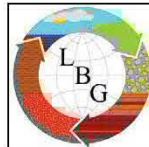


# PRODUCT THICKNESS 2011

© G3Mandan08FMANDAN08F.MXD, Created By: Mike Plante, Last Edited By: Mike Plante, 7/22/2011, 9:07:50 AM, NAD 1983 StatePlane North Dakota South FIPS 3202 Feet



- Product Thickness**
- High: 2.71 feet
  - Low: 0.00 feet
- Product Thickness Contour (feet)**
- Monitoring / Remedial Well Not Measured
  - Monitoring / Remedial Well Measured Product Thickness (feet)



Prepared By:  
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**MANDAN REMEDIATION PROJECT**  
 MANDAN, NORTH DAKOTA

PRODUCT THICKNESS APRIL THROUGH JULY 2011

FILE:	G3MANDAN08F.MXD	DATE:	7/22/2011	FIGURE:	1
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Source: May 2009 aerial photo (City of Mandan).



# PRODUCT THICKNESS 2012



GIS:\Mandan\g3mandan08L.mxd Created By: Mike Plante Last Edited By: Mike Plante 8/16/2012 6:03:27 PM M.D. 1983 StarPlane North Dakota South FIPS 3302 Feet

- Product Thickness
- High : 2.85 feet
- Low : 0.00 feet
- Product Thickness Contour (feet)
- Monitoring / Remedial Well Not Measured
- Monitoring / Remedial Well Measured
- 0.05 Product Thickness (feet)

Source: May 2009 aerial photo (City of Mandan).



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**MANDAN REMEDIATION PROJECT**  
 MANDAN, NORTH DAKOTA

PRODUCT THICKNESS MAY THROUGH JUNE 2012

FILE:	G3MANDAN08L.MXD	DATE:	8/16/2012	FIGURE:	1
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# PRODUCT THICKNESS 2013

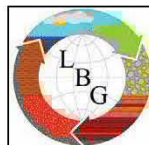


C:\GIS\Mandan\g3mandan08q.mxd, 7/9/2013, 3:54:44 PM, NAD, 1983 StatePlane North Dakota South FIPS 3202 Feet

**Product Thickness**



- Product Thickness Contour (feet)
- /● Monitoring / Remedial Well Not Measured
- /● Monitoring / Remedial Well Measured
- 0.03 Product Thickness (feet)



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PRODUCT THICKNESS JUNE THROUGH JULY 2013

FILE:	G3MANDAN08Q.MXD	DATE:	7/9/2013	FIGURE:	1
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Source: May 2009 aerial photo (City of Mandan).



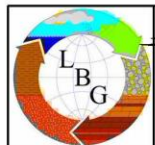
# PRODUCT THICKNESS 2014



C:\GIS\Mandan\gismandan08v.mxd 5/21/2014, 12:52:04 PM NAD 1983 StatePlane North Dakota South FIPS 5002 Feet

