GEN-TAT-000767-2015.001
Request for Coverage - SCQS General Permit

DEC 21 2015

resourceful. naturally.
engineering and environmental consultants

BARR

12/18/2015

Attn: Claudia Smith
EPA Region 8
Air Program (8P-AR)
1595 Wynkoop Street
Denver, CO, 80202

Re: Request for Coverage under the General Air Quality Permit for New or Modified True Minor Source Stone Quarrying, Crushing, and Screening Facilities in Indian Country

Dear Ms. Smith:

On behalf of U.S Silica, enclosed is an application for a general permit to request coverage under the General Air Quality Permit for New or Modified True Minor Source Stone Quarrying, Crushing, and Screening Facilities in Indian Country. U.S. Silica (USS) is proposing construction of a new rail transload facility to transport silica sand from rail cars to trucks near Parshall, North Dakota in support of ongoing oil and gas development in the Bakken region.

We have reviewed the criteria for coverage under this permit per 40 CFR Part 49 and the guidance materials found on EPA's Tribal Minor New Source Review website and have determined that it meets the applicable requirements. In addition to the application, we have included supplemental information in this application package to aid your review of this request including: site diagram, process flow diagrams, emission calculation documentation, equipment information on dust collection units, endangered species act review documentation, and documentation that the requirements of the screening process per the National Historic Preservation Act have been completed.

If you have any questions or require additional information for a complete review of this request for coverage, please contact Rachel Ames at (952) 832-2845 or rames@barr.com or Lori Stegink at (952) 832-2633 lstegink@barr.com.

Sincerely,

Lori L Stegink

Lori Stegink
Vice President

Cc: Tina Archer, U.S. Silica
Mark Fox, MHA Nation
Adam Yoxtheimer, U.S Silica (electronic only)
Mike Ruttle, U.S. Silica (electronic only)

United States Environmental Protection Agency
General Permit for New or Modified Minor Sources of Air Pollution in Indian Country
http://www.epa.gov/air/tribal/tribalnsr.html

Request for Coverage under the General Air Quality Permit for New or Modified True Minor Source Stone Quarrying, Crushing, and Screening Facilities in Indian Country

Last Modified: November 14, 2013
Version 1.0

Prior to construction or modification, complete this application and submit it to your reviewing authority. A list of reviewing authorities, their area of coverage, and contact information can be found in Attachment D to the General Air Quality Permit for True Minor Source Stone Quarrying, Crushing, and Screening Facilities or visit: http://www.epa.gov/air/tribal/tribalnsr.html.

For questions regarding this application please contact your reviewing authority.

For instructions on completing this application please see the document "Instructions for Requesting Coverage under the General Air Quality Permit for New or Modified True Minor Source Stone Quarrying, Crushing, and Screening Facilities in Indian Country."

Section 1: Contact Information

1. Business Name: **U.S. Silica - Parshall Transload Facility**	2. Date: **December 2015**
3. Site Address: **The facility would be located northwest of the 366th Street SW and 247 Avenue SW intersection, Makoti, ND 58771.**	4. County: **Mountrail and Ward Counties**
5. Name of Operator at Site (if different from owner):	6. Phone of Operator or Contact at Site (if different from owner):
7. Owner: **U.S. Silica**	8. Telephone of Owner: **312-291-4364**
9. Mailing Address: **U.S. Silica** **180 North LaSalle Street, Suite 2890** **Chicago, Illinois 60601**	10.Send all correspondence regarding this application to: Company Name: **Barr Engineering** C/o: **Attn: Rachel Ames** Address: **4300 MarketPointe Dr., Suite 200** **Minneapolis, MN 55435**
11. Authorized contact regarding this permit application: Name: **Tina Archer** Title: **Environmental Project Manager** Phone: **312-291-4364**	Email: **archer@ussilica.com** FAX:

Section 2: Facility Information

12. This application is for (check all that apply):

☒ A new stone quarrying, crushing, and screening facility (please describe the proposed new source).
See the attached project description.

☐ Modification of an existing stone quarrying, crushing, and screening facility. Please describe the modification below. **The definition of "modification" can be found at 40 CFR 49.152(d), and in the "Instructions" document.**

☐ Stationary (fixed) stone quarrying, crushing, and screening facility

☐ Portable stone quarrying, crushing, and screening facility

☐ Relocation of an existing stone quarrying, crushing, and screening facility

13. North American Industry Classification System/Standard Industrial Classification Code and/or description of the facility:
1499

14. Is your new or modified facility located in an ozone nonattainment area? Information on the ozone attainment status of the area where your facility is/will be located can be found at: http://www.epa.gov/airquality/greenbook/.

☐ Yes ☒ No

If yes, specify the classification of the ozone nonattainment area:

☐ Marginal ☐ Moderate ☐ Serious ☐ Severe ☐ Extreme

15. Is your new or modified facility located in a moderate or serious particulate matter ($PM_{10}/PM_{2.5}$) nonattainment area? Information on the attainment status of the area where your facility is located can be found at: http://www.epa.gov/airquality/greenbook/ .

☐ Yes ☒ No

If yes, specify the classification of the $PM_{10}/PM_{2.5}$ nonattainment area:

☐ Moderate ☐ Serious

16. Is the potential to emit (PTE), of your new facility or the emissions increase from your modified existing facility equal to or above the applicable minor NSR thresholds listed below for ANY of the listed pollutants, both in tons per year (tpy)? Emissions from your facility may be calculated using the PTE calculator available online at: http://www.epa.gov/air/tribal/tribalnsr.html. Be sure to include all new, modified, or existing emission units when determining PTE.

Pollutant	Attainment Area	Nonattainment Area
Carbon Monoxide (CO)	10 tpy	5 tpy
Particulate Matter (PM)	10 tpy	5 tpy
Particulate Matter (PM_{10})	5 tpy	1 tpy
Particulate Matter ($PM_{2.5}$)	3 tpy	0.6 tpy
Sulfur Dioxide (SO_2)	10 tpy	5 tpy
Nitrogen Oxides (NO_X)	10 tpy	5 tpy
Carbon Monoxide (CO)	5 tpy	2 tpy

☒ Yes ☐ No

17. If located in an attainment area, is the PTE of your facility less than 250 tpy for PM, PM_{10}, $PM_{2.5}$, VOC, NO_X, CO, and SO_2? Be sure to include all existing, new, and modified emission units.

☒ Yes ☐ No

If you answered **'No,'** your source does not qualify for the minor NSR program. Please contact your reviewing authority to apply for a site-specific permit. If you answered **'Yes,'** continue on to the next question.

18. If located in a nonattainment area, is the PTE of your facility for the particular nonattainment pollutant less than the NSR major source thresholds below for ALL pollutants? Be sure to include all existing, new, and modified emission units.

Pollutant	Nonattainment Classification	NSR Major Source Threshold
Ozone	Marginal	100 tpy of VOC or NO_X
	Moderate	100 tpy of VOC or NO_X
	Serious	50 tpy of VOC or NO_X
	Severe	25 tpy of VOC or NO_X
	Extreme	10 tpy of VOC or NO_X
PM_{10}	Moderate	100 tpy
	Serious	70 tpy
CO	Moderate	100 tpy
	Serious	50 tpy
SO_2, NO_2, $PM_{2.5}$	No nonattainment classification	100 tpy

☐ Yes ☐ No ☒ N/A - Not located in any nonattainment area

If you answered **'No,'** your source does not qualify for the minor NSR program. Please contact reviewing authority to apply for a site-specific permit. If you answered **'Yes' or 'N/A,'** continue on to the next question.

19. What is the projected annual throughput of rock, stone, sand, gravel, and aggregate (in tons) to be processed at your new or modified facility?
_6,600,000________ tons per consecutive 12 month period

20. What is the projected annual usage of diesel fuel (in gallons) for all stationary combustion sources (e.g., boilers) at your new or modified facility?
0 gallons __________ gallons per consecutive 12 month period

21. What will the distance of the proposed facility be from the nearest property boundary (feet)?
_460 ft______________

From the nearest residence (feet)? __1,090 ft______________

Section 3: Technical Information

22. Facility Equipment

List all equipment at the site owned, leased or operated by the applicant, as well as the maximum rated capacity in tons per hour, Btu, or horsepower. If needed to list all equipment, additional pages may be photocopied and added after this one.

Unit ID #	Type Description					Maximum Rated Capacity	Make/ Model	Date of Construction (mm/dd/yyyy)
	Crusher	Screener	Internal Combustion Engine	Other Exhaust Unit	Other (please specify)	Tons per Hour (tph) for Equipment and Btu or Horsepower for engines		
	See equipment tables included with the attached project description.							
	☐	☐	☐	☐				
	☐	☐	☐	☐				
	☐	☐	☐	☐				
	☐	☐	☐	☐				
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	☐	☐	☐	☐				

Unit ID #	Type Description					Maximum Rated Capacity	Make/ Model	Date of Construction (mm/dd/yyyy)
	☐	☐	☐	☐				
	☐	☐	☐	☐				
	☐	☐	☐	☐				
	☐	☐	☐	☐				
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	☐	☐	☐	☐				
	☐	☐	☐	☐				

Notes:
In the column labeled Unit ID # please give unique identifiers for all of the equipment at the site. You may use an existing facility numbering system or emissions inventory ID #. This unique identifier will differentiate between the different emission units at the facility.

In subsequent sections of this permit application, please use the same Unit ID #'s already provided for the equipment listed here.

It is recommended—but not required— that you include an identifying letter specific to the equipment type, e.g., 'C' for crusher, followed by an identifying number of your choice.

23. Crushing (Please use same ID #'s identified above in this permit application)

Unit ID #	Process Rate			Type				Controls		
	tph	Annual hours of operation	tpy (tph x annual hours)	Primary	Secondary	Tertiary	Fines	Average Moisture Content (%)	Controls Used (Please specify)	Efficiency
No applicable units.				☐	☐	☐	☐			
				☐	☐	☐	☐			
				☐	☐	☐	☐			
				☐	☐	☐	☐			
				☐	☐	☐	☐			
Totals:										

24. Screening (Please use same Unit ID #'s identified above in this permit application)

Unit ID #	Process Rate			Type of Screening			Controls		
	tph	Annual hours of operation	tpy (tph x annual hours)	Regular	Fines	Wet Screening*	Average Moisture Content (%)	Controls Used (Please specify)	Efficiency
No applicable units.				☐	☐	☐			
				☐	☐	☐			
				☐	☐	☐			
				☐	☐	☐			
				☐	☐	☐			
Totals:									

* Wet screening refers to screening processes that are accomplished with water as the carrier of the sand/aggregate or where the aggregate is saturated with water.

25. Material Handling – Transferring, loading, unloading, conveyors, and dropping (Please use same Unit ID #'s identified above in this permit application)

Unit ID #	Description	Maximum Material Transferred (tpy)	Average Moisture Content	Control Technology					
	e.g. truck dump, conveyor drop, truck loading	Per point	%	None	Water Spray	Chemical Additive	Conveyor with ½ cover	Conveyor with ¾ cover	Cover with full cover
See equipment tables included with the attached project description.				☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐
				☐	☐	☐	☐	☐	☐
Totals:									

26. Internal Combustion Engines (including emergency generators)

Unit ID #	Unit Description	Maximum Rated Capacity (HP)	Types of Fuel(s) Used[1]	Manufactured Date (mm/dd/yyyy)	Model Year
See equipment tables included with the attached project description.					

Unit ID #	Unit Description	Maximum Rated Capacity (HP)	Types of Fuel(s) Used[1]	Manufactured Date (mm/dd/yyyy)	Model Year

27. Volatile Liquid Storage Tanks

This section applies to storage tanks used to store liquid materials. Please provide the following information for each storage tank.

Unit ID#	Type of Liquid	Capacity (gallons)	Vapor pressure of liquid (psi)	Is the tank above or underground?	Date of installation (if existing)
See equipment tables included with the attached project description.					

Section 4: Information on Compliance with Federal Statues Necessary for Requesting Coverage under the General Permit

28. Endangered Species Act

Have you demonstrated that you meet one of the criteria listed in Appendix A with respect to the protection of any and all species that are federally-listed as endangered or threatened under the ESA or of habitat that is federally-designated as "critical habitat" under the ESA? If no, you cannot request coverage under this permit.

[X] Yes [ ] No

If yes, then you need to provide the appropriate documentation to the EPA to qualify for coverage under this permit. Please indicate under which criterion in Appendix A you are satisfying this requirement:

[X] A [ ] B [ ] C [ ] D [ ] E

29. National Historic Preservation Act

Have you followed the screening process in Appendix B to determine if the construction, modification or operation of your new or modified true minor source of air pollutants has the potential to cause effects to historic properties (pursuant to the NHPA), and whether you need to contact the appropriate state or tribal representative for further information? If no, you cannot request coverage under this permit.

[X] Yes [ ] No

If yes, then provide the appropriate documentation to the EPA to qualify for coverage under this permit.

Applicant's Statement (to be signed by the applicant)
I certify that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.
Name: Michael D Winkler (Signature) Name: Mike Winkler (Print or Type) Date: 12/18/15 Title: COO, U.S. Silica

Project Description

U.S. Silica Company Transload Facility near Parshall, North Dakota

Project Description

U.S. Silica (USS) is considering construction of a new rail transload facility to transport silica sand from rail cars to trucks near Parshall, North Dakota in support of ongoing oil and gas development in the Bakken region. The facility would be located northwest of the 366th Street SW and 247 Avenue SW intersection in Township 152N, Range 88W, Section 13 and Township 152N, Range 87W, Section 18. The proposed facility layout (attached) shows the rail loop would be located in both Mountrail and Ward Counties, North Dakota.

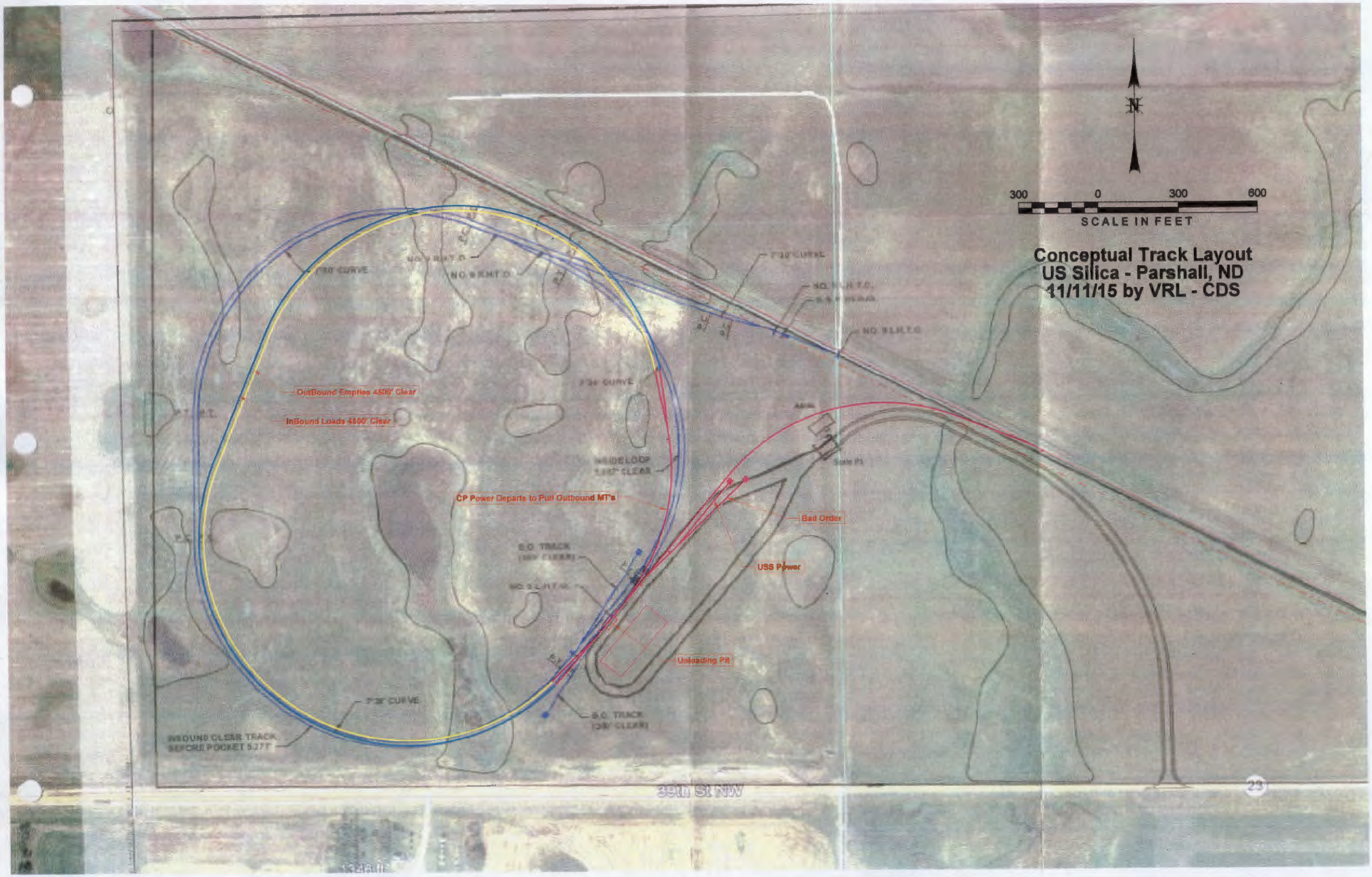
Construction of the transload facility would include installation of a new rail line parallel and adjacent to the existing Canadian Pacific's (CP's) railway and a new rail loop to be used for unloading rail cars. Sand would be conveyed from the rail cars either directly into trucks using portable conveyors and/or into a newly constructed offloading building and then sorted and stockpiled by grade. Inside the offloading building, an end loader would move the enclosed stockpiled sand to a second conveyor which would go into day bins and then empty into haul trucks. All outdoor material handling conveyors and conveyor feed and discharge points are designed to be covered and are equipped with a dust collection unit. Manufacturer information for these dust collection units has been included as an attachment to this application. Process flow diagrams and emission calculations have been created to display this step by step process and to quantify emissions and are also included with this application. A paved parking area would be constructed to accommodate incoming and outgoing trucks as well as approximately 20 daily USS employees.

