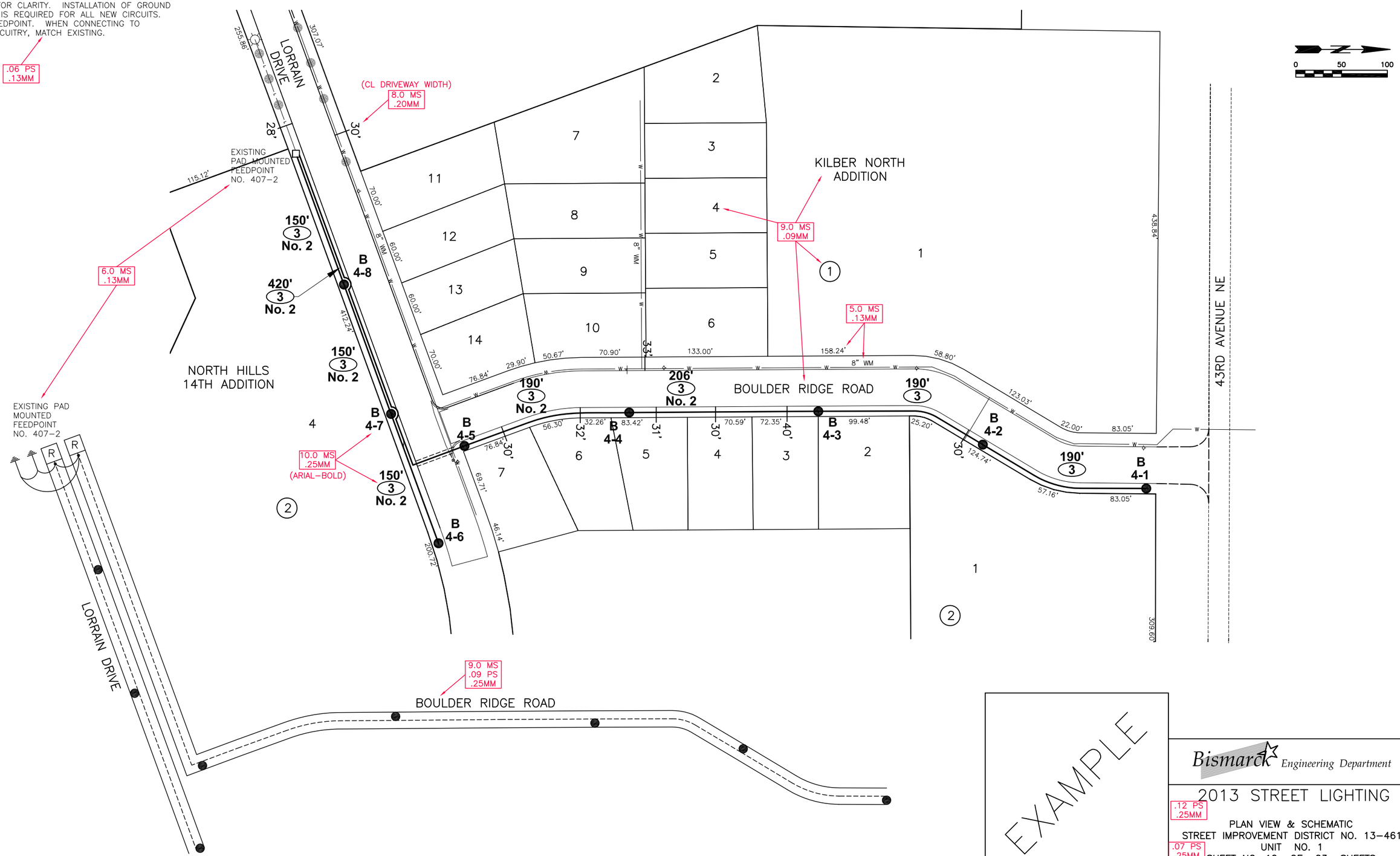
CONSTRUCTION NOTES

.09 PS
.25MM

GROUND CONDUCTOR IS NOT SHOWN ON THE WIRING SCHEMATIC FOR CLARITY. INSTALLATION OF GROUND CONDUCTOR IS REQUIRED FOR ALL NEW CIRCUITS. BOND AT FEEDPOINT. WHEN CONNECTING TO EXISTING CIRCUITRY, MATCH EXISTING.

.06 PS
.13MM



EXAMPLE

Bismarck Engineering Department

2013 STREET LIGHTING

.12 PS
.25MM

PLAN VIEW & SCHEMATIC
STREET IMPROVEMENT DISTRICT NO. 13-461
UNIT NO. 1

.07 PS
.25MM

SHEET NO. 12 OF 23 SHEETS
BISMARCK, N.D. DATE: 2/22/2013

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STORM WATER & DRAINAGE EASEMENT