**Product Thickness**  
 High : 1.20 feet  
 Low : 0.00 feet

**Product Thickness Contour (feet)**  
 Monitoring / Remedial Well Not Measured  
 0.05 Product Thickness (feet)



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**MANDAN REMEDIATION PROJECT**  
 MANDAN, NORTH DAKOTA

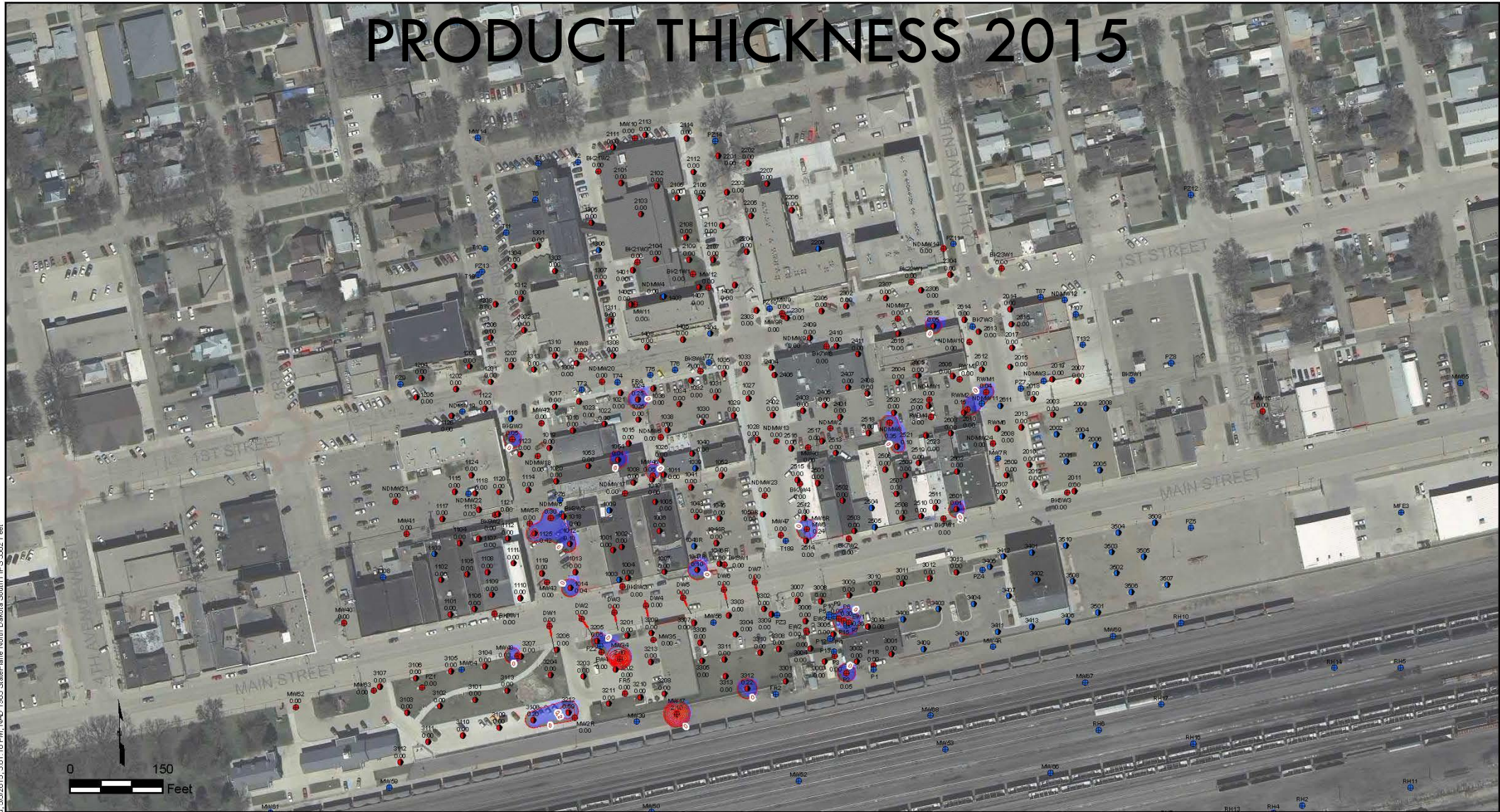
**PRODUCT THICKNESS APRIL THROUGH MAY 2014**

FILE:	G3MANDAN08V.MXD	DATE:	5/21/2014	FIGURE:	1
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Source: May 2009 aerial photo (City of Mandan).



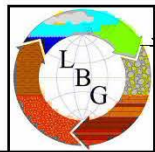
# PRODUCT THICKNESS 2015



G:\GIS\Mandan\mandan08y.mxd\_552015\_30110.DM, NAD 1983 StatePlane North Dakota South FIPS 5002 Feet

**Product Thickness**  
 High : 2.40 feet  
 Low : 0.00 feet

**Product Thickness Contour (feet)**  
 ●/● Monitoring / Remedial Well Not Measured  
 ●/● Monitoring / Remedial Well Measured  
 0.59 Product Thickness (feet)



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PRODUCT THICKNESS MARCH AND APRIL 2015

FILE: G3MANDAN08Y.MXD DATE: 5/5/2015 FIGURE: 1

Source: May 2009 aerial photo (City of Mandan).



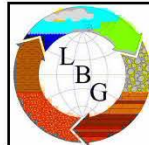
# PRODUCT THICKNESS 2016



G:\GIS\Mandan\g3mandan09b.mxd 12/20/2016, 9:11:01 AM, NAD, 1080 StatePlane North Dakota South FIPS 5002 Feet

- Product Thickness
- Product Thickness Contour (feet)
- Monitoring / Remedial Well Not Measured
- Monitoring / Remedial Well Measured
- 1.12 Product Thickness (feet)
- Remote Manifold Boundary

Source: May 2009 aerial photo (City of Mandan).