The facility would be constructed on land owned by CP and under easement to USS. Both the new rail and loading facility would be located within an approximately 330 acre project area.

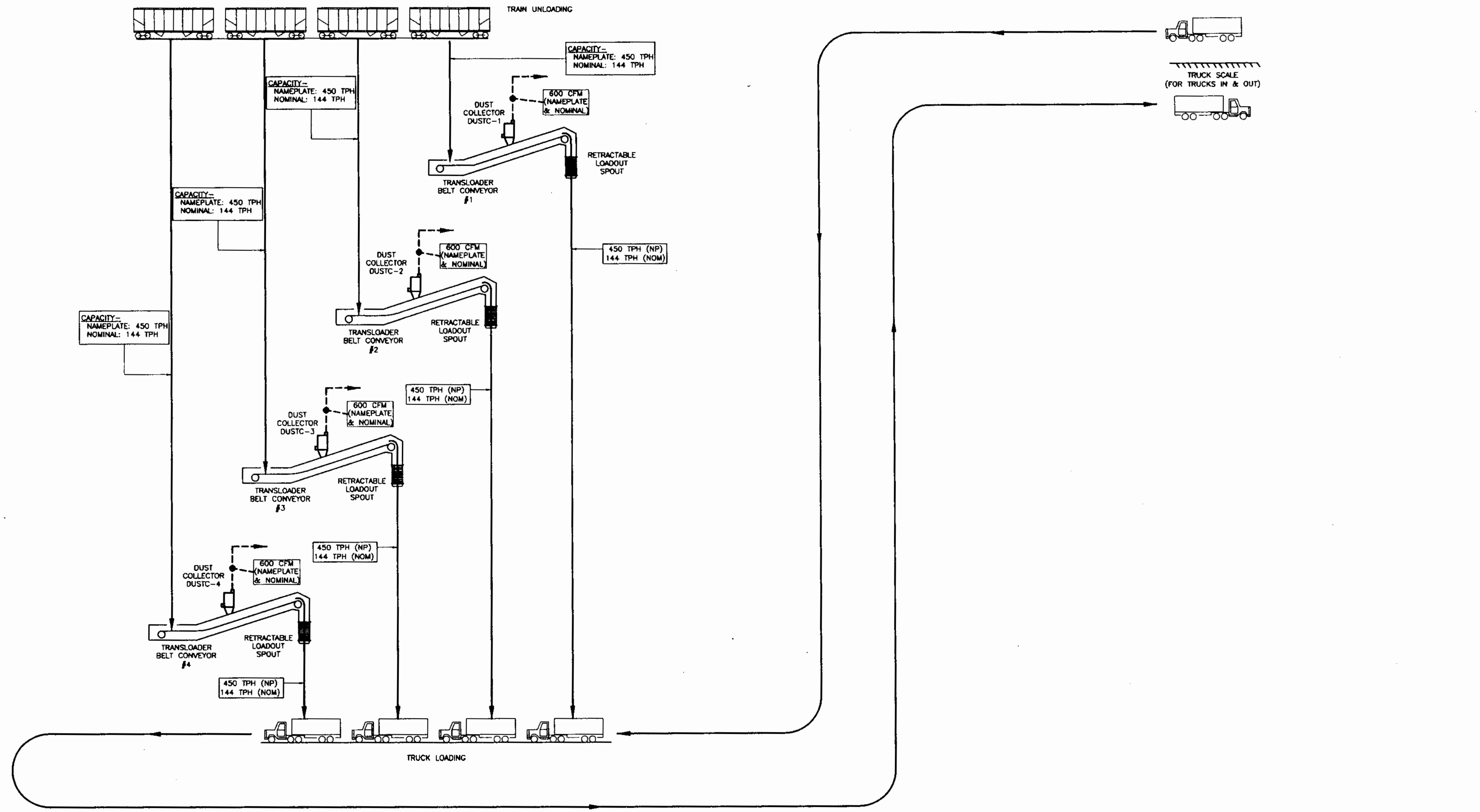
Site Diagrams:

Facility Layout

Process Flow Diagrams



300 0 300 600
SCALE IN FEET
Conceptual Track Layout
US Silica - Parshall, ND
11/11/15 by VRL - CDS
OutBound Empties 4500' Clear
InBound Loads 4500' Clear
CP Power Departs to Pull Outbound MT's
Bad Order
USS Power
Unloading Pit
Scale Pit
S.O. TRACK
39th St NW
23



NOTES:

1. THE INFORMATION PRESENTED IN THIS FLOWSHEET REPRESENTS INFORMATION PROVIDED BY U.S. SILICA AND INCLUDES U.S. SILICA PROPRIETARY PROCESS DESIGN.

PRELIMINARY DRAFT
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	AMB3	–	–	— —	–

US SILICA
CORPORATE HEADQUARTERS
FREDERICK, MD 21701
301-682-0600

RELEASED TO/FOR	A	B	C	0	1	2	3
CLIENT							
BID							
CONSTRUCTION							

DATE RELEASED

BARR
Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277
Project Office: BARR ENGINEERING CO. 4700 WEST 77TH STREET MINNEAPOLIS, MN 55435
Ph: 1-800-632-2277 Fax: (952) 832-2601 www.barr.com

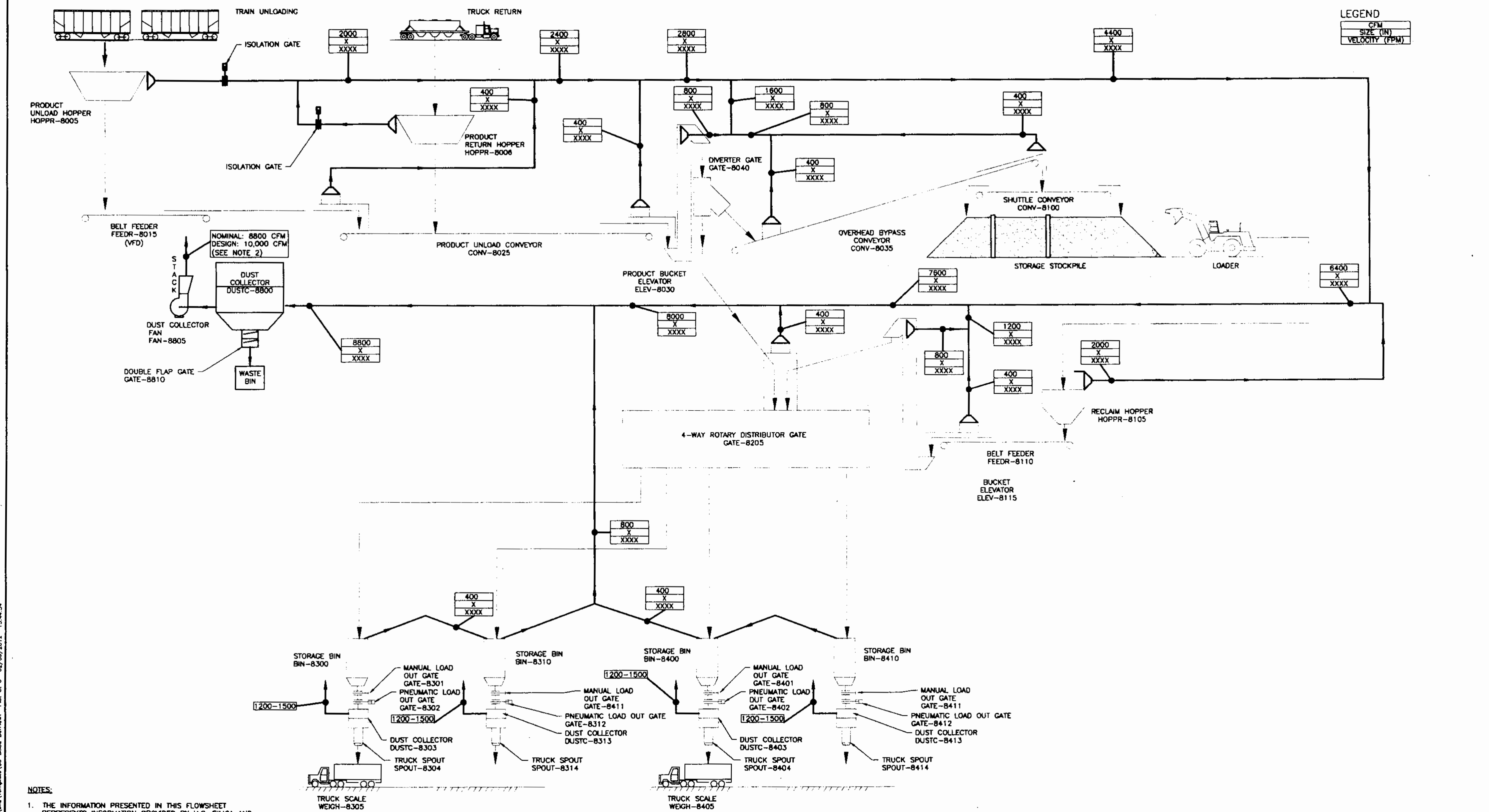
Scale	AS SHOWN
Date	10/13/15
Drawn	AMB3
Checked	AMB3
Designed	AMB3
Approved	

U.S. SILICA
FREDERICK, MARYLAND

PARSHALL TRANSLOAD FACILITY
PARSHALL, NORTH DAKOTA

PROCESS FLOWSHEET
PHASE 1

BARR PROJECT No. 34/51-1015
CLIENT PROJECT No.
DWG. No. 800FS
REV. No. A



NOTES:

1. THE INFORMATION PRESENTED IN THIS FLOWSHEET REPRESENTS INFORMATION PROVIDED BY U.S. SILICA AND INCLUDES U.S. SILICA PROPRIETARY PROCESS DESIGN.
2. THIS AIR FLOW RATE OF 10,000 CFM INCLUDES A DESIGN SAFETY FACTOR ADDED TO THE 8800 CFM NOMINAL VALUE. THE NOMINAL VALUE IS A TOTAL OF THE INDIVIDUAL COLLECTION POINT VALUES OF THE SYSTEM.

PRELIMINARY DRAFT
NOT FOR CONSTRUCTION

NO.	BY	CHK	APP.	DATE	REVISION DESCRIPTION
A	JAK3	-	-	-	-

US SILICA
CORPORATE HEADQUARTERS
FREDERICK, MD 21701
301-682-0600

CLIENT / BID / CONSTRUCTION

RELEASED TO/FOR — A B C 0 1 2 3 — DATE RELEASED

BARR
Corporate Headquarters: Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN 55435
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

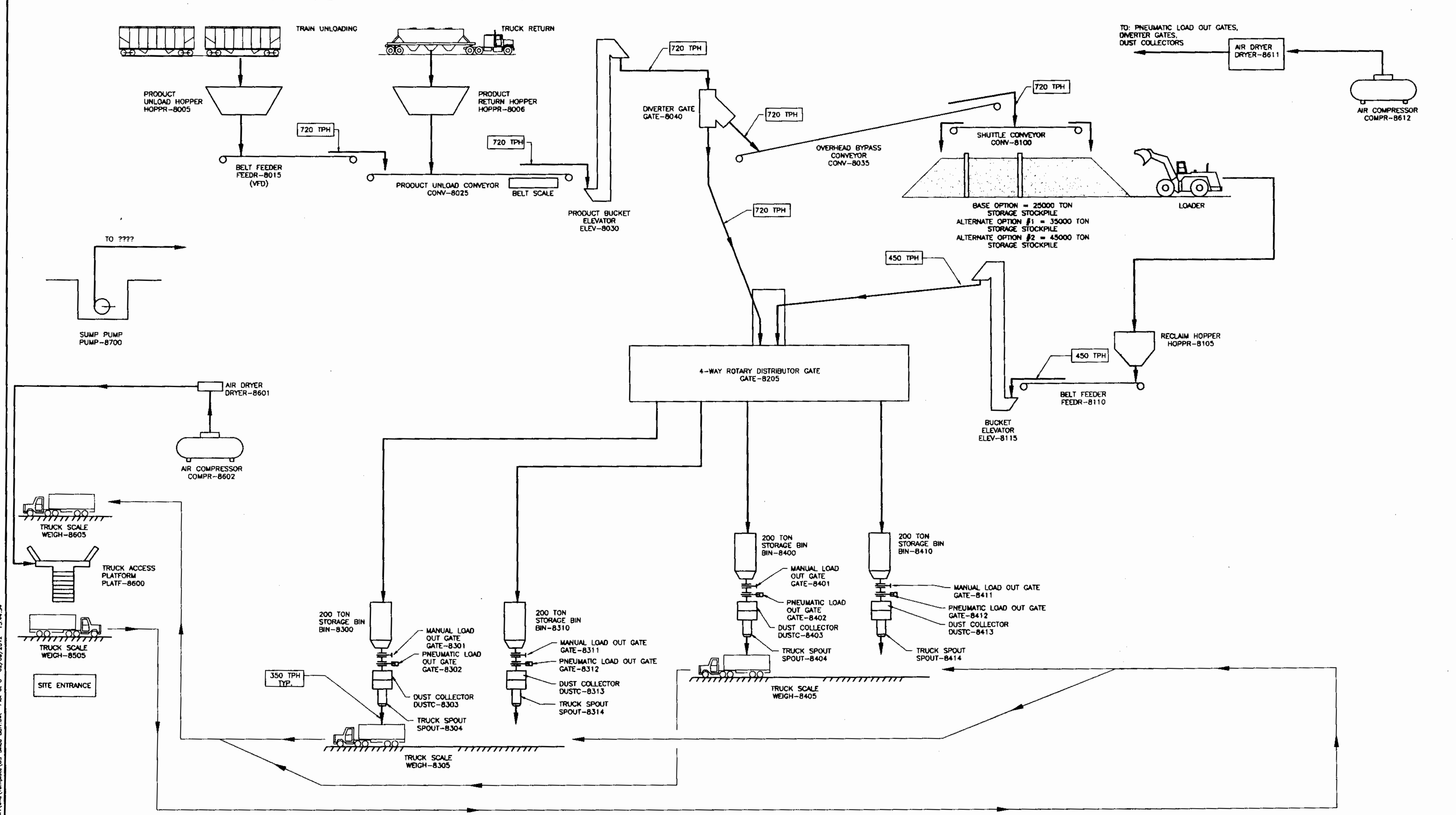
Scale	NO SCALE
Date	2/10/15
Drawn	JAK3/AMB3
Checked	AMB3
Designed	JAK3
Approved	

U.S. SILICA
FREDERICK, MARYLAND

PARSHALL TRANSLOAD FACILITY
PARSHALL, NORTH DAKOTA

DUST COLLECTION FLOWSHEET
PHASE 2

BARR PROJECT No. 34/51-1015
CLIENT PROJECT No.
DWG. No. 802FS
REV. No. A



NOTES:

1. THE INFORMATION PRESENTED IN THIS FLOWSHEET REPRESENTS INFORMATION PROVIDED BY U.S. SILICA AND INCLUDES U.S. SILICA PROPRIETARY PROCESS DESIGN.

