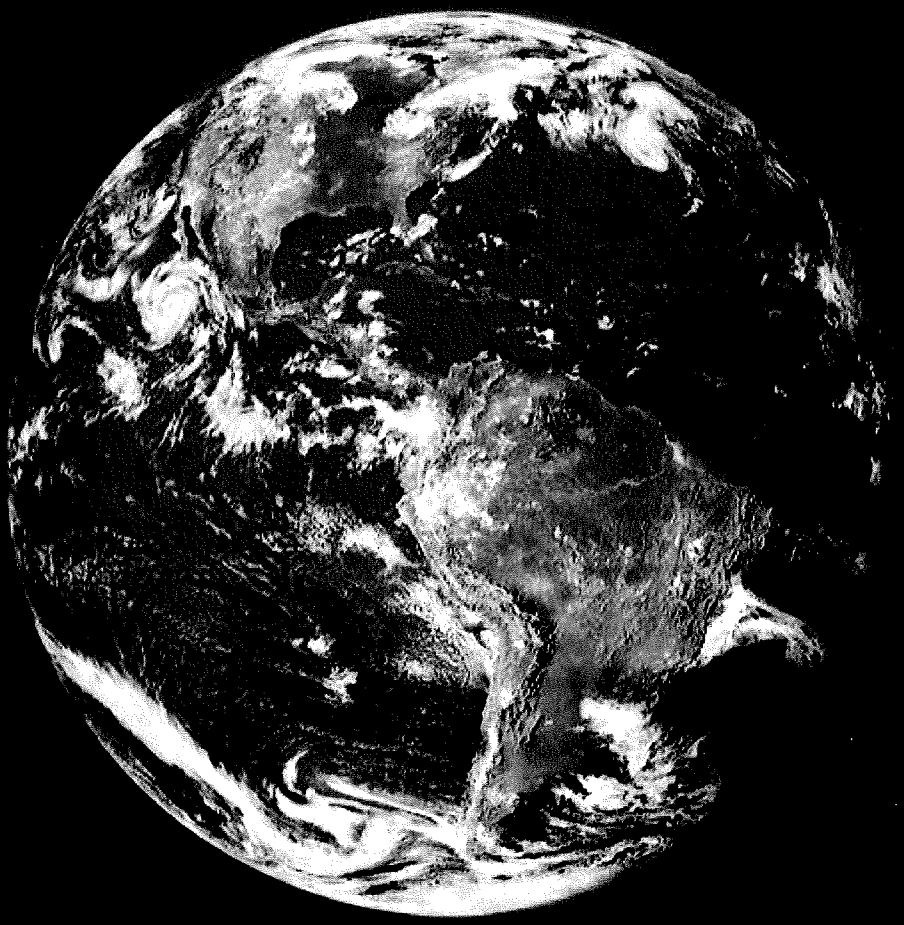
Geodetic Control Network for the City of Minot, North Dakota



Prepared by:

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Minot, North Dakota

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INTRODUCTION / AIM

A high quality, consistent control network is paramount in any survey or geographic information system. In 2001, Ackerman Surveying & Associates, Inc. began the development of a geodetic survey control network that encompasses the majority of the land area within a 25-mile radius of the City of Minot. This report outlines the methods and practices used in establishing such a control network. The adjusted and calibrated final coordinates of the existing and newly installed geodetic control points are also documented within.

Following the recovery of nearly 80 original monuments placed by the United States Coast & Geodetic Survey, the U.S. Geological Survey, and the National Geodetic Survey, measurements were made using both static and kinematic Global Positioning System (GPS) methods. The goal was to maintain a network that had adequate redundancy to ensure accuracy. This was achieved through the use of three dual-frequency Trimble GPS antennas, allowing three distinct baselines to be measured simultaneously with respect to one another.

Horizontal Control

In the development of the horizontal network, four "sub-networks" were created. This was done to reduce the necessary occupation time and to increase the redundancy of the network through measurements to stations common to two or more sub-networks.