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**MANDAN REMEDIATION PROJECT**  
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PRODUCT THICKNESS APRIL AND MAY 2016

FILE:	G3MANDAN09B.MXD	DATE:	12/20/2016	FIGURE:	1
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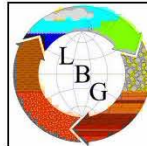
# PRODUCT THICKNESS 2017



© 2017 G3M mandanhighmandan09e.mxd 12/6/2017, 10:20:32 PM, NAD 1983 StatePlane North Dakota South FIPS 5302 Feet



- Product Thickness Contour (feet)
- / ● Monitoring / Remedial Well Not Measured
- / ● Monitoring / Remedial Well Measured
- 0.95 Product Thickness (feet)
- Remote Manifold Boundary



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**MANDAN REMEDIATION PROJECT**  
 MANDAN, NORTH DAKOTA

PRODUCT THICKNESS SEPTEMBER TO OCTOBER 2017

FILE:	G3MANDAN09E.MXD	DATE:	12/6/2017	FIGURE:	1
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Source: May 2009 aerial photo (City of Mandan).



# PRODUCT THICKNESS 2018



WSP Office, St. Paul, MN | Source: G:\GIS\Mandan\2mandanrdb.mxd, 9/21/2018, 2:40:53 PM, I:\401863 StatePlane North Dakota South FIPS 3302 Feet

- Product Thickness
  - High : 1.36 feet
  - Low : 0.00 feet
- Product Thickness Contour (feet)
  - Monitoring / Remedial Well Not Measured
  - Monitoring / Remedial Well Measured
  - 0.05 Product Thickness (feet)
  - Remote Manifold Boundary

Drawn: 9/21/2018  
 Service Layer Credits: Cross Section B-B' from LBG's 2016 Desktop Hydrogeologic Assessment.

WSP USA Inc.  
 8 PINE TREE DRIVE  
 SUITE 250  
 ST. PAUL, MN 55112  
 TEL: +1 651 490 1405

**MANDAN REMEDIATION PROJECT**  
**MANDAN, NORTH DAKOTA**

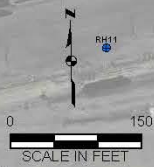
PREPARED FOR  
**MANDAN REMEDIATION TRUST**

**FIGURE 1**

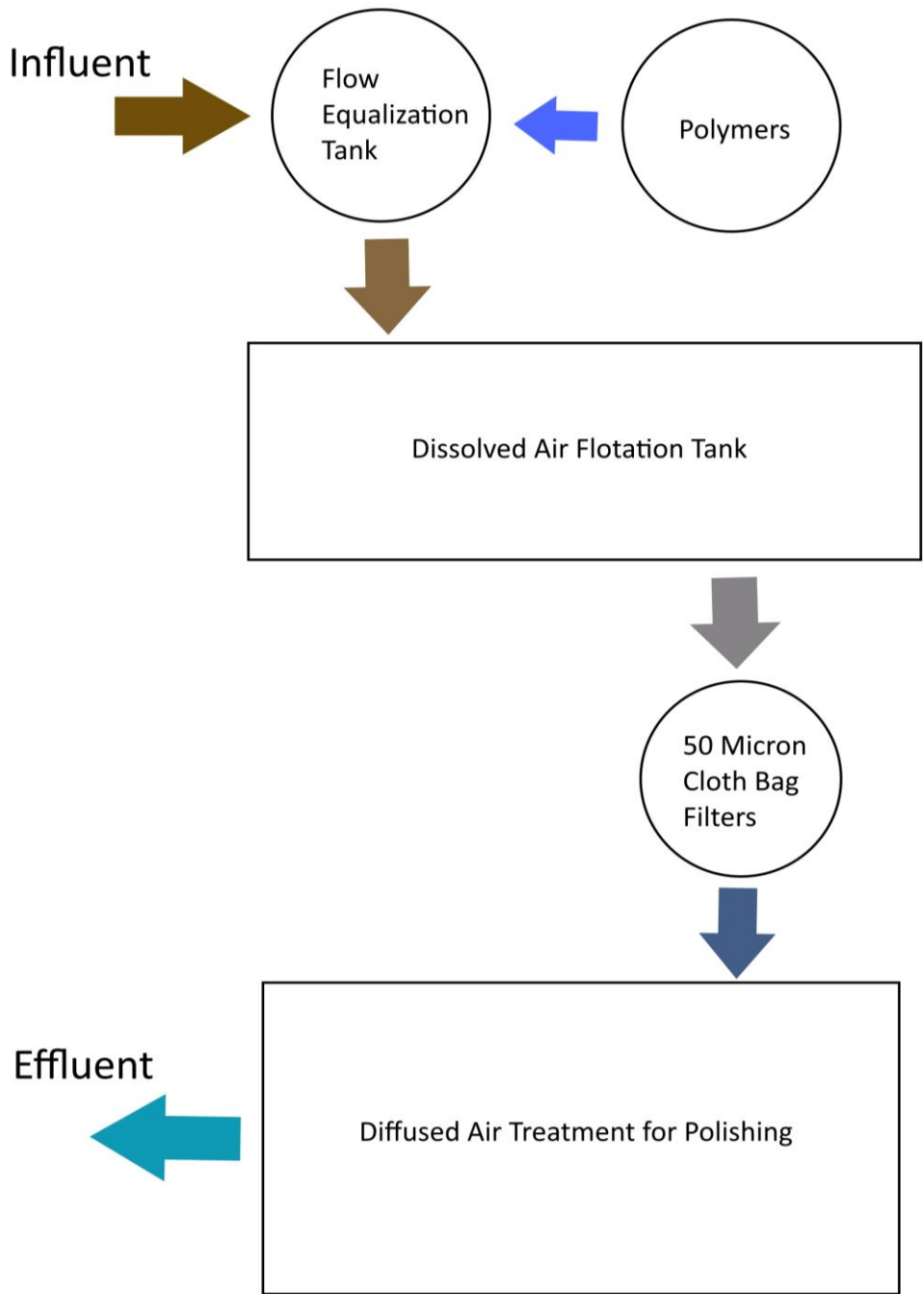
**PRODUCT THICKNESS AUGUST-SEPTEMBER 2018**