PRELIMINARY DRAFT
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
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US SILICA
CORPORATE HEADQUARTERS
FREDERICK, MD 21701
301-682-0600

CLIENT
BID
CONSTRUCTION
RELEASED TO/FOR

A	B	C	0	1	2	3

DATE RELEASED

BARR
Corporate Headquarters: Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN 55435
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Fax: (952) 832-2601
www.barr.com

Scale	AS SHOWN
Date	2/10/15
Drawn	JAK3/AMB3
Checked	AMB3
Designed	JAK3
Approved	

U.S. SILICA
FREDERICK, MARYLAND

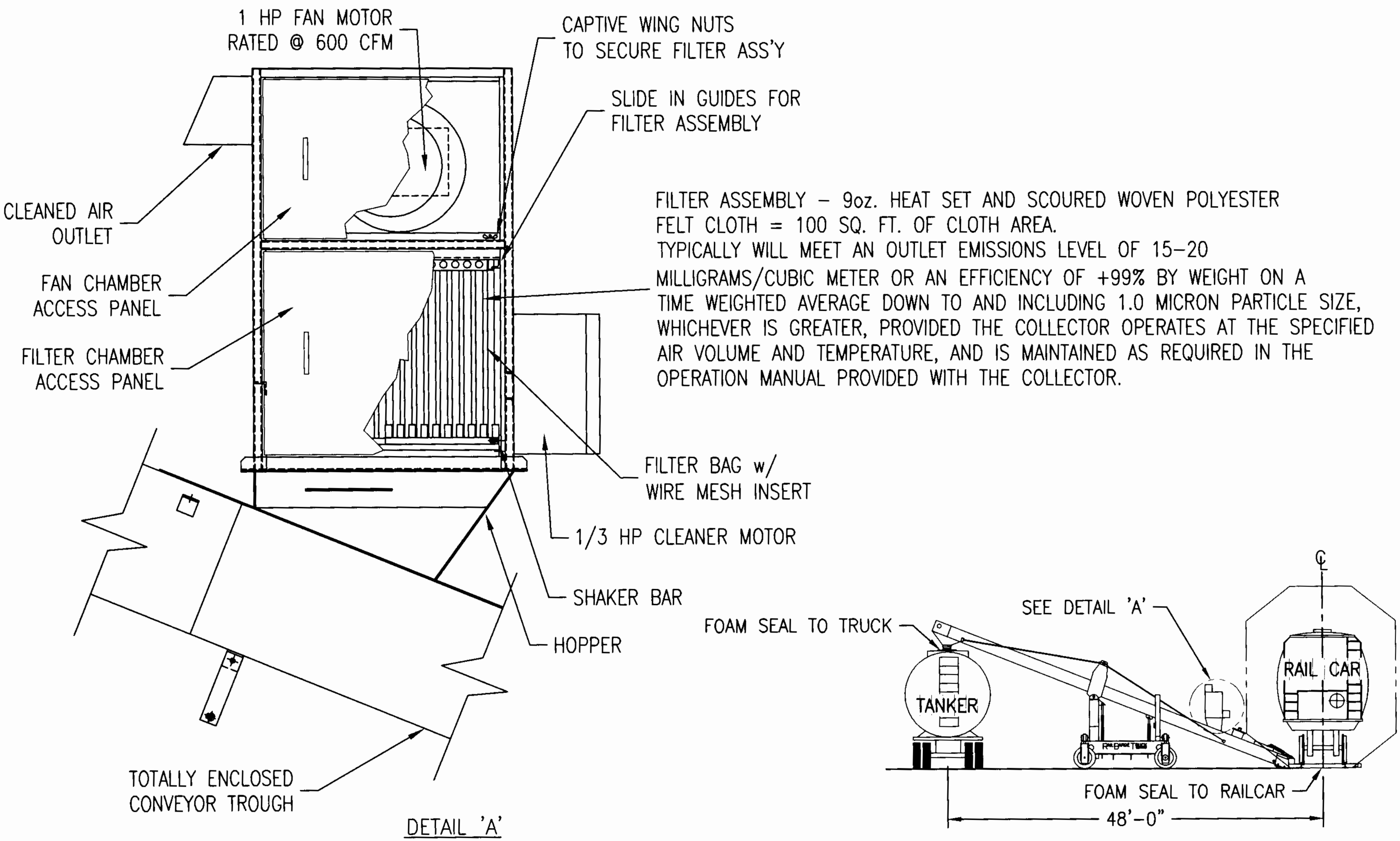
PARSHALL TRANSLOAD FACILITY
PARSHALL, NORTH DAKOTA

PROCESS FLOWSHEET
PHASE 2

BARR PROJECT No. 34/51-1015
CLIENT PROJECT No.
DWG. No. 801FS
REV. No. A

Equipment Specification:

Dust Collection Unit



REV. #	DATE:	DESCRIPTION:	BY:
1	03/027/03	REVISE NOTES TO MANUFACTURER SPEC	SWD
0	06/03/02	REVISED PER DRAWING STANDARDS	DWD

RAIL BARGE TRUCK SERVICES, INC.
218 CORPORATE DRIVE
ELIZABETHTOWN, KY 42701
PHONE: (270) 763-6649
FAX: (270) 763-6653
e-mail: sales@rbtsi.com

DESCRIPTION:

DCE MODEL UMA-100
DUST COLLECTOR
DETAIL OVERVIEW

DRAWN BY: RDB	DRAWN DATE: 08/13/98	APPROVED BY: BHJR	APPROVED DATE: 08/13/98
CHECKED BY:	CHECKED DATE:	SHEET NUMBER: OF	
CUSTOMER:		JOB NO:	SCALE: N/A
LOCATION:		DWG NO: UMA-100	

Equipment List

Equipment List

22. Facility Equipment

Unit ID #	Description					Maximum Rated Capacity	Make/Model	Date of Construction (mm/dd/yyyy)
	Crusher	Screener	Internal Combustion	Other Exhaust Unit	Other (please specify)	Tons per Hour (tph) for Equipment and Btu or Horsepower for Engines		
DUSTC-1					Train Unloading Dust Collector 1	450 tph / 1500 cfm	TBD	TBD
DUSTC-2					Train Unloading Dust Collector 2	450 tph / 1500 cfm	TBD	TBD
DUSTC-3					Train Unloading Dust Collector 3	450 tph / 1500 cfm	TBD	TBD
DUSTC-4					Train Unloading Dust Collector 4	450 tph / 1500 cfm	TBD	TBD
DUSTC-8800					Sand Transfer Baghouse	10,000 cfm	TBD	TBD
Building Exhaust					Sand Storage Building	42,000 cfm	TBD	TBD
DUSTC-8303					Sand Truck Load-out Station Baghouses	350 tph / 1500 cfm	TBD	TBD
DUSTC-8313					Sand Truck Load-out Station Baghouses	350 tph / 1500 cfm	TBD	TBD
DUSTC-8403					Sand Truck Load-out Station Baghouses	350 tph / 1500 cfm	TBD	TBD
DUSTC-8413					Sand Truck Load-out Station Baghouses	350 tph / 1500 cfm	TBD	TBD
MENG-1			X			60 HP	TBD	TBD
MENG-2			X			60 HP	TBD	TBD
MENG-3			X			60 HP	TBD	TBD
MENG-4			X			60 HP	TBD	TBD
TANK-1					Diesel Storage Tank	500 Gallons	TBD	TBD

25. Material Handling

Unit ID #	Description	Maximum Material Transferred (tpy)	Average Moisture Content	Control Technology					
	e.g. truck dump, conveyor drop, truck loading	Per point	%	None	Water Spray	Chemical Additive	Conveyor with 1/2 cover	Conveyor with 3/4 cover	Conveyor with full cover
DUSTC-1	Train Unloading DC 1	6,600,000.00	0						X
DUSTC-2	Train Unloading DC 2		0						X
DUSTC-3	Train Unloading DC 3		0						X
DUSTC-4	Train Unloading DC 4		0						X
DUSTC-8800	Sand Transfer Baghouse	6,600,000.00	0						X
Building Exhaust	Sand Storage Building	6,600,000.00	0						X
DUSTC-8303	Sand Truck Load-out Station Baghouses	6,600,000.00	0						X
DUSTC-8313	Sand Truck Load-out Station Baghouses		0						X
DUSTC-8403	Sand Truck Load-out Station Baghouses		0						X
DUSTC-8413	Sand Truck Load-out Station Baghouses		0						X
Totals:		6,600,000.00							

*Note that all material handling conveyors are designed to be covered and are equipped with a dust collection unit.
**Totals reflects the maximum total tonnage of material moved at the facility in one year.

26. Internal Combustion Engines (including emergency generators)

Unit ID #	Description	Maximum Rated Capacity (HP)	Types of Fuel(s) Used	Manufactured Date (mm/dd/yyyy)	Model Year
MENG-1	Mobile Non-Road Sand Unloading Engine	60	Diesel	TBD	TBD
MENG-2	Mobile Non-Road Sand Unloading Engine	60	Diesel	TBD	TBD
MENG-3	Mobile Non-Road Sand Unloading Engine	60	Diesel	TBD	TBD
MENG-4	Mobile Non-Road Sand Unloading Engine	60	Diesel	TBD	TBD

27. Volatile Liquid Storage Tanks

Unit ID #	Type of Liquid	Capacity (gallons)	Vapor pressure of liquid (psi)	Is the tank above or underground?	Date of Installation (if existing)
TANK-1	Diesel	500	0.009	Above	TBD

Emission Calculations

US Silica - Parshall, ND Transload Facility
Summary of Project Potential Emissions

Mobile Conveyor Emissions (tons/year)

Source	NO_X	SO_2	CO	VOC	PM	PM_{10}	$PM_{2.5}$	CO_2e	Total HAPs
Train Unloading DC 1					0.20	0.20	0.20		
Train Unloading DC 2					0.20	0.20	0.20		
Train Unloading DC 3					0.20	0.20	0.20		
Train Unloading DC 4					0.20	0.20	0.20		
Sand Unloading Engines	32.45	2.13	6.99	2.65	2.28	2.28	2.28	1206.78	0.03
Total	**32.45**	**2.13**	**6.99**	**2.65**	**3.07**	**3.07**	**3.07**	**1206.78**	**0.03**

Sand Storage Building and Loading Emissions (tons/year)

Source	NO_X	SO_2	CO	VOC	PM	PM_{10}	$PM_{2.5}$	CO_2e	Total HAPs
Sand Transfer Baghouse					1.88	1.88	1.88		
Sand Storage Building					6.89	6.89	6.89		
Sand Truck Load-out Station Baghouses					11.26	11.26	11.26		
Total	**0.00**	**0.00E+00**	**0.00**	**0.00**	**20.03**	**20.03**	**20.03**	**0**	**0.00**

Facility Grand Total (tons/year)

	NO_X	SO_2	CO	VOC	PM	PM_{10}	$PM_{2.5}$	CO_2e	Total HAPs
Total	32.45	2.13	6.99	2.65	23.10	23.10	23.10	1206.78	0.03

US Silica - Parshall, ND Transload Facility
Sand Transfer Baghouse

Quantity	Value	Units	Reference
Inlet Grain Loading:	3.0	gr/acf	Estimated
Outlet Grain Loading:	5.00E-03	gr/acf	Estimated based on similar units
Control Efficiency:	99.8%		Calculated
Hours of Operation:	8,760	hr/yr	

Emission calculations are for PM, PM10, PM2.5. All PM is filterable and < 2.5 μm diameter.

Emission Point	Exhaust Flow Rate (dscfm)	Potential to Emit (lb/hr) [1]	Potential to Emit (tpy) [2]
DUSTC-8800	10,000	0.43	1.88
Total		0.43	1.88

[1] Potential to Emit (lb/hr) = Emission Factor (gr/dscf) x Exhaust Gas Flow (dscf/hr) / 7000 gr/lb
[2] Potential to Emit (tpy) = Potential to Emit (lb/hr) x Hours of Operation (hr/yr) / 2,000 lb/ton
[3] acf is assumed to be equivalent to dscf since the process is at ambient conditions.

US Silica - Parshall, ND Transload Facility
Sand Storage Building

Quantity	Value	Units	Reference
			OSHA Permissible Exposure Limit
Building Concentration:	10	mg/m^3	(PEL) - General Industry
	0.004	gr/acf	Calculated
Hours of Operation:	8,760	hr/yr	

Emission calculations are for PM, PM10, PM2.5. All PM is filterable and < 2.5 μm diameter.

Emission Point	Exhaust Flow Rate (dscfm)	Potential to Emit (lb/hr) [1]	Potential to Emit (tpy) [2]
Building Exhaust	42,000	1.57	6.89
Total		1.57	6.89

[1] Potential to Emit (lb/hr) = Emission Factor (gr/dscf) x Exhaust Gas Flow (dscf/hr) / 7000 gr/lb
[2] Potential to Emit (tpy) = Potential to Emit (lb/hr) x Hours of Operation (hr/yr) / 2,000 lb/ton
[3] 10 mg/m^3 OSHA Permissible Exposure Limit (PEL) - General Industry

10 mg	1 m^3	0.015432 gr
m^3	35.3147 ft^3	1 mg

[4] acf is assumed to be equivalent to dscf since the process is at ambient conditions.

US Silica - Parshall, ND Transload Facility
Sand Loadout

Quantity	Value	Units	Reference
			Vendor specification - Pebco Model 260
Inlet Grain Loading:	3.0	gr/acf	Integral Dust Collector listed "2-5 gr/acf"
Outlet Grain Loading:	0.050	gr/acf	Estimated based on similar units.
Control Efficiency:	98.3%		Calculated
Hours of Operation:	8,760	hr/yr	

Emission calculations are for PM, PM10, PM2.5. All PM is filterable and < 2.5 μm diameter.

Emission Point	Exhaust Flow Rate (acfm)	Potential to Emit (lb/hr) [1]	Potential to Emit (tpy) [2]
DUSTC-8303	1500	0.64	2.82
DUSTC-8313	1500	0.64	2.82
DUSTC-8403	1500	0.64	2.82
DUSTC-8413	1500	0.64	2.82
Total		2.57	11.26

[1] Potential to Emit (lb/hr) = Emission Factor (gr/dscf) x Exhaust Gas Flow (dscf/hr) / 7000 gr/lb
[2] Potential to Emit (tpy) = Potential to Emit (lb/hr) x Hours of Operation (hr/yr) / 2,000 lb/ton
[3] acf is assumed to be equivalent to dscf since the process is at ambient conditions.

US Silica - Parshall, ND Transload Facility
Sand Unloading

Quantity	Value	Units	Reference
Inlet Grain Loading:	3.0	gr/acf	Estimated
Outlet Grain Loading:	9E-03	gr/acf	Vendor specifications [3]
Control Efficiency:	99.7%		Calculated
Hours of Operation:	8,760	hr/yr	

Emission calculations are for PM, PM10, PM2.5. All PM is filterable and < 2.5 μm diameter.

Emission Point	Exhaust Flow Rate (dscfm)	Potential to Emit (lb/hr) [1]	Potential to Emit (tpy) [2]
DUSTC-1	600	0.04	0.20
DUSTC-2	600	0.04	0.20
DUSTC-3	600	0.04	0.20
DUSTC-4	600	0.04	0.20
Total		0.18	0.79

[1] Potential to Emit (lb/hr) = Emission Factor (gr/dscf) x Exhaust Gas Flow (dscf/hr) / 7000 gr/lb
[2] Potential to Emit (tpy) = Potential to Emit (lb/hr) x Hours of Operation (hr/yr) / 2,000 lb/ton
[3] Vendor specifications provided a grain loading of 15-20 mg/m^3 or an efficiency of+99% at an air flow rate of 600 cfm.

20 mg	1 m^3	0.015432 gr
m^3	35.3147 ft^3	1 mg

[4] acf is assumed to be equivalent to dscf since the process is at ambient conditions.