The first sub-network (Transport-Base) included two separate phases. The earliest phase included the following stations: Transport, Burlington 2, Burl, Gam, Mayo, Great, M-221, A-276, Surrey, Sou'East, Larson, Harrison, Gassinapp, Minot Reset and G-217. The results of the baseline measurements to Minot Reset were inconclusive due to the station's environment, and as such, were discarded. The second phase of the sub-network included the following additional stations: Twin Buttes, Norwich, Wolseth, Yellow, North 3, Des Lacs, Lacs and Coulee. Solutions from the first sub-network were used for the development of the three subsequent sub-networks.

The second sub-network (Gam-Base) established the positions of the following additional stations: Rising, Sour, Ensign 2, Glenburn, Brace and Fox. In addition, baseline checks were made to North 3, Wolseth, Yellow and Mayo.

The third sub-network (Twin Buttes-Base) established new geodetic positions for the following stations: Ward, Corn 2, Saron 2, Rice, Ramon, Sage, Irwin, Lone, Zion, Butter Reset, Two Hills, Place 2, and Fron. Baseline checks were made to Sou'East, Larson, Burlington 2, Des Lacs, Lacs, Coulee, Gassinapp and Harrison.

The fourth and final subnetwork (Norwich-Base) established the postitions of the following additional stations: Sincoe, Susan, Logan, Coline and Wich 3. This sub-network included redundant baselines to Mayo, Surrey, Rising and Great.

All of the baselines in the network were processed using Transport as a basis. The coordinates published by the National Geodetic Survey were used as the starting point for the station. The solutions generated from the first sub-network were then used to produce baseline solutions for the sub-networks that would follow.

Each sub-network was adjusted slightly (<.015') to account for human, instrumental, and eccentric errors due to measuring, leveling, centering, etc. After the sub-networks were shifted, the coordinate solutions for the stations were obtained.

After the positions were established, the network was adjusted globally to more accurately depict the spatial positions of the individual stations. The adjustment was performed as follows:

First order horizontal stations were assigned a weighing factor of 1; second order stations 1/2; third order stations 1/3. The deviations of each station from the published coordinates were then multiplied by their appropriate factor. The sum of the weighed deviations divided by the sum of the weighing factors represented the global network adjustment. In total, the global network adjustment (horizontal shift) was under 8 centimeters.

At the request of the City of Minot, additional geodetic stations were established within a close vicinity of the city center. These stations (ACKERMAN 1 – ACKERMAN 5) were installed according to National Geodetic Survey guidelines. A detail drawing of an installed monument can be seen in Appendix -C-.

The positions of these stations were established using the calibrated coordinates of the original network. The base station of the survey was set at ACKERMAN 4, a centrally located point in the Minot network, and baselines were measured to the surrounding control points. These points included both existing, calibrated control and the newly established monuments. A calibration was performed following field measurements and the published coordinates are shown within.

Vertical Control

After the static surveying was completed on the horizontal network, kinematic GPS procedures were used to measure baselines extending from Transport to the remaining NGS & USCGS benchmarks within the project vicinity.

The kinematic solutions were calibrated using those coordinates obtained from the horizontal control network. The elevations published in this report are relative to the City of Minot datum of NGVD 1929.

Those existing benchmarks whose environments were unfavorable for GPS operations (ie. vertical caps in columns or walls) were offset using differential leveling techniques. The offset to the station was then measured and the elevation of the benchmark back-computed accordingly.

HORIZONTAL SURVEY CONTROL NETWORK

HORIZONTAL CONTROL NETWORK

LEGEND

PREVIOUSLY OCCUPIED BASELINES

CITY OF MINOT CONTROL SURVEY BASELINES

SCALE: 1" = 4000'