THE ORIGINAL VERSION OF THIS DRAWING IS IN COLOR. BLACK AND WHITE COPIES MAY NOT ACCURATELY DEPICT CERTAIN INFORMATION.

NOTICE: THIS DRAWING HAS BEEN PREPARED UNDER THE DIRECTION OF A PROFESSIONAL. DO NOT ALTER THIS DOCUMENT IN ANY WAY WITHOUT THE WRITTEN CONSENT OF WSP USA INC.





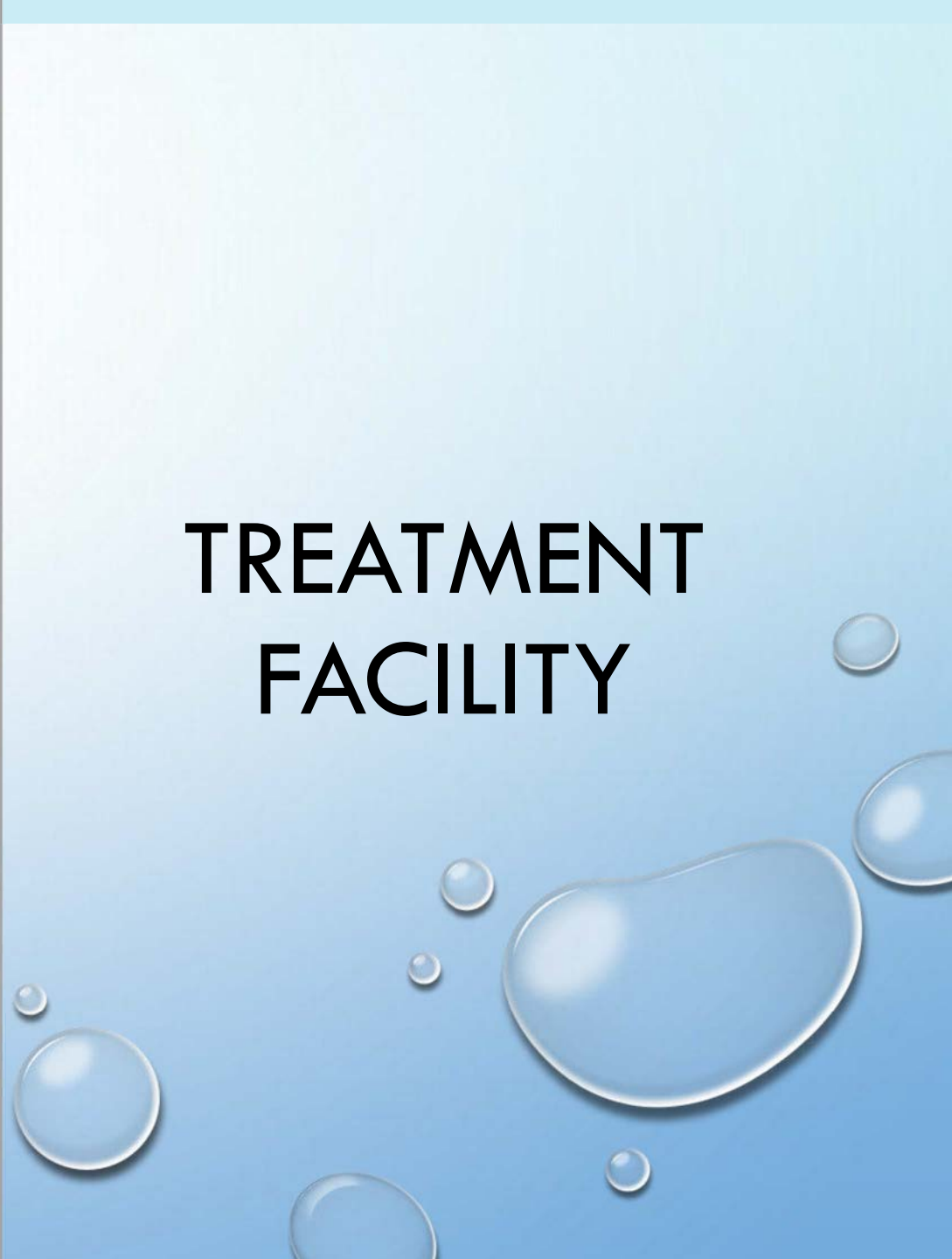


# WASTE WATER TREATMENT SYSTEM SCHEMATIC





# TREATMENT FACILITY





# MANDAN PRETREATMENT PERMIT CONDITIONS

WASTEWATER DISCHARGED INTO THE SANITARY SEWER SYSTEM SHALL NOT HAVE ANY CONCENTRATION GREATER THAN THAT LISTED FOR THE SUBSTANCE BELOW.

<u>POLLUTANT</u>	<u>DAILY MAXIMUM LIMIT</u>
ARSENIC	0.230 MG/L
BENZENE	0.050 MG/L
BTEX	0.750 MG/L
CADMIUM	0.250 MG/L
CHROMIUM – TOTAL	4.120 MG/L
CHROMIUM (III)	3.550 MG/L
CHROMIUM (VI)	0.033 MG/L
COPPER	4.040 MG/L
LEAD	0.740 MG/L
MERCURY	0.073 MG/L
MOLYBDENUM	1.020 MG/L
NICKEL	1.880 MG/L
SELENIUM	0.280 MG/L
SILVER	2.460 MG/L
ZINC	2.000 MG/L
OIL AND GREASE	*NO VISIBLE SHEEN