US Silica - Parshall, ND Transload Facility
Sand Unloading Engines

Quantity	Value	Units	Reference
Power per Engine	60	HP	Vendor Specifications [4]

Source	Max. Hrly Rate (MMBtu/hr)	Max. Annual Rate (MMBtu/yr)	Pollutant	Emission Factor (lb/MMBtu)	Quantity	Control Efficiency	Emissions (lb/hr)	Emissions (ton/yr)	Reference & Comments
	0.42	3679.2	PM/PM10/PM2.5	3.10E-01	4	0	0.52	2.28	[1]
	0.42	3679.2	SOx	2.90E-01	4	0	0.49	2.13	[1]
	0.42	3679.2	NOx	4.41E+00	4	0	7.41	32.45	[1]
	0.42	3679.2	CO2	1.64E+02	4	0	275.52	1206.78	[1]
	0.42	3679.2	CO	9.50E-01	4	0	1.60	6.99	[1]
	0.42	3679.2	TOC				0.60	2.65	[1]
	0.42	3679.2	Exhaust	3.50E-01	4	0	0.59	2.58	
	0.42	3679.2	Evaporative	0.00E+00	4	0	0.00	0.00	
	0.42	3679.2	Crankcase	1.00E-02	4	0	0.02	0.07	
	0.42	3679.2	Refueling	0.00E+00	4	0	0.00	0.00	

HAPs	Diesel (lb/MMBtu)	Capacity (MMBtu/hr)	Potential to Emit (lb/hr)	Potential to Emit (ton/yr)	Projected Actual Emissions (ton/year)	Reference & Comments
Acetaldehyde	7.67E-04	1.68E+00	1.29E-03	5.64E-03	5.64E-03	[2]
Acrolein	9.25E-05	1.68E+00	1.55E-04	6.81E-04	6.81E-04	[2]
Benzene	9.33E-04	1.68E+00	1.57E-03	6.87E-03	6.87E-03	[2]
Formaldehyde	1.18E-03	1.68E+00	1.98E-03	8.68E-03	8.68E-03	[2]
Toluene	4.09E-04	1.68E+00	6.87E-04	3.01E-03	3.01E-03	[2]
Xylenes	2.85E-04	1.68E+00	4.79E-04	2.10E-03	2.10E-03	[2]
PAH	1.68E-04	1.68E+00	2.82E-04	1.24E-03	1.24E-03	[2]
Total HAP			**0.01**	**0.03**	**0.03**	

[1] AP-42, Table 3.3-1 Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines
Assume PM10 = PM = PM2.5
Assume an average brake-specific fuel consumption rate of 7000 Btu/hp-hr

[2] AP-42, Table 3.3-2 Speciated Organic Compound Emission Factors for Uncontrolled Diesel Engines
Assume an average brake-specific fuel consumption rate of 7000 Btu/hp-hr

[3] hp-hr to MMBtu/hr

	hp-hr	1000000	Btu
7000	Btu		MMBtu

[4] There will be four mobile non-road engines onsite.

[5] Assume that combined TOC is equivelant to total VOC emissions for the diesel engines.

Endangered Species Act Documentation

Endangered Species Act Documentation

A list of federally-listed species potentially occurring in the vicinity of the proposed project was obtained through the United States Fish and Wildlife Service (USFWS) Information, Planning, and Conservation System (IPaC) online program on November 20, 2015. Nine species listed as threatened, endangered, or candidate were identified in the official species listed generated through the IPaC request:

Common Name	**Scientific Name**	**Federal Status**
Least Tern	*Sterna antillarum*	Endangered
Whooping Crane	*Grus americana*	Endangered
Pallid Sturgeon	*Scaphirhynchus albus*	Endangered
Gray Wolf	*Canis lupus*	Endangered
Piping Plover	*Charadrius melodus*	Threatened
Sprague's Pipit	*Anthus spragueii*	Candidate
Red Knot	*Calidris canutus rufa*	Threatened
Dakota Skipper	*Hesperia dacotae*	Threatened
Northern long-eared bat	*Myotis septentrionalis*	Threatened

Through both desktop review and a field assessment of suitable habitat, the proposed project is anticipated to have no effect on federally listed species due to lack of suitable habitat and high levels of existing human disturbance.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
North Dakota Ecological Services Field Office
3425 MIRIAM AVENUE
BISMARCK, ND 58501
PHONE: (701)250-4481 FAX: (701)355-8513
URL:
www.fws.gov/northdakotafieldoffice/endspecies/endangered_species.htm

Consultation Code: 06E15000-2016-SLI-0023 November 20, 2015
Event Code: 06E15000-2016-E-00049
Project Name: U.S. Silica Parshall Transload Facility

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: U.S. Silica Parshall Transload Facility

Official Species List

Provided by:

North Dakota Ecological Services Field Office
3425 MIRIAM AVENUE
BISMARCK, ND 58501
(701) 250-4481
http://www.fws.gov/northdakotafieldoffice/endspecies/endangered_species.htm

Consultation Code: 06E15000-2016-SLI-0023
Event Code: 06E15000-2016-E-00049

Project Type: TRANSPORTATION

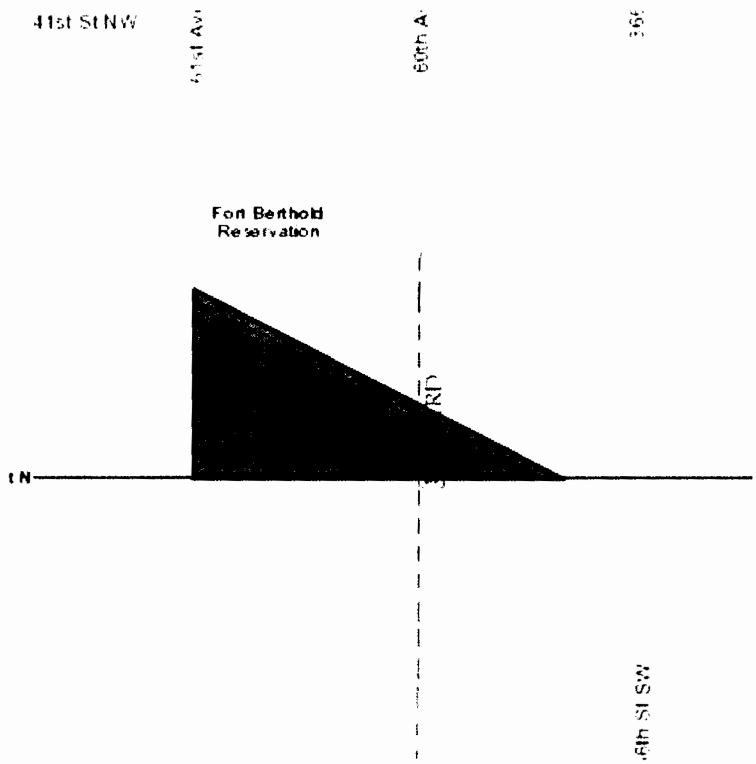
Project Name: U.S. Silica Parshall Transload Facility
Project Description: U.S. Silica (USS) is proposing construction of a new rail transload facility to transport silica sand from rail
cars to trucks near Parshall, North Dakota. Construction of the transload facility would include installation of a
new rail line parallel and adjacent to the existing Canadian Pacificâs railway and a new rail loop to be used for loading and unloading rail cars. USS would plan to build a offloading building where sand would be sorted and stockpiled by grade.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

United States Department of Interior
Fish and Wildlife Service

Project name: U.S. Silica Parshall Transload Facility

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-101.89324608509196 47.989871692559994, -101.89335337345256 47.977735386234414, -101.85757313214708 47.977771584237395, -101.89324608509196 47.989871692559994)))

Project Counties: Mountrail, ND | Ward, ND

Endangered Species Act Species List

There are a total of 9 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	**Status**	**Has Critical Habitat**	**Condition(s)**
Least tern *(Sterna antillarum)* Population: interior pop.	Endangered		
Piping Plover *(Charadrius melodus)* Population: except Great Lakes watershed	Threatened	Final designated	
Red Knot *(Calidris canutus rufa)*	Threatened		
Sprague's Pipit *(Anthus spragueii)*	Candidate		
Whooping crane *(Grus americana)* Population: except where EXPN	Endangered	Final designated	
Fishes			
Pallid sturgeon *(Scaphirhynchus albus)* Population: Entire	Endangered		
Insects			
Dakota Skipper *(Hesperia dacotae)*	Threatened	Final designated	
Mammals			
Gray wolf *(Canis lupus)* Population: U.S.A.: All of AL, AR, CA, CO,	Endangered		

CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico.			
Northern long-eared Bat *(Myotis septentrionalis)*	Threatened		

Critical habitats that lie within your project area

There are no critical habitats within your project area.

National Historic Preservation Act Documentation

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A Class I and Class III Cultural Resource Inventory of the U.S. Silica Parshall Transload Facility, Mountrail and Ward Counties, North Dakota

Submitted to

State Historical Society of North Dakota

Prepared for

Barr Engineering Company

Prepared by

SWCA Environmental Consultants

October 2015

MANUSCRIPT DATA RECORD FORM

1. Manuscript Number:

2. SHPO Reference #:

3. Author(s): Carolyn Riordan

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5. Report Date: October 2, 2015

6. Number of Pages: 51

7. Type – I, T, E, O: I

8. Acres: 61.75

9. Legal Location(s) (no quarter sections) with Historic Context Study Unit(s): Consult the township tables in *The North Dakota Comprehensive Plan for Historic Preservation: Archeological Component*, (SHSND 2008; available at http://history.nd.gov/hp/hpforms.html) for Study Unit assignments.
   Study Units: LM, CB, KN, HE, SM, GA, JA, GR, NR, SR, SO, SH, YE

COUNTY	TWP	RNG	SEC	SU
Mountrail	152N	88W	13	GA
Ward	152N	87W	18	GA

A Class I and Class III Cultural Resource Inventory of the U.S. Silica Parshall Transload Facility, Mountrail and Ward Counties, North Dakota

Submitted to:

State Historical Society of North Dakota
612 East Boulevard Avenue
Bismarck, North Dakota 58505

Prepared for:

Barr Engineering Company
4700 West 77th Street, Suite 200
Minneapolis, Minnesota 55435

Prepared by:

Carolyn Riordan

Principal Investigator:

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SWCA Environmental Consultants
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Bismarck, North Dakota 58501

SWCA Cultural Resource Report Number 15-517

October 2, 2015

ABSTRACT

SWCA Environmental Consultants (SWCA) conducted a Class I and Class III cultural resource inventory on behalf of Barr Engineering Company (Barr) in support of the U.S. Silica Parshall Transload Facility project. U.S. Silica proposes to construct a transload facility in Mountrail and Ward Counties, North Dakota. The proposed project is located within the exterior boundaries of the Fort Berthold Indian Reservation; however, it is located entirely on fee lands.

Based on information provided by Barr, it is anticipated that the only federal agency potentially involved with the project is the U.S. Army Corps of Engineers (USACE) through the Clean Water Act, because a Section 404 Individual Permit is potentially required. Therefore, the inventory was conducted in compliance with Section 404 of the Clean Water Act and Section 106 of the National Historic Preservation Act. The cultural resource inventory report is being submitted to the State Historical Society of North Dakota for review; however, it may be submitted to the U.S. Army Corps of Engineers at a later date, as part of a Section 404 Individual Permit, should it be required.

The Class I inventory was conducted on August 10, 2015, and the Class III inventory was conducted on August 27, 2015. The Class III inventory consisted of a 200-foot-wide buffer surrounding portions of the project that cross wetlands or potential waters of the U.S. (potentially jurisdictional areas) under the jurisdiction of the U.S. Army Corps of Engineers. The survey was located in Section 13, Township (T) 152 North (N), Range (R) 88 West (W), and Section 18, T152N, R87W. Two potentially jurisdictional areas were inventoried, and in total, 61.75 acres were surveyed for the project.

The Class I file search identified one cultural resource (32WD1667) within the proposed transload facility study area, but not within the survey area. During the Class III inventory, no cultural resources were newly observed. 32WD1667 is a segment of a historic railroad, recommended eligible for the National Register of Historic Places. According to a recent addendum to the North Dakota State Historic Preservation Office manual, the railroad segment does not require recordation. No further work is recommended for this resource. It is recommended that the project be granted a determination of *No Historic Properties Affected* and clearance to proceed as planned.

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INTRODUCTION

This report presents the results of a Class I and Class III cultural resource inventory conducted by SWCA Environmental Consultants (SWCA) on behalf of Barr Engineering Company (Barr) in support of the U.S. Silica Parshall Transload Facility project. U.S. Silica proposes to construct a transload facility in Mountrail and Ward Counties, North Dakota. The project is located within the exterior boundaries of the Fort Berthold Indian Reservation; however, as proposed, is located entirely on fee land.

Based on information provided by Barr, it is anticipated that the only federal agency potentially involved with the project is the U.S. Army Corps of Engineers (USACE) through the Clean Water Act. Although the project as a whole does not fall under the jurisdiction of any federal or state agency, Barr retained SWCA to complete a Class I cultural resource inventory for the entire proposed study area, and a Class III cultural resource inventory for portions of the study area that cross wetlands or potential waters of the U.S. (potentially jurisdictional area) under USACE jurisdiction, because a Section 404 Individual Permit is potentially required. Therefore, the survey was conducted in compliance with Section 404 of the Clean Water Act and Section 106 of the National Historic Preservation Act.

The Class III survey area is located in the W½ NE¼ SE¼, E½ NW¼ SE¼, E½ SW¼ SE¼, and W½ SE¼ of Section 13, Township (T) 152 North (N), Range (R) 88 West (W), and the SW¼ SW¼ and the SW¼ NW¼ SW¼ of Section 18, T152N, R87W. The proposed transload facility location/study area and survey area are illustrated in Figure 1, and represented on Wabek (1980) and Makoti (1980), North Dakota, U.S. Geological Survey 7.5-minute quadrangles. Two irregularly shaped parcels (41.3 and 20.45 acres, respectively) were inventoried, consisting of a 200-foot-wide buffer surrounding potentially jurisdictional wetland areas (labelled "field verified wetlands" on Figure 1). In total, 61.75 acres were surveyed for the project.

For the cultural resource investigation, William Harding served as principal investigator. Fieldwork was completed on August 27, 2015, by Matthew Cox and Debra McCarthy. All field notes and photographs are on file at SWCA's Bismarck, North Dakota, office under project number 34017. The cultural resource inventory report is being submitted to the State Historical Society of North Dakota (SHSND) for review; however, it may be submitted to the USACE at a later date, as part of a Section 404 Individual Permit, should it be required.

Contains Privileged Information -- Do Not Release

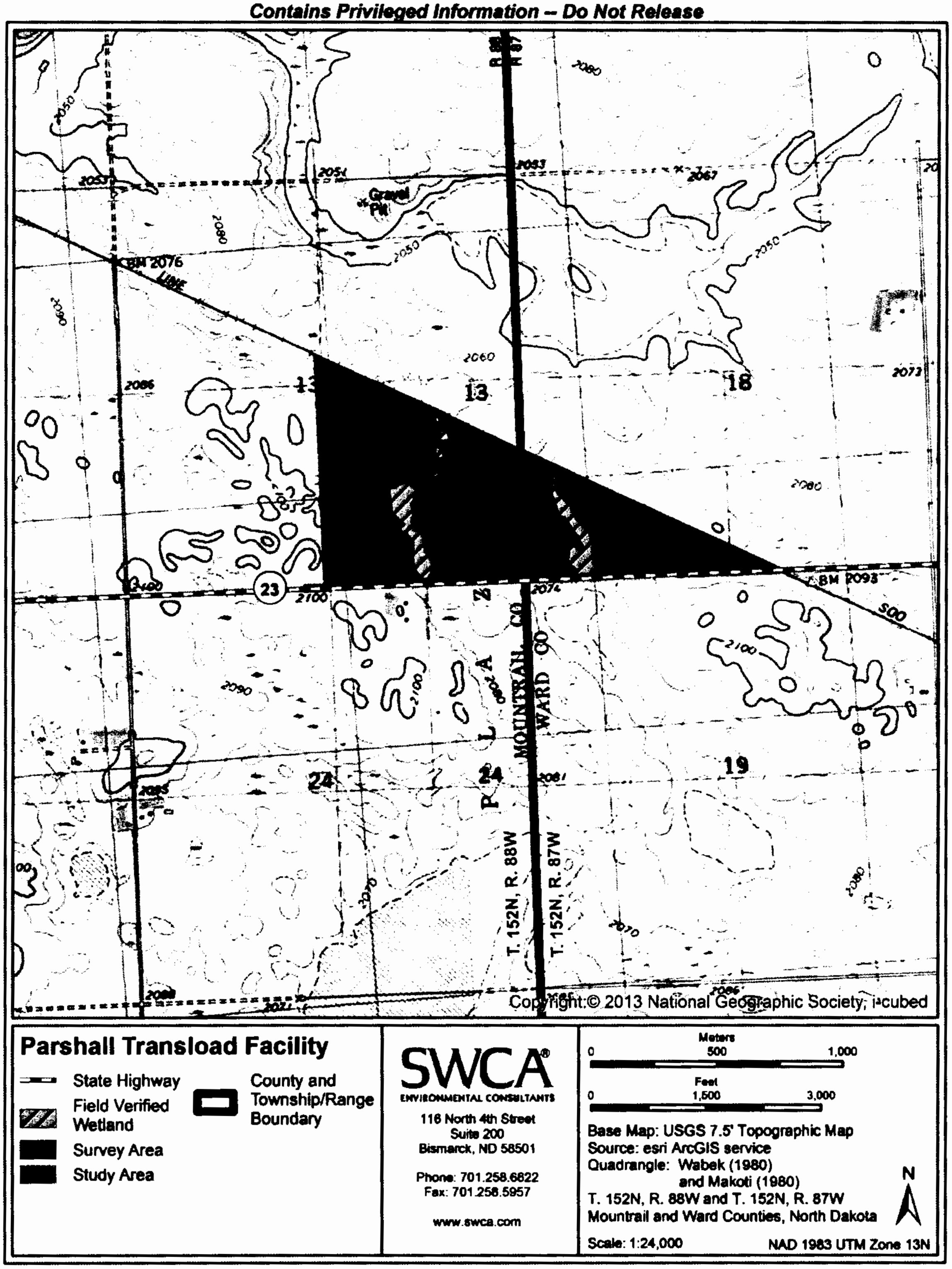

Figure 1. Map showing the study area, survey area, and field verified wetlands.