LOT 2, BLOCK 1, BISMARCK AIRPORT ADDITION
BISMARCK, NORTH DAKOTA
NOVEMBER, 2013

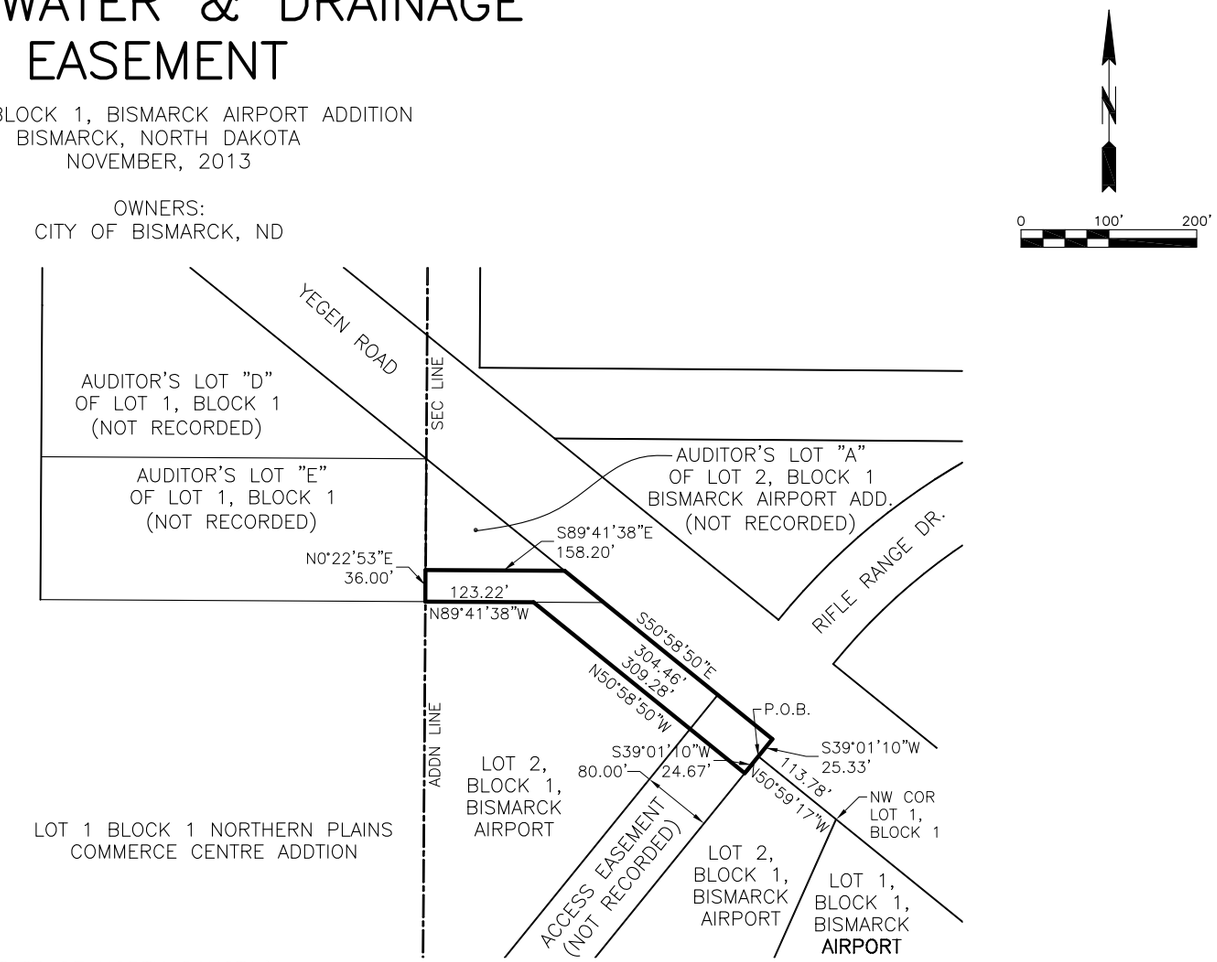
OWNERS:
CITY OF BISMARCK, ND

PARCEL No. 1

A tract of land lying in Lot 2, Block 1, Bismarck Airport Addition, Bismarck, North Dakota, more particularly described as follows:

Commencing at the northwest corner of Lot 1, Block 1, Bismarck Airport Addition; thence N 50°59'17" W, along the southwest right-of-way line of Yegen Road, a distance of 113.78' feet to the point of beginning; thence S 39°01'10" W, a distance of 24.67 feet; thence N 50°58'50" W, a distance of 309.28 feet; thence N 89°41'38" W, a distance of 123.22 feet; to the westerly line of said lot; thence N 0°22'53" E, along the westerly line of said lot, a distance of 36.00 feet; thence S 89°41'38" E, a distance of 158.20 feet; thence S 50°58'50" E, along the southeast right-of-way line of Yegen Road, a distance of 304.46 feet; thence S 39°01'10" W, a distance of 25.33 feet to the point of beginning.

Said tract contains 20,409 SF or 0.47 Acres, more or less.



SURVEYORS CERTIFICATE

I, CLEARY JOHS, NORTH DAKOTA PROFESSIONAL LAND SURVEYOR 5288, HEREBY CERTIFY THAT THE INFORMATION SHOWN ON THIS DOCUMENT IS TRUE AND CORRECT TO THE BEST OF MY BELIEF AND KNOWLEDGE. ANY ALTERATION OF THIS DOCUMENT WILL VOID THIS CERTIFICATION.

EXAMPLE

CLEARY JOHS, NDPLS 5288
CITY OF BISMARCK
221 N. 5TH STREET
BISMARCK, ND 58501

STATE OF NORTH DAKOTA }
SS }
COUNTY OF BURLEIGH }

ON THIS _____ OF _____, 2013, BEFORE ME PERSONALLY APPEARED CLEARY JOHS, KNOWN TO ME TO BE THE PERSON DESCRIBED IN AND WHO EXECUTED THE FOREGOING SURVEYOR'S CERTIFICATE AND HE ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME.

PAMELA SANDER, NOTARY PUBLIC
BURLEIGH COUNTY, NORTH DAKOTA
MY COMMISSION EXPIRES FEBRUARY 2, 2016

Bismarck Engineering Department

EASEMENT

PARCEL 1

BISMARCK, N.D. DATE: 10/29/2013

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