\* IF A VISIBLE SHEEN OR FLOATING OIL IS OBSERVED IN THE DISCHARGE, A GRAB SAMPLE SHALL BE COLLECTED, ANALYZED AND THE CITY SHALL BE CONTACTED.

THE DAILY MAXIMUM CONCENTRATIONS AS LISTED ABOVE SHALL APPLY AT THE POINT OF DISCHARGE TO THE CITY OF MANDAN'S WASTEWATER COLLECTION SYSTEM.



# SAMPLING SCHEDULE

THE PERMITTEE NAMED ABOVE SHALL SAMPLE AND ANALYZE ITS WASTEWATER FOR THE FOLLOWING POLLUTANTS AND UNDER THE FOLLOWING SCHEDULES UNLESS AUTHORIZED OTHERWISE BY THE WASTEWATER TREATMENT PLANT SUPERINTENDENT:

<u>POLLUTANT</u>	<u>TYPE OF SAMPLE</u>	<u>FREQUENCY</u>
PH	GRAB	SEMI-ANNUAL
OIL AND GREASE	VISUAL	VISUAL 1X / WEEK 1
BTEX	GRAB	SEMI-ANNUAL
DRO	GRAB	SEMI-ANNUAL
GRO	GRAB	SEMI-ANNUAL

<sup>1</sup> PERFORM VISUALS DAILY WHEN WORKERS PRESENT, SAMPLE IF SHEEN DETECTED, OR MONTHLY AT A MINIMUM.





## CURRENT SITE CONDITIONS

- SHUT DOWN ALL SYSTEMS IN 2018
- 2019 MONITORING
- MAY CLOSE ENTIRE SYSTEM IN 2019 IF NO FURTHER RISK TO HEALTH OR ENVIRONMENT



THANK YOU