PROJECT SETTING

TOPOGRAPHY

The study area is located in the glaciated Missouri Plateau section of the Interior Plains physiographic province (Fenneman 1931) in west-central North Dakota. The glaciated Missouri Plateau section is characterized by old plateaus and isolated mountains (Fenneman 1931). The area can be further characterized by the Level IV ecoregion: Glaciated Dark Brown Prairie (Bryce et al. 1996). The Glaciated Dark Brown Prairie is defined by glacial till over tertiary sandstone and shale, and is dominated by level to gently rolling plains sloping toward the Missouri River, with established drainage patterns (Bryce et al. 1996). Specifically, the study area is on a relatively flat plain, with elevation ranging minimally from approximately 2,070 to 2,090 feet above sea level (Figure 2).

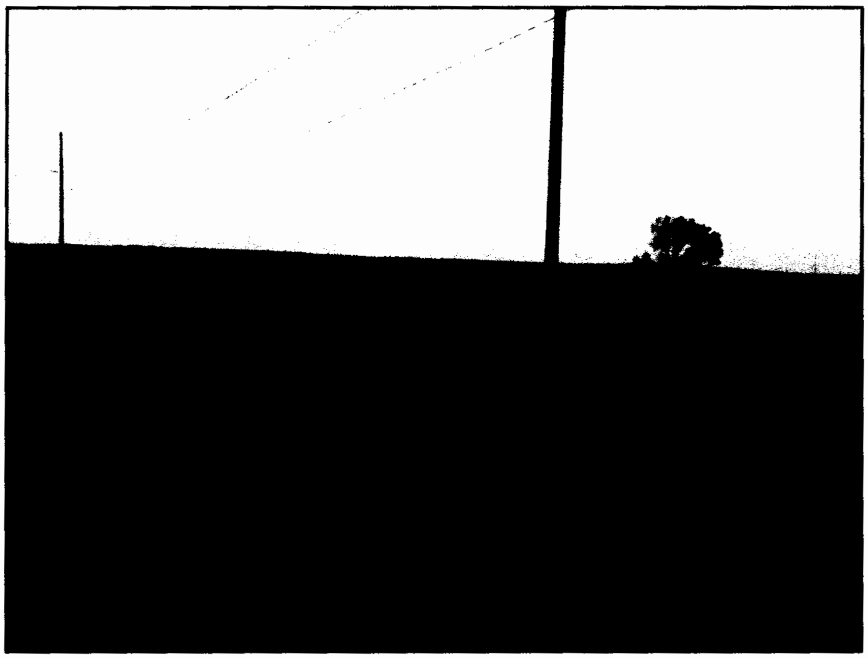

Figure 2. Study area topography from the southern portion of the western survey area, facing northwest.

CLIMATE

The climate for west-central North Dakota is temperate. Based on climatic data collected from the Max, North Dakota, weather station between 1981 and 2010, January is the coldest month, with a mean daily temperature of 10.0 degrees Fahrenheit (°F), whereas July is the warmest month, with a mean daily temperature of 69.3°F (National Climatic Data Center [NCDC] 2015). Temperature extremes on record range from 0.2°F at the coldest to 81.8°F at the warmest (NCDC 2015). On average, 126 days are frost-free (28°F or above); the average date of the first fall frost is September 18, and the average date of the last spring frost is May 15 (North Dakota Agricultural Statistics Service 2010). Per annum, Max receives 18.08 inches of precipitation (NCDC 2015). The wettest month is June, with an average of 3.66 inches of precipitation received; February is the driest, with only 0.42 inch of precipitation received on average (NCDC 2015).

Overall, west-central North Dakota, like much of the northwestern Great Plains, is characterized by a moderate to cool climate, with cold, dry winters and mild to warm, dry to moderately wet summers.

HYDROLOGY

The study area surrounds two wetlands/potentially jurisdiction areas. Generally, the study area is located in the Missouri River watershed, and is approximately 0.5 mile south of Shell Creek. Shell Creek drains into the Van Hook Arm of the Lake Sakakawea portion of the Missouri River approximately 19.5 miles southwest of the study area.

GEOLOGY

In general, the geology of the study area is characterized primarily by the Glacial Sediment-Collapsed Glacial Sediment. This geographical unit in the study area dates to the Holocene to Pleistocene epochs, and consists of an unbedded, unsorted mixture of clay, silt, sand, and pebbles, with a few cobbles and boulders, as thick as 100 feet (Clayton 1980).

SOILS

Seven soil series are present in the study area, and the dominant soil parent material is fine-loamy till (Natural Resources Conservation Service 2015). The dominant soil series is the Williams-Bowbells loams, comprising approximately 50 percent of the study area, followed by the Williams-Zahl-Zahill complex, comprising approximately 26 percent of the study area. Table 1 summarizes the soils in the study area from most to least prevalent.

Table 1. Summary of Soil Series in the Study Area

Soil Series	Parent Material	Drainage	Slope	Landform
Williams-Bowbells loams	Fine-loamy till	Well drained	0%–6%	Rises
Williams-Zahl-Zahill complex	Fine-loamy till	Well drained	6%–9%	Rises
Hamerly-Tonka complex	Fine-loamy till	Somewhat poorly drained	0%–3%	Flats
Tonka silt loam	Alluvium over till	Poorly drained	0%–1%	Depressions
Hamerly loam	Fine-loamy till	Somewhat poorly drained	0%–3%	Flats
Zahl-Williams loams	Fine-loamy till	Well drained	9%–15%	Hills, ridges
Parnell silty clay loam	Alluvium	Very poorly drained	0%–1%	Depressions

Source: Natural Resources Conservation Service (2015).

FLORA AND FAUNA

The study area is in the Glaciated Dark Brown Prairie ecoregion, characterized by a complex stream drainage pattern. Vegetation known to the ecoregion includes such species as western wheatgrass (*Pascopyrum smithii*), needle and thread (*Hesperostipa comata*), green needlegrass (*Nassella viridula*), and blue grama (*Bouteloua gracilis*) (Bryce et al. 1996). Figure 3 illustrates vegetation observed in the study area.

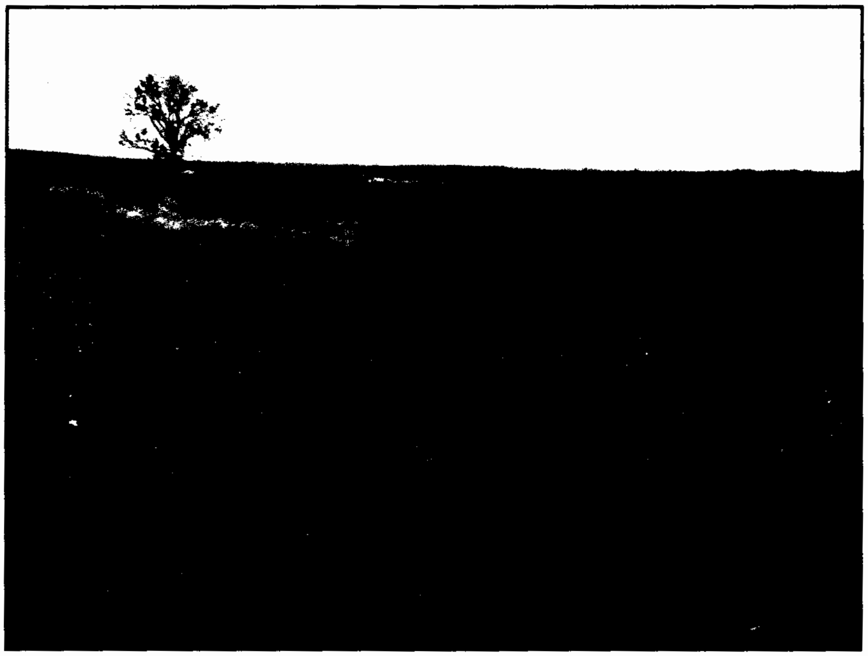

Figure 3. Study area vegetation from Highway 23, facing northeast.

Approximately 160 wildlife species are resident or seasonal visitors to the Missouri River ecosystem, and hundreds of native fish species live in the mainstem and tributaries. Some of the animal species that would have been common and available for human use in the Missouri River Valley area—both prehistorically and historically—include fur-bearing mammals such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), eastern cottontail (*Sylvilagus floridanus*), elk (*Cervus elaphus*), moose (*Alces alces*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), and bison (*Bison bison*), as well as bird and waterfowl species such as mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), sharp-tailed grouse (*Tympanuchus phasianellus campestris*), golden eagle (*Aquila chrysaetos*), and bald eagle (*Haliaeetus leucocephalus*) (Seabloom et al. 1978).

At present, seven federally listed threatened or endangered species reside in Mountrail and Ward Counties—the least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), whooping crane (*Grus americana*), Dakota skipper (*Hesperia dacotae*), rufa red knot (*Calidris canutus rufa*), northern long-eared bad (*Myotis septentrionalis*), and pallid sturgeon (*Scaphirhynchus albus*) (U.S. Fish and Wildlife Service 2015).

ENVIRONMENTAL CONSTRAINTS

Preservation of archaeological materials in or adjacent to the study area has been impacted largely by erosion due to agricultural practices as well as natural erosion, including ongoing alluvial processes. Other sources of impact to archaeological resources include road construction, vehicle traffic, transmission line installation and upkeep, and railroad use and maintenance. Some oil and gas development has occurred near the study area and is presently increasing as demand for domestic energy sources has grown in recent years. In some places, these varied land uses have resulted in increased ground visibility and removal of overburden, allowing for the identification of numerous sites and an interpretation of high site density. In other cases, though, it has simply removed the archaeological materials and resulted in the identification of low site densities. In combination, these factors may have disrupted the contexts of a moderate percentage of cultural materials.

CULTURAL HISTORICAL OVERVIEW

PREHISTORIC CONTEXTS

No definitive prehistoric context is available for the northern Great Plains or Missouri River regions. The following discussion incorporates a variety of sources to develop a prehistoric overview for the work conducted for this project and includes information from the Garrison Study Unit (GSU) in which the study area is located (Gregg and Bleier 2008). As of 2007, 3,303 archaeological sites were identified in the GSU, most of which were identified on ridges (40.5 percent); hills, bluffs, and knolls (24.0 percent); and terraces (10.4 percent) (Gregg and Bleier 2008).

Paleoindian Tradition (ca. 11,500–7,900 years before present [B.P.])

Although speculation exists regarding the possibility of earlier habitation of the Great Plains, the Paleoindian tradition is the oldest of the region, and, in general, is associated with a hunting and gathering adaptation (Gregg 1985). The Paleoindian tradition is subdivided here into six main complexes: Clovis, Goshen, Folsom, Hell Gap/Agate Basin, Alberta/Cody, and Parallel Oblique Flaked. Fourteen Paleoindian archaeological resources have been identified in the GSU (Gregg and Bleier 2008). Paleoindian sites in the GSU include the Beacon Island site (32MN234A), the Beacon Island Agate Basin site (32MN234), the Moe site (32MN101), and 32ME946.

The Clovis complex (ca. 11,500–10,800 B.P.), defined by large, fluted lanceolate projectile points, is the earliest unequivocal complex in North America. Clovis artifacts have been found with megafauna, such as mammoth, in buried contexts in the Southwest and Great Plains (Grayson and Meltzer 2002); however, although megafauna were probably dietary constituents, it is debated to what degree Early Paleoindians pursued large game (Cannon and Meltzer 2004; Grayson and Meltzer 2002). In the South Dakota Badlands, the Lange-Ferguson site yields the best evidence for proboscidean exploitation (Hannus 1990). Here, modified mammoth bones are directly associated with a flake, and three projectile points were recovered from deposits similar to those containing mammoth, indicating that Clovis hunter-gatherers either killed the animals or scavenged their carcasses (Hannus 1990). Skeletal remains from a single mammoth were unearthed during building construction in 1988 near Powers Lake within the GSU. These remains were shallowly buried, were not radiocarbon dated, and were not appraised for the potential of associated cultural remains (Gregg and Bleier 2008). Few Clovis sites have been recorded in the region. Clovis artifacts were recovered from two sites, a single Clovis point base was recovered from 32ME946 (Floodman 1988), and Clovis points have been recovered from the Beacon Island Agate Basin site (Ahler 2003).

Goshen (ca. 10,900–10,100 B.P.) is a technological complex first identified at Hell Gap, Wyoming (Irwin 1967, 1971), but it is also found at Mill Iron, Montana, Carter-Kerr/McGee, Wyoming, and the Jim Pitts site, located in the South Dakota Black Hills (Sellet 2001). Goshen is poorly understood—the basally thinned, unfluted projectile points share affinities with both Clovis and Folsom, but are also similar to Southern Plains Plainview points. In stratified deposits, Goshen materials typically underlie Folsom (Frison et al. 1996). Plainview or Goshen points were recovered from the Moe site in the GSU (Gregg and Bleier 2008).

The Folsom complex (ca. 10,900–10,200 B.P.) is typified by distinctive, fluted, lanceolate projectile points. With most large grazers extinct by Folsom times and grasslands dominating the Great Plains, bison populations flourished, providing resources for Folsom hunters (Frison 1991). However, many high elevation Folsom sites also demonstrate broad diets of diverse small prey (Hill 2007). Probable structures recorded at the Mountaineer and Barger Gulch sites in Colorado suggest long-term occupations in mountain settings (Stiger 2006; Surovell and Waguespack 2007). In North Dakota, there are numerous documented Folsom sites (Gregg 1985), including the Bobtail Wolf (32DU955A), Big Black (32DU955C), and Young-Man-Chief (32DU955D) sites (Root 2000; Shifrin 2000; William 2000). These sites are interpreted as camps, quarries, and lithic workshops where Knife River flint was procured and used for tool production. In the GSU, Folsom points were recovered from the Moe (32MN101) and Beacon Island Agate Basin (32MN234) sites (Gregg and Bleier 2008).

Both the Agate Basin (ca. 10,500–10,000 B.P.) and Hell Gap (ca. 10,000–9,500 B.P.) techno-complexes are typified by lanceolate projectile points with thick lenticular cross sections (Frison 1991). Based on morphological similarities and stratigraphic evidence, Hell Gap is technologically descended from Agate Basin. Agate Basin and Hell Gap hunter-gatherers were probably specialized bison hunters. Sites like Agate Basin II (Hill 2001) and Casper (Todd et al. 1997) indicate more frequent extraction of marrow and within-bone nutrients, suggesting a greater focus on planning than previously evident. Some sites associated with this tradition have been recorded in North Dakota and South Dakota, but these mainly consist of isolated and surface finds (Gregg 1985). One of the most significant Paleoindian sites in the GSU is the Beacon Island Agate Basin site (Ahler 2003). Agate Basin points have also been recovered from the Moe site, and an isolated Knife River flint Agate Basin point was recorded at 32ME946 (Gregg and Bleier 2008).

Alberta (9800–9000 B.P.) is a poorly dated technology complex that probably descends from Hell Gap and is documented at the Hell Gap, Wyoming, and Hudson-Meng, Nebraska, sites (Agenbroad 1978; Frison 1991). Hudson-Meng is one of the largest documented bison kills and suggests that Alberta people focused on bison hunting (Agenbroad 1978); however, more recent work suggests that humans were not responsible for killing the bison and that they died of a natural event (Todd and Rapson 1999). The Cody complex (9200–8800 B.P.), which includes stemmed/shouldered Eden and Scottsbluff projectile points and the distinctive Cody knife, apparently arose from the Alberta complex (Frison 1991). These sites are widespread across the northwestern and central

Great Plains, with components at the Wyoming Horner I, Finley, and Medicine Lodge Creek sites (Frison and Todd 1986; Frison and Walker 2007) and the Mammoth Meadows, Myers-Hindman, and MacHaffie sites in Montana (Davis 1993). Such sites indicate that Cody adaptations were diverse and used large fauna as well as small prey and floral resources (Frison et al. 1996; Galvan 2007). Alberta/Cody sites have been recorded in North Dakota and South Dakota. In fact, Hudson-Meng contains extensive Knife River flint, showing a strong connection to the Missouri River region. A single Scottsbluff point was recorded at the Moe site, and Metcalf et al. (1988) recorded a probable Alberta point as an isolated find near Scorio Creek.

The Parallel Oblique Flaked complex is a catch-all grouping of Paleoindian projectile point types (Gregg 1985), including Angostura, Milnesand, Browns Valley, Lusk, Allen, and Frederick; these range in age from ca. 9400 to 7900 B.P. All types are lanceolate with parallel oblique flaking. Bison kill-butcheries became rare on the northwestern and northern Great Plains after ca. 8000 B.P. (Frison 1998), perhaps due to severe ecological deterioration that could no longer support large bison populations. Complex excavated and surface sites have been recorded in the Dakotas, including sites on the Missouri River. In the GSU, six archaeological resources defined under the general "Plano" category have been identified (Gregg and Bleier 2008).

Plains Archaic Tradition (ca. 8000–1500 B.P.)

The transition from Paleoindian to Archaic is archaeologically visible as an abrupt shift to large notched projectile points (Frison 1991), perhaps indicating a shift to atlatl propelled darts from hand-thrown spears. This transition is also associated with warming/drying trends that prompted diverse subsistence adaptations among hunter-gatherers (Carlson 1994). Ground stone appears in the Archaic, suggesting a greater focus on processing floral resources. In conjunction with the appearance of pithouses and storage pits in the western intermontane basins, this suggests a shift in subsistence base, a reduction in overall residential mobility, and more predictable seasonal rounds (Frison 1991). The Plains Archaic tradition is subdivided here into four main complexes: Logan Creek/Mummy Cave, Oxbow, McKean, and Pelican Lake. In the GSU, 96 Archaic archaeological resources have been identified. Thirty-one of these are from unspecified associations (Gregg and Bleier 2008). Important Archaic-age sites in the GSU include the Mondrian Tree site (32MZ58) and the Moe site (32MN101).

The Logan Creek/Mummy Cave complex (5600–4000 B.P.) is the earliest example of large side-notched projectile points on the northern Great Plains. The blending of the Logan Creek and Mummy Cave for this complex is due to varied nomenclature used among archaeologists regionally for similar archaeological complexes (Gregg 1985). Settlement types associated with this complex include bison kills, transient camps, and some stone circle sites. Four archaeological resources containing large side-notched projectile point varieties have been identified in the GSU (Gregg and Bleier 2008).

The Oxbow complex (5000–4000 B.P.), typified by side-notched, deeply concave-based projectile points, is concentrated in northern Montana, Alberta, and Saskatchewan (Hannus 1994:180), but is also quite common in North and South Dakota, with numerous sites along the Missouri River and its tributary system. Oxbow subsistence apparently centered on bison, and sites include bison impoundments and jumps, encampments on stream terraces, stone circles, and processing areas (Hannus 1994; Reeves 1969). However, numerous birds and small mammals were probably exploited (Aaberg et al. 2006:174). Some northern Great Plains sites further yield evidence of complex cultural behavior, including bundle burials with elaborate grave goods (Bryan 1991). Four Oxbow archaeological resources have been identified in the GSU (Gregg and Bleier 2008).

The McKean complex (ca. 4500–3400 B.P.) encompasses three distinct subphases—the McKean lanceolate, Duncan, and Hannah. The McKean complex is widespread across the Great Plains, and sites from this period can be found associated with bison kills, stone circles, lithic caching, and seasonal settlements (Frison 1991). Slab-lined pit hearths are common, as are ground stone artifacts, suggesting a greater reliance on plant resources (Carlson 1994; Frison 1991). McKean complex sites often demonstrate evidence of lithic raw material exchange, including Swan River chert, Tongue River silicified sediment, and Knife River flint (Gregg 1985). In the GSU, 23 archaeological resources dating to the McKean complex have been identified (Gregg and Bleier 2008).

The Pelican Lake complex (ca. 3000–2700 B.P.), typified by broad, thin corner-notched projectile points, is likely a descendant of the McKean complex and is found across the northern and central Great Plains (Frison 1991). This wide spatial distribution may indicate significant population growth in response to the favorable moist conditions of the Sub-Atlantic episode (Reeves 1983). Numerous communal bison kills, such as Head-Smashed-In (Frison 1991), indicate communal bison hunting, but this does not suggest it was an exclusive feature of their subsistence. Rather, Pelican Lake populations probably relied on a broad-based economy across diverse ecozones (Hannus 1994). Thirty-four Pelican Lake archaeological resources have been identified in the GSU (Gregg and Bleier 2008).

Plains Woodland Tradition (ca. 2000–450 B.P.)

Temporally overlapping with the Plains Late Archaic, the Plains Woodland tradition is characterized by increased sedentism, garden horticultural activity, expanding regional exchange networks with eastern Woodland populations (Adena and Hopewell), and the elaboration of ceremonial activities and mortuary practices, specifically mound burials (Griffin 1967). Significant technological advances such as bow and arrow and ceramics-use are also apparent (Gregg 1985); however, the fundamental subsistence strategies of the Plains Woodland did not drastically differ from their Archaic predecessors (Zimmerman 1985). It is assumed that this tradition saw the beginning of horticultural practices in the region. For the purposes of this study, the complexes classed as belonging to the Plains Woodland are Besant, Sonota, Laurel, Avonlea, Old Woman's, and Blackduck. The Besant and Sonata complexes are well represented in the GSU (Gregg and Bleier 2008). Of the 184 Woodland sites in the GSU, 119 are unspecified and 37 are Besant- and/or Sonata-age sites (Gregg and Bleier 2008).

The Besant complex (ca. 2000–1500 B.P.), typified by small- to medium-sized side-notched triangular projectile points, represents the earliest presence of ceramics in North Dakota, probably resulting from eastern woodland influence (Walde 2006). Besant ceramics are more common in the eastern half of the Dakotas; the vessels show a basic conoidal shape and suggest lump modeling manufacture with some coarse cording (Wood and Johnson 1973). Besant sites show extensive use of Knife River flint (Reeves 1970). Site types include stone circle sites, habitations on stream and river terraces, and bison kills. Numerous communal kill sites, including the Ruby bison pound in Wyoming (Frison 1991), suggest that Besant people were sophisticated bison hunters. The Sonota complex (1850–1350 B.P.) appears to be a possible sub-complex of Besant, but differs in that burial mounds are common at Sonota sites (Reeves 1983; Wood 1967). These mounds include rectangular subfloor pits/tombs with dismembered bodies and, commonly, articulated bison remains (Johnson and Johnson 1998). The presence of associated exotic artifacts is often cited as evidence of Hopewell influence on Middle Plains Woodland populations (Johnson and Johnson 1998). In the GSU, 37 Besant/Sonota archaeological resources have been identified, including at 32DU2, the Twin Buttes site (32DU32/32ME617), and 32ME254.

Sites from the Laurel complex (2100–850 B.P.) are generally found in the eastern portions of North Dakota, northern Minnesota, and southern Canada. Laurel pottery and mound building are fairly distinct, but lithics associated with this complex tend to be various and lack a particular style (Gregg 1985).

Avonlea complex (ca. 1800–1000 B.P.) sites occur across the northern Great Plains and are contemporaneous with Besant. This complex includes a variety of site types, including stone circles, bison kills, and rock shelter habitations (Reeves 1970). Avonlea represents the first regional complex to produce arrow points exclusively, suggesting a transition to bow and arrow technology (Frison 1988). Avonlea point types are small and indistinctly side-notched. Saskatchewan Basin Complex: Early Variant pottery is found at Avonlea sites (Byrne 1973). Avonlea subsistence in the north relied heavily on communal bison procurement, but in their southern range, bison hunting was supplemented by smaller game (e.g., pronghorn), fish, and seasonal plant exploitation (Smith and Walker 1988). Avonlea sites are relatively rare in the Dakotas (Vickers 1994). In North Dakota, the Evans site (32MN301) contained Avonlea projectile points and ceramics (Schneider and Kinney 1978). Only one Avonlea-aged archaeological resource was identified in the GSU.

Rare in North Dakota is the Old Woman's complex (A.D. 700–1300). This complex is contemporaneous with the Plains Village tradition, so it would seem likely that many associated sites would be granted the latter designation (Gregg 1985).

The Blackduck complex (A.D. 1150–450) derives from northern Minnesota and was concentrated in southern Manitoba. It is contemporaneous with both Avonlea and Old Woman's complexes, and with Extended and Terminal Middle Missouri traditions. Some evidence of possible Blackduck pottery has been found along the Missouri River, which suggests trade between the Missouri River villagers and the Blackduck people to the north (Joyes 1970).

Plains Village Tradition (ca. 1050–350 B.P.)

Lehmer (1971) defines the Plains Village tradition as possessing the following diagnostic traits: equal horticulture and hunting and gathering strategies, semi-permanent villages near the Missouri River floodplain, earth lodges, large storage and refuse pits, distinctive ceramics, abundant end scrapers and arrow points, bison scapula hoes, and a well-developed bone tool industry. The Plains Village tradition is divided into the Middle Missouri tradition (A.D. 969–1500) and the Coalescent tradition (A.D. 1300–1650), discussed below. Fifteen Plains Village archaeological resources have been identified in the GSU (Gregg and Bleier 2008).

Middle Missouri Tradition (A.D. 969–1500)

Three primary Middle Missouri tradition variants are recognized: Initial Middle Missouri (A.D. 969–1297), Extended Middle Missouri (A.D. 1075–1443), and Terminal Middle Missouri (A.D. 1300–1500) (Eighmy and LaBelle 1996). These represent a continuation and intensification of Northern Plains Woodland lifeways, and their appearance coincides with the onset of the Medieval Warm Period (Bryson et al. 1970), when a moisture increase likely permitted horticulture in areas previously characterized by tenuous farming conditions (Wood 2001).

The Initial Middle Missouri variant (IMMV) is thought to have developed as an outgrowth of the Great Oasis (Tiffany 2007) or by the arrival of eastern populations already exploiting a Plains Village lifeway (Lehmer 1971). The IMMV was concentrated in the southern portions of the Middle Missouri region and characterized by highly fortified villages of large, semi-subterranean rectangular houses (Lehmer 1971; Winham and Calabrese 1998).

The Extended Middle Missouri variant (EMMV) is concentrated in the northern portions of the Middle Missouri region (Lehmer 1971). EMMV groups resided in small villages of semi-subterranean rectangular houses; southern villages were more often fortified than those in the north (Wood 2001). It is unclear whether the EMMV replaced the IMMV or represents a contemporaneous offshoot of the IMMV. Origins aside, it is assumed that IMMV populations were eventually absorbed into EMMV populations. The final expression of this variant was the Terminal Middle Missouri variant (Winham and Calabrese 1998:282). These sites were concentrated in a smaller geographic area along the Missouri River in southern North Dakota and characterized by fewer but much larger villages (Wood 2001). Sites again contained long, rectangular semi-subterranean houses but were highly fortified (Wood 2001). A continuation of the Middle Missouri tradition is recognized historically as the Siuoan-speaking Mandan and Hidatsa (Wood 2001).

Coalescent Tradition (A.D. 1300–1650)

The Coalescent tradition is temporally divided into Initial (650–350 B.P.), Extended (500–300 B.P.), and Post-Contact Coalescent (300 B.P.–Historic period) variants (Johnson 1998; Lehmer 1971). The Coalescent tradition is thought to represent a geographic movement of Central Plains tradition village-dwelling populations to the Missouri River Valley in South Dakota (Blakeslee 1993). Central Plains tradition groups might have migrated from Nebraska and Kansas in response to drought brought on by the Pacific climatic episode (Lehmer 1971). Similar to Middle Missouri tradition groups, Coalescent populations practiced an economy split between mixed cultigen horticulture and bison hunting (Johnson 1998).

Initial Coalescent tradition sites are located on bluffs overlooking the Missouri River and its drainages in southern South Dakota. Populations lived in fortified villages consisting of subrectangular to circular/oval earth lodges and often surrounded by complex fortifications (Johnson 1998). Violence amongst Coalescent groups is evidenced at the Crow Creek site (39BF11), where approximately 486 individuals were killed in the village fortification ditch ca. 625 B.P. (Willey and Emerson 1993). Crow Creek is interpreted as evidence of internecine warfare amongst Initial Coalescent variant groups over land competition (Zimmerman and Bradley 1993) or, conversely, as evidence of warfare between immigrant Coalescent groups and resident Middle Missouri tradition peoples (Johnson 1998). The Extended Coalescent variant apparently descended from the Initial Coalescent sometime in fifteenth century A.D. Sites are concentrated along the

Missouri River and its tributaries in central and northern South Dakota (Krause 2001). Extended Coalescent sites are far more abundant than during the Initial Coalescent and are characterized by a dispersed, unfortified village structure of circular earth lodges (Johnson 1998; Krause 2001; Lehmer 1971). The Extended Coalescent variant evolved into the Post-Contact Coalescent during the Protohistoric and Historic and the Coalescent tradition is recognized as the Arikara (Krause 2001). The last post-contact village was Like-a-Fishhook Village, occupied by the Arikara, Mandan, and Hidatsa; it was abandoned in 1886 when groups relocated to the Fort Berthold Indian Reservation (Smith 1972).

HISTORIC CONTEXT

European Trade and Exploration (A.D. 1738–1858)

Perhaps the earliest attempts at exploring the northern Great Plains came as a result of the ventures of Pierre Gaultier de Varennes Siure de la Verendrye (Dill 1983). His travels from New France into North Dakota led him as far as the Missouri River (somewhere near Bismarck), and led to subsequent expeditions by his sons, which went farther south into South Dakota (near Pierre) and west toward the Black Hills. While the elder la Verendrye met the Mandan, his sons encountered the Arikara and other tribes in South Dakota. Their reports heightened interest in the region and the possibilities that existed for trade with its inhabitants.

Following the la Verendryes, a modest fur trade developed in the region, but until the expedition of Captains Meriwether Lewis and William Clark returned successfully from their voyage up the Missouri, the region was considered a wild unknown (Schulenberg 1957).

In 1807, Manuel Lisa established a short-lived post at the mouth of the Bighorn, and by 1809. his St. Louis Missouri Fur Company was building posts among most of the tribes all along the Missouri River. Other notable companies, such as the Northwest Company, Hudson Bay Company, the Columbia Fur Company, and the American Fur Company, soon followed suit (Schulenberg 1957). The life of these posts tended to be short, but they did much to influence the tribes who frequented the Missouri River in both North and South Dakota. Fort Union—at the confluence of the Yellowstone and Missouri Rivers—was the last of the great posts, and its waning during the late 1850s saw the fur trade in the Dakotas in its last throes.

Post-Contact Tribal Overview (A.D. 1780–1900)

In addition to the tribes that arose from the Middle Missouri and Coalescent traditions (Mandan, Hidatsa, and Arikara), the northern Great Plains and the Missouri River were also used by countless other tribes since before European contact.

The Assiniboine were known to frequent the northern Missouri River (mainly near the confluence with the Yellowstone), and were active in the fur trade throughout the eighteenth and nineteenth centuries. As well, the Cheyenne were pushed westward by the Chippewa during the middle of the eighteenth century and took up at least a temporary settlement period on the Missouri River. At least one earth lodge village has been attributed to the Cheyenne in eastern North Dakota, and some Cheyenne villages on the Missouri River were located between the Mandan to the north, and the Arikara to the south, where they built earth lodges and pursued horticulture and buffalo hunting (Schlesier 1968).

The Plains Cree and Plains Chippewa also frequented the northern Missouri—mainly near the confluence with the Yellowstone, but also near Fort Clark. Both tribes traded actively with the Mandan and Hidatsa. The Crow, although more westerly in their territory, were related to the Hidatsa and would often trade and visit with the Missouri River tribes (Schulenberg 1957).

Based on linguistic evidence, the Sioux (or Dakota) originated from the southwest Great Lakes region (DeMallie 2001a). The timing of the migration is unclear, but ceramic evidence suggests that the Dakota were living on the plains several centuries before the arrival of Europeans (Hanson 1998). Based on linguistics, it is thought that the Assiniboine split from the Sioux sometime before the mid-seventeenth century (Hanson 1998). The Teton Dakota are divided into seven sub-tribes, comprising the Oglala, Brule, Sans Arc, Hunkpapa, Blackfeet, Miniconjou, and Two Kettles (Hanson 1998). According to DeMallie (2001a), by the mid-eighteenth century, the Teton Dakota hunted bison in the area east of the Missouri River, their movements limited in part by the Arikara stronghold along the Missouri River. However, a series of smallpox epidemics from 1771 to 1781 devastated the Arikara villages (Johnson 1998) and permitted the Teton Dakota to move west of the Missouri River. Like the Teton Dakota, the Yankton and Yanktonai Dakota occupied the prairies east of the Missouri River and north into Minnesota in the mid-seventeenth century (DeMallie 2001a). By the mid-nineteenth century, the Yankton and Yanktonai occupied the prairies east of the Missouri River from the mouth of the Big Sioux River in the south to the Red River in the north (DeMallie 2001b).

The Reservation period began in the 1860s and continues into today. This time period contains numerous accounts of hurt feelings and unjust actions—including government actions to stop tribal ceremonialism, forced boarding school education of Indian children, and attempts at termination and relocation to solve the "Indian Problem" in the Dakotas. Regardless of this checkered history, the tribes who lived on, and used, the Missouri River have persisted to the present as strong and vital people with a living culture that has survived for present and future generations.

In the GSU, five Hidatsa, one Arikara, one Chippewa, one Mandan, and 21 unspecified historic Native American archaeological resources have been identified (Gregg and Bleier 2008).

Homesteading in the Dakotas (A.D. 1860–1930)

The first homestead in North Dakota was filed in 1868, which was the only homestead filed until 1871. The true rush for homesteads did not take place until 1885. This rush was spurred by the extension of the Northern Pacific Railroad across the Red River from Minnesota (Works Progress Administration [WPA] 1950). Western North Dakota—including McKenzie County—did not see much settlement before the 1890s, and the major settlement of this region did not start in any great numbers until between 1900 and 1910. In general, those homesteaders who selected lands along the Missouri River were able to do some crop farming, but most of the homesteads were arranged as ranch operations for sheep or cattle.

In addition to the homesteading, which brought an increasing number of people to western North Dakota, the discovery of large deposits of lignite coal further boosted interest in the development of McKenzie County and the surrounding area (WPA 1950). Although slow at first, the mining industry started to flourish during the 1930s; to this day, it remains a major focus of activity that drives the economy of both the county and the state. In total, eight historic Euro-American archaeological resources have been identified in the GSU (Gregg and Bleier 2008).

Pick Sloan and the Development of the Missouri River (1940–Present)

Following the Great Depression, new demands for power, irrigation, economic development, and flood control in the northern Great Plains focused greater attention on the Missouri River. Starting in the early 1940s, a series of legislative measures and agency plans were developed to address the difficult task of harnessing the Missouri River. Initial efforts were directed toward establishing a Missouri Valley Authority (MVA), similar to the successful Tennessee Valley Authority, which had created dams that provided rural electrification for the southern states. The concept of an MVA did not meet with a favorable response from the local citizens or government officials, who feared losing control of the Missouri River to the federal government. After several attempts to resurrect the plan, the idea of an MVA was lost (Harvey 1996; Linenberger 1998). Nevertheless, continued flooding along the river and the lack of electricity on rural farms eventually drove the communities on the river to embrace some kind of federal actions to manage the river. Two separate plans were proposed to legislation.

The first plan presented to legislation was the Pick Plan, named after Lewis Pick, the director of the Missouri River Office of the USACE. It focused on flood control and navigation improvement, calling for USACE to construct 1,500 miles of levees, five multi-purpose dams and reservoirs along the mainstem of the river, and other dams on various tributaries of the river (Harvey 1996; Linenberger 1998). The Pick Plan conflicted with the alternate plan proposed by William Glenn Sloan, director of the Billings, Montana, office of the U.S. Bureau of Reclamation. Sloan's Plan, which had been several years in the making, was initially created in response to the severe droughts during the 1930s. Following the droughts, the Dakotas, Wyoming, and Montana appealed to the U.S. Bureau of Reclamation to construct irrigation works. Sloan created a plan, focusing primarily on providing irrigation and hydroelectric power, calling for the creation of dams and reservoirs on tributaries in the upper Missouri Basin (Harvey 1996).

In October 1944, representatives from USACE and the U.S. Bureau of Reclamation met and agreed on a combined plan, called the Pick-Sloan Plan. Five intents for the management of the Missouri River were created under this plan. These intents included providing hydroelectric power, flood control, and surplus water supply; facilitating navigation; and supplying areas for public use, including fish and wildlife and recreation (Ferrell 1993). President Franklin D. Roosevelt signed the act on December 22, 1944. Under this plan, both agencies would have influence over hydroelectric power; the U.S. Bureau of Reclamation would have responsibility for all irrigation issues, and USACE would have responsibility over the mainstream dams (Billington et al. 2005). The development of the mainstem system of dams was authorized under the Pick-Sloan Flood Control Act of 1944 (Public Law 78-534) (Ferrell 1993). Along with the previously constructed Fort Peck Reservoir in Montana, five dams were to be constructed and overseen by USACE. The dams to be constructed were Gavin's Point (located immediately west of Yankton, South Dakota), Fort Randall (located just north of the Nebraska-South Dakota border), Big Bend (located immediately upstream from the tail waters of Fort Randall), Oahe (located upstream from Pierre, South Dakota), and Garrison (located north of Stanton, North Dakota) (Figure 5).

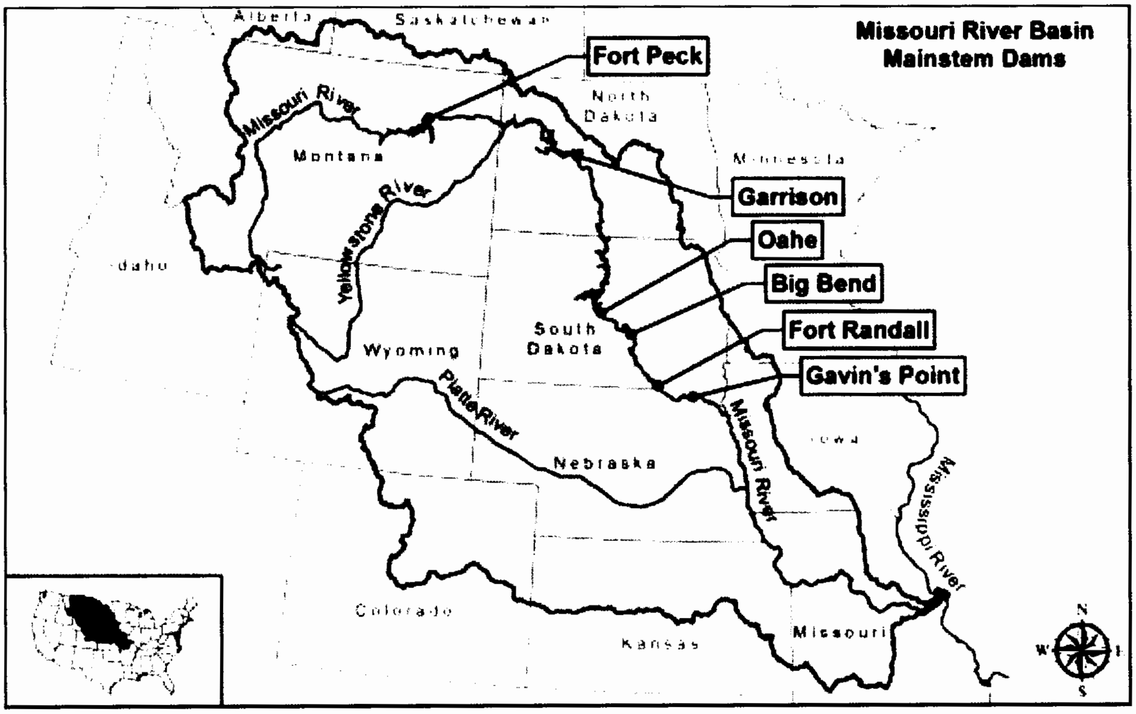

Figure 4. Missouri River mainstem dams.

The creation of the Pick-Sloan reservoirs displaced thousands of Native Americans from their lands along the Missouri River. By some counts, the five mainstem dams displaced approximately 900 Native American families. All the mainstem dams in North and South Dakota (except Gavin's Point Dam) flooded some of the most productive tribal lands. Garrison Dam/Lake Sakakawea, completed in 1953, inundated more than 152,360 acres, one-quarter of the Fort Berthold Indian Reservation, and forced the relocation of over half of the reservation population (Morris 1990). The Bureau of Indian Affairs reported in 1948 that 257 of the 357 homes in the Fort Berthold Indian Reservation would be destroyed by the project (McCullough 1948).

The inundation also cost the tribe most of its timber and wild game resources—most of which relied on the natural bottomlands of the Missouri River. Similarly, the Oahe Reservoir inundated hundreds of thousands of acres at the Standing Rock and Cheyenne River Reservations. The Big Bend and Fort Randall Dams were also significant in impacting Native American families on the Yankton, Lower Brule, and Crow Creek Reservations; the dams flooded over 20,000 acres of tribal land, with most (approximately 17,000 acres) of those on the Crow Creek and Lower Brule Reservations, where over 120 families were displaced against their will (Lawson 1982).

Although the Three Affiliated Tribes living on the Fort Berthold Indian Reservation were not included in the initial discussions about the dam, they demanded that the federal government compensate them for the land that would be lost when the dam was completed. They requested that the government provide them with an equivalent acreage of land to what would be lost from the flooding, permission to graze their cattle on USACE lands along the banks of the lake, 20,000 kilowatt/hours per year of electricity generated by the dam, and first right to collect timber felled during the flooding (Griffen 1996). Their requests were rejected, although the federal government provided some compensation for their loss. They were given $5,105,625 for lost lands (approximately $33 per acre), were denied grazing access to the lands adjacent to the lakes, did not receive any free electricity, and were not allowed to collect fallen timber (Griffen 1996). The tribes would eventually get an additional 7.5 million dollars in compensatory funds, but overall, the deal fell far short of what they had requested.

USACE has continued to develop its relationship with the tribes. In 1987, the Joint Tribal Advisory Committee released its final report concerning the impact that the Pick-Sloan Plan had on the tribes. The tribes within the Omaha district soon afterward requested an "Indian Desk" at the USACE. In 1992, this request was fulfilled, and USACE developed a position for a full-time Native American liaison (USACE 2015).

Development of Transportation (1864–Present)

Early settlement in North Dakota followed along the expansion of the rail lines, with the railroad companies establishing towns to support the settlement of the vast expanse of the Great Plains. By the early twentieth century, little had changed, and the railroad continued to dominate settlement and transportation across the state, with settlers reliant upon the railroads for importing supplies, and for exporting products of their farms and ranches to more lucrative markets. At the same time, the system of roads and trails, in place before a single track of rail was placed in North Dakota, continued to operate, albeit marginalized by the expanding rail networks (Wilkins and Wilkins 1977).

As early as 1848, officials in Washington were beginning to consider the possibility of creating a network of railroads across the country. Three routes were initially proposed for alignments crossing from the Atlantic Ocean to the Pacific Ocean. The northernmost route proposed crossed the Great Plains from Minnesota to Oregon crossing through Fort Union in the Dakota Territory. Congress authorized the northern route, and in 1864, President Lincoln signed a charter for the Northern Pacific Railroad (Northern Pacific). To help fund the railroad project, the Northern Pacific received a massive land grant from the government, amounting to 40 sections per mile through the Dakota Territory (Tweton and Jelliff 1976).

Although Washington had interest in completing the northern route, finding investors to back the 2,000-mile journey proved more difficult. Northern Pacific was unable to secure sufficient financial backing until 1869, the same year that the Union Pacific Railroad completed their transcontinental route. Financial troubles continued to plague the railroad, and by 1873, with the line completed from Duluth to Bismarck, the investment company funding the construction was bankrupt. In 1875, the Northern Pacific reorganized under the leadership of Frederick Billings, and with strong revenues from the completed part of the line, the Northern Pacific was able to secure the financial support to continue construction, completing its path to the Pacific in 1881. Between 1881 and 1887, the Northern Pacific continued to expand its operations in North Dakota, building several branch lines to reach the important agricultural and population centers across the state (Tweton and Jelliff 1976).

The second major railroad to begin construction in North Dakota was the Great Northern Railroad. Starting as the St. Paul and Pacific Railroad in 1857, congress supplied a similar grant to the railroad company, and construction began heading west from St. Paul, Minnesota. Like the Northern Pacific, the St. Paul and Pacific had trouble securing the financial support for the project, going bankrupt in 1872. Under the direction of James J. Hill, the St. Paul and Pacific began construction again in 1878. Rather than building straight west, Hill expanded branch lines across North Dakota and Minnesota, and by the 1890s, Hill's railroad had more miles of track in North Dakota than the Northern Pacific. The railroad finally reached the Pacific Ocean in 1893, and the name was changed to the Great Northern Railroad (Tweton and Jelliff 1976).

A third railroad, the Minneapolis, St. Paul & Sault St. Marie, or the "Soo," built a track across North Dakota in 1883. The primary focus of the Soo was to access grain farmers in the northern part of the state, providing connections for agricultural goods to both the Northern Pacific and the Great Northern rail lines. With the three railroads completed, North Dakota settlers had a means to transport wheat crops to milling centers in Minnesota or to larger markets across the country. The railroad also supplied a means to support expanded settlement across the state, with important depots at Grand Forks, Bismarck, and Fargo becoming prominent buildings driving economic activity (Tweton and Jelliff 1976; Wilkins and Wilkins 1977).

Although railroads supported the expanded settlement during the Dakota Boom, the state was also crossed by a series of roads and trails that expanded into a broad network during the twentieth century. Some of the earliest roads in the state were developed by the military, connecting forts established to monitor the activities of Native Americans, and to protect Euro-American interests in the area. These roads were heavily travelled by the military, by postal carriers, and by early settlers. In the winter months, when snow covered much of the state, these trails were often travelled by sled (Carlson and Sprunk 1979). When North Dakota became a state in 1889, the state constitution made it a requirement to have a two-thirds majority for the approval of state road construction. This meant that the responsibility for road construction was mostly left to the counties. Early roads mostly followed the local topography, providing the most direct route between destinations. Later roads, established during the settlement booms, generally followed section lines. In 1899, in an effort to regulate road construction and provide some standards, the state legislature declared that section roads would be considered public land and that the roads should measure at least 33 feet (2 rods) wide (Carlson and Sprunk 1979).

Leaving the counties responsible for road construction proved sufficient until the arrival of the automobile in the early twentieth century. The automobile increased the demand for roads across the state, and demand for existing roads to be better maintained to remain passable. Access to funding became the determining factor in road construction, with roads often built disproportionally to the actual demand. Lack of funding in some areas led to lapses in maintenance, which in turn led to washouts, collapsed bridges, and heavy rutting. The poor conditions of roads across the state attracted the attention of A. L. Fellows, the state engineer, who voiced his concern about road conditions in 1906. However, it would take several years before that concern turned into action (Carlson and Sprunk 1979).

In 1909, State Senator George A. Welch introduced a bill that would allow North Dakota to receive federal funding for the construction of "demonstration" roads. These roads were federally funded experiments that tested new road building materials and engineering methods. These demonstration roads were only constructed in Bismarck, but it was the beginning of a state-level interest in road conditions that would continue throughout the early twentieth century (Carlson and Sprunk 1979). In 1911, the state authorized the State Engineer's office to provide plans for road construction to any county that requested it, and in 1913, the State Engineer was tasked with approving all bridge designs prior to construction. The year 1913 also marked the creation of the South Dakota State Highway Commission. The commission was established to give the State Engineer the authority to oversee all road construction. It also required that maps be created that showed the location of all roads, culverts, and bridges (Carlson and Sprunk 1979).

The federal government also took steps to assist the states in road construction. In 1916, the Federal Aid Road Act made funding available for creating and maintaining roads. Funding through this act was limited at first, but in the 1920s, interest in developing a federal highway system resulted in additional federal allocations. Due to an ambitious and perhaps exaggerated assessment of the number of roads in North Dakota, it received a disproportionate amount of federal funding in the 1920s (Carlson and Sprunk 1979). The state ranked 36th (out of 48) in population, but 16th in road funding. As a result of this funding, the state proposed the creation and improvement of an extensive series of paved, graveled, and graded roads. Most of these roads were concentrated in the eastern and central portions of the state. In the western counties such as Dunn, Mercer, and McKenzie, most roads remained little more than rutted two-tracks.

In 1924, the Rand McNalley Company created an Auto-trails map, attempting to provide an easier means of navigating the highway systems across the country. The Auto-trails maps used blazed markers to identify highways that could be followed between destinations. For many early twentieth century motorists, driving was as much about recreation as it was about transportation, and as such, the early auto trails were intended to enhance the driving experience. Roads did not always take the most direct routes between cities, but would wind through scenic locations and historical landmarks. The intent was also to improve tourism across the country. The Auto-trail system was quickly replaced in 1925 when congress established a numbered highway system, most of which followed similar alignments to the old Auto-trail system (Wilkerson 2000). Several of the numbered highways continued to use their Auto-trail names.

During the Great Depression, road projects at the local level dropped significantly. Federal assistance helped buoy the losses of local funding with New Deal Programs continuing to provide support for road and bridge projects. The lack of local funding for road projects continued through World War II. Coupled with the lack of available labor during the war, many of North Dakota's roads fell into disrepair. During the 1940s, the government began to crack down on several states, including North Dakota, for the conditions of its roads, threatening to cut off funding if the existing roads were not better maintained. In an effort to assert more control over road projects across the country, congress passed the Federal Highway Act in 1944, which changed the approach to funding road construction, setting aside money specifically to maintain a federal highway system (Carlson and Sprunk 1979).

BACKGROUND RESEARCH

SWCA conducted a background search of archaeological and historical literature and records for the study area and surrounding 1-mile area. Researchers reviewed relevant record holdings at the SHSND and other available sources for information regarding previously recorded historic and prehistoric sites located in the study area, including General Land Office (GLO) survey plats. Background research was conducted on August 10, 2015.

Historical land survey maps from 1911 depict a railroad, entitled M. ST. P. AND S.S.M. R.R. This railroad aligns with the current, in use, railroad that borders the northern boundary of the survey area. The Class I file search identified the railroad (discussed below); however, as of March 20, 2015, the State Historic Preservation Office (SHPO) distributed a list of sites that no longer require formal documentation. That list states that "Railroad segments such as altered grades and tracks unassociated with other railroad features do not have to be recorded" (SHPO 2015). As such, the site was not revisited during the current inventory.

Six previous cultural resources inventories were identified in or within 1 mile of the study area during the SHSND file search (Table 2). The inventories have been conducted between 2007 and 2013, in support of highway and transmission line projects.

Based on the results of the SHSND file search, one previously recorded cultural resource was identified in or within 1 mile of the study area (Table 3). The cultural resource (32WD1667) consists of a segment of an historic railroad, the Soo Line Railroad. 32WD1667 was recommended eligible for the National Register of Historic Places (NRHP).

Table 2. Previous Inventories within 1 Mile of the Study Area

Manuscript Number	Title	Authors	Year
011246	Highway 23: A Class III Cultural Resource Inventory in Mountrail and Ward Counties, North Dakota	J. Snortland	2009
012774	Highway 23 from Mountrail County Line (RP 78.4) to US 83 (RP105.517) Right-of-Way Survey: A Class III Cultural Resource Inventory Ward County, North Dakota	B. Suess, W. Burns	2011
012794	Highway 23 Right-of-Way Survey from New Town (RP 49.92) to the Ward County Line (RP78.4): A Class III Cultural Resource Inventory in Mountrail County, North Dakota	B. Suess, W. Burns	2011
013571	Central Power Electric Cooperative's Snake Creek to Parshall (Part 1) Transmission Line: A Class II and III Cultural Resource Inventory in McLean and Ward Counties, North Dakota	E. Stine, A. Kulevsky	2012
014840	Mountrail Williams Electric Cooperative's Snake Creek to Parshall (Part II) Transmission Line: A Class III Cultural Resource Inventory in Mountrail County, North Dakota	B. Bluemle, E. Stine	2007
014855	Highway 23 Material Source Areas: A Class III Intensive Cultural Resource Inventory in Ward County, North Dakota	A. Person	2013

Table 3. Previously Recorded Resources within 1 Mile of the Study Area

Site Number	Site Name	Site Type(s)	Cultural Affiliation	NRHP Eligibility
32WD1667	Soo Line	Railroad	Historic (1893)	Eligible

FIELDWORK METHODS

Fieldwork was designed so that project archaeologists could collect all appropriate and necessary data for the completion of the project report of results and recommendations, and to ensure accurate completion of site forms for all resources encountered.

In accordance with the scope of work, archaeologists surveyed a 200-foot-wide buffer surrounding potentially jurisdictional areas using parallel sinuous transects with spacing not exceeding 15 meters. The ground surface was examined for artifacts, features, or other evidence of cultural occupation. Cut banks, eroded surfaces, and other areas with significant exposure were examined intensively throughout fieldwork, especially where previously recorded cultural resources existed. In areas with high vegetation cover and high probability of cultural resources, survey transects were reduced to 10 meters to maintain adequate visibility.

When no cultural resources are located, project archaeologists map the survey area, any notable landscape features, and other necessary data, using handheld submeter-accurate Trimble Global Positioning System (GPS) units for post-processing into ArcMap 10.3 shapefiles, and for plotting onto associated U.S. Geological Survey 7.5-minute quadrangles to ensure accuracy and to produce required location maps of the survey area. Additionally, project personnel photograph the survey area in overview and for other data collection needs. Notable landscape features are described, and if applicable, measured and recorded using a handheld GPS unit. Field personnel note environmental setting, context, topography, soils, vegetation, and geographical location of the proposed project.

SITE EVALUATION

SWCA reviewed previously recorded sites and their significance, as defined by criteria set forth in Title 36 Code of Federal Regulations 60.4 (National Park Service 1991), which states the following:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A) That are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B) That are associated with the lives of persons significant in our past; or
>
> C) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D) That have yielded, or may be likely to yield, information important in prehistory or history.

Not eligible sites have lost integrity and are unlikely to contribute further data significant to knowledge of prehistory or history.

Prehistoric Archaeological Sites

Prehistoric lithic scatters/campsites (sites without any structures or association with known significant events or persons) generally will not contain an NRHP discussion for Criteria A, B, and C. Instead, for NRHP recommendation purposes, these properties are discussed for their potential to yield information significant to prehistory or the archaeological record under NRHP Criterion D. Special cases generally apply to Criterion A, where a prehistoric site type (such as a stone circle site) may not be recommended eligible for the NRHP from an archaeological perspective, but may be considered important to cultures of Native American peoples.

Evaluation of the significance of archaeological sites under Criterion D considers general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of subsurface cultural deposits; the nature of any features within the site (construction techniques, building materials, structural integrity); and the age range reflected by the site assemblage. Sites considered significant generally contain an assemblage of cultural remains that reflects sufficient diversity to permit identification of activities and to allow confirmation of the period of site use. Sites with the most potential to address research questions about human lifeways contain associated features, structures, and/or relatively intact and dateable artifacts.

Historic Archaeological Sites or Components

Historic sites containing or consisting of preserved features or structures are evaluated primarily under Criteria A, B, and C. Historic trash scatters lacking associated features or structures are primarily evaluated under Criterion D. In general, these types of sites represent ephemeral prospecting or stock management activities, but they lack identifiable or important association with specific persons or events of regional or national history (Criteria A and B), and they lack the formal and structural attributes necessary to qualify as eligible under Criterion C. The evaluation of significance of historic archaeological sites under Criterion D focuses on the capacity of the sites or components to yield significant information regarding knowledge of history during the period(s) of site significance. Evaluation of the significance of historic sites considers general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of subsurface cultural deposits; the nature of any features within the site; construction techniques; building materials; structural integrity; and the age range reflected by the site assemblage.

Historic sites considered significant under Criterion D generally contain an assemblage of cultural remains that reflects sufficient diversity to permit identification of activities and to allow confirmation of the period of site use. Sites with the most potential to address research questions contain associated features, structures, and relatively intact and datable artifacts. Significant sites are those that could impart information not available solely from historical documents. Although archival research may provide an essential form of information, often historical records are inaccurate or incomplete. For example, examination of construction techniques or household assemblages can provide information on economic slumps, reuse of structures for other than original purposes, and re-occupation cycles. As a result, insight may be gained into questions about human lifeways that are often asked in archaeology, but rarely specified directly in historical documentation.

Non-Archaeological Historic Sites or Components

Non-archaeological historic sites or sites with non-archaeological components are those primarily assessed for NRHP eligibility under Criteria A, B, and C, rather than Criterion D and typically are not subject to subsurface testing. Individual segments of significant historic sites are evaluated as contributing or non-contributing in terms of physical and environmental integrity. Examples of historic site types include linear historic features, such as transportation routes and water conduits, standing building, and structure sites, and potentially extend to any historic feature on an otherwise archaeological site, such as traditional cultural property (TCP) features. Historic and ethnographic sites evaluated for potential contribution to history or cultural traditions for reasons beyond their possible future research value tend to have different evaluation and management considerations than archaeological sites. Typically, the integrity of historic sites is addressed using the guidelines presented in National Register Bulletin 15 (National Park Service 1991), which defines the seven elements of integrity as location, design, setting, materials, workmanship, feeling, and association. As such, properties are basically evaluated in consideration of their physical integrity and the integrity of their surroundings. TCPs are also considered under the guidelines of National Register Bulletin 38 (Parker and King 1998).

INVENTORY RESULTS AND RECOMMENDATIONS

SWCA conducted a Class III inventory of the survey area on August 27, 2015. Archaeologists surveyed a 200-foot-wide buffer surrounding potentially jurisdictional areas/wetlands. Vegetation observed includes Canada thistle, sweet clover, and wild mustard, allowing for approximately 5 percent bare ground visibility. The area has been impacted by alluvial erosion; agriculture; roads, including State Highway 23, which borders the southern edge of the survey area; and the Soo Railroad, which borders the northern edge of the survey area.

During the Class III inventory SWCA archaeologists did not observe any new cultural resources. No shovel tests were conducted, because the probability of intact buried cultural deposits was low in the survey area. The Class I file search identified one previously recorded resource, 32WD1667. As of March 20, 2015, the State Historic Preservation Office (SHPO) distributed a list of sites that no longer require formal documentation. That list states that "Railroad segments such as altered grades and tracks unassociated with other railroad features do not have to be recorded" (SHPO 2015). As such, the site was not revisited during the current inventory. No further work is recommended for this resource. However, a resource location map illustrating the location of the resource is provided in Appendix A.

CONCLUSION

SWCA conducted a Class I and Class III cultural resource inventory on behalf of Barr in support of the U.S. Silica Parshall Transload Facility project. The proposed project is located on fee land within the exterior boundaries of the Fort Berthold Indian Reservation, in Mountrail and Ward Counties.

The inventory was conducted in compliance with Section 404 of the Clean Water Act and Section 106 of the National Historic Preservation Act. The Class III inventory consisted of a 200-foot-wide buffer surrounding portions of the project that cross potentially jurisdictional areas. In total, 61.75 acres were surveyed for the project.

The Class I file search identified one cultural resource (32WD1667) within the proposed transload facility study area. During the Class III inventory, no cultural resources were newly observed. 32WD1667 is a segment of an historic railroad, recommended eligible for the NRHP. According to a recent addendum to the North Dakota SHPO manual, the railroad segment does not require recordation. No further work is recommended for this resource. It is recommended that the project be granted a determination of *No Historic Properties Affected* and clearance to proceed as planned.

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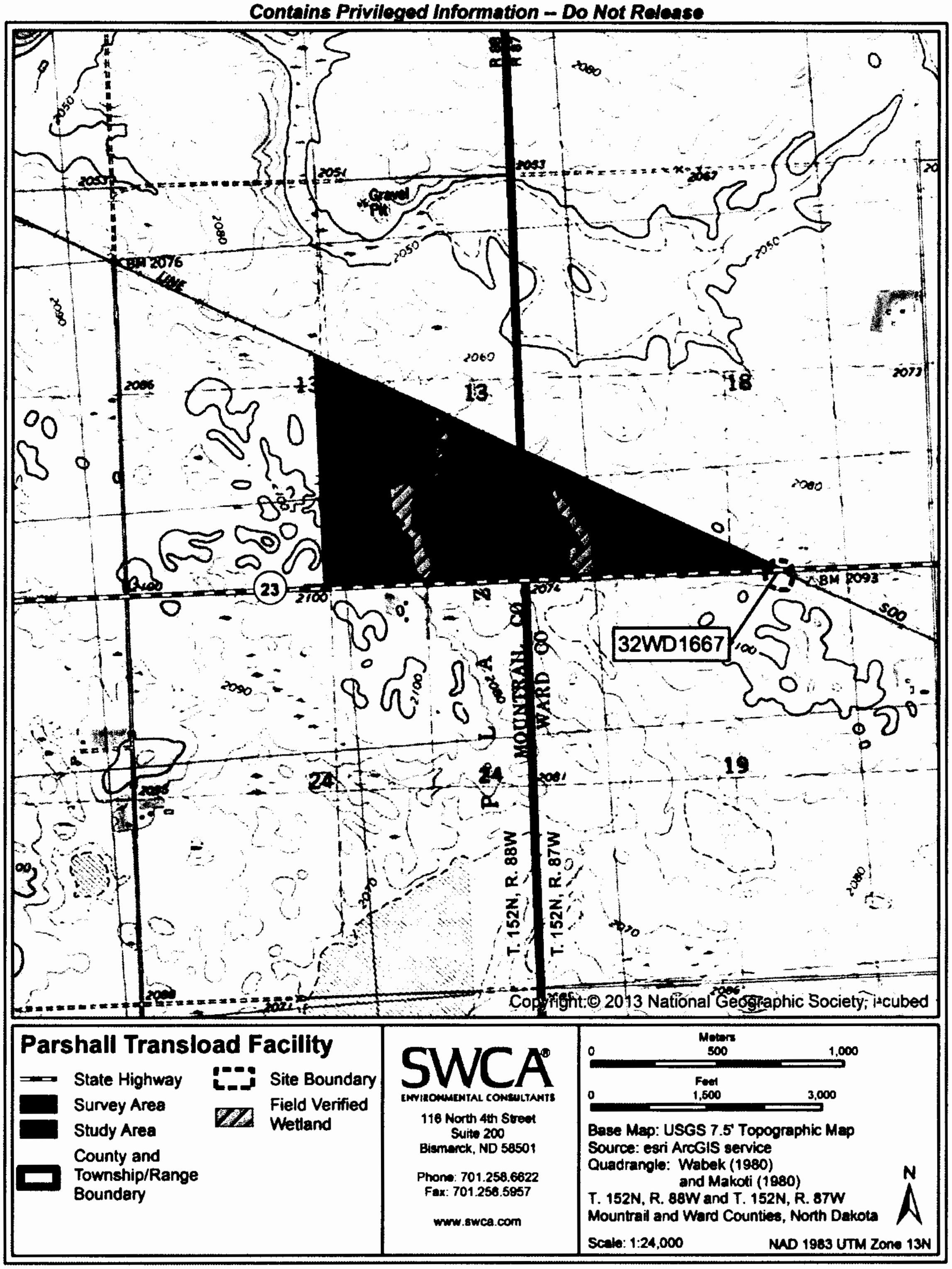
APPENDIX A

Resource Location Map

Contains Privileged Information -- Do Not Release



Resource location map at 1:24,000-scale.

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