ACKERMAN 1

ACKERMAN 2

TRANSPORT

M-221

GASSINAPP

A-276

ACKERMAN 3

ACKERMAN 4

ACKERMAN 5

HARRISON

G-217

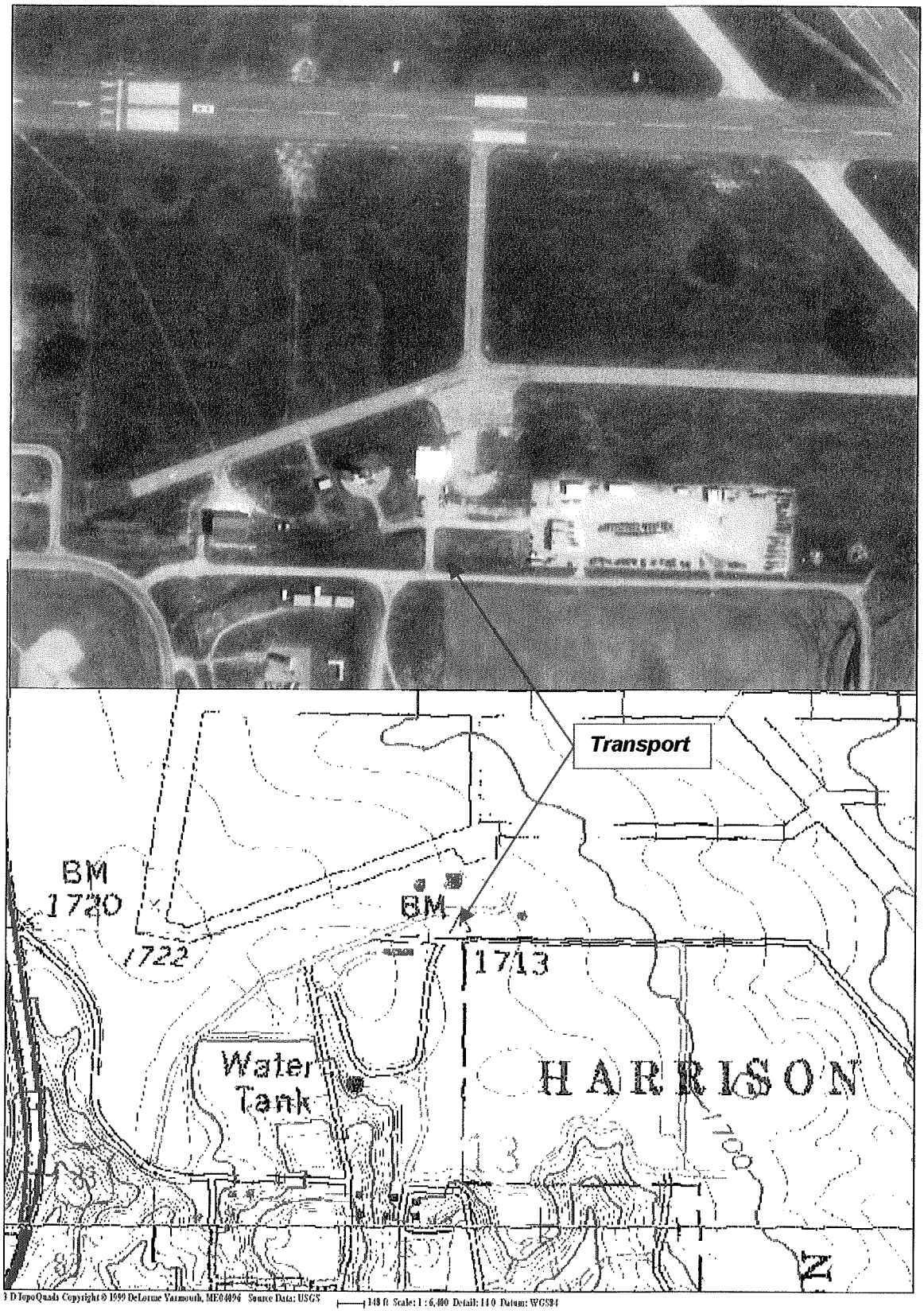
SURREY

SOUEAST

LARSON

ACKERMAN SURVEYING & ASSOCIATES
(701) 838-0786
6008 HWY 2 EAST, MINOT, N.D. 58701

HORIZONTAL CONTROL DATA SHEETS


Transport
BM
1720
1722
BM
1713
Water
Tank
HARRISON
1700
3 D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
148 ft Scale: 1 : 6,480 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 100 ***Station Designation: Transport***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°15'16.26735"	W 101°17'06.68310"	1646.012

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
458584.162	1777221.600	1713.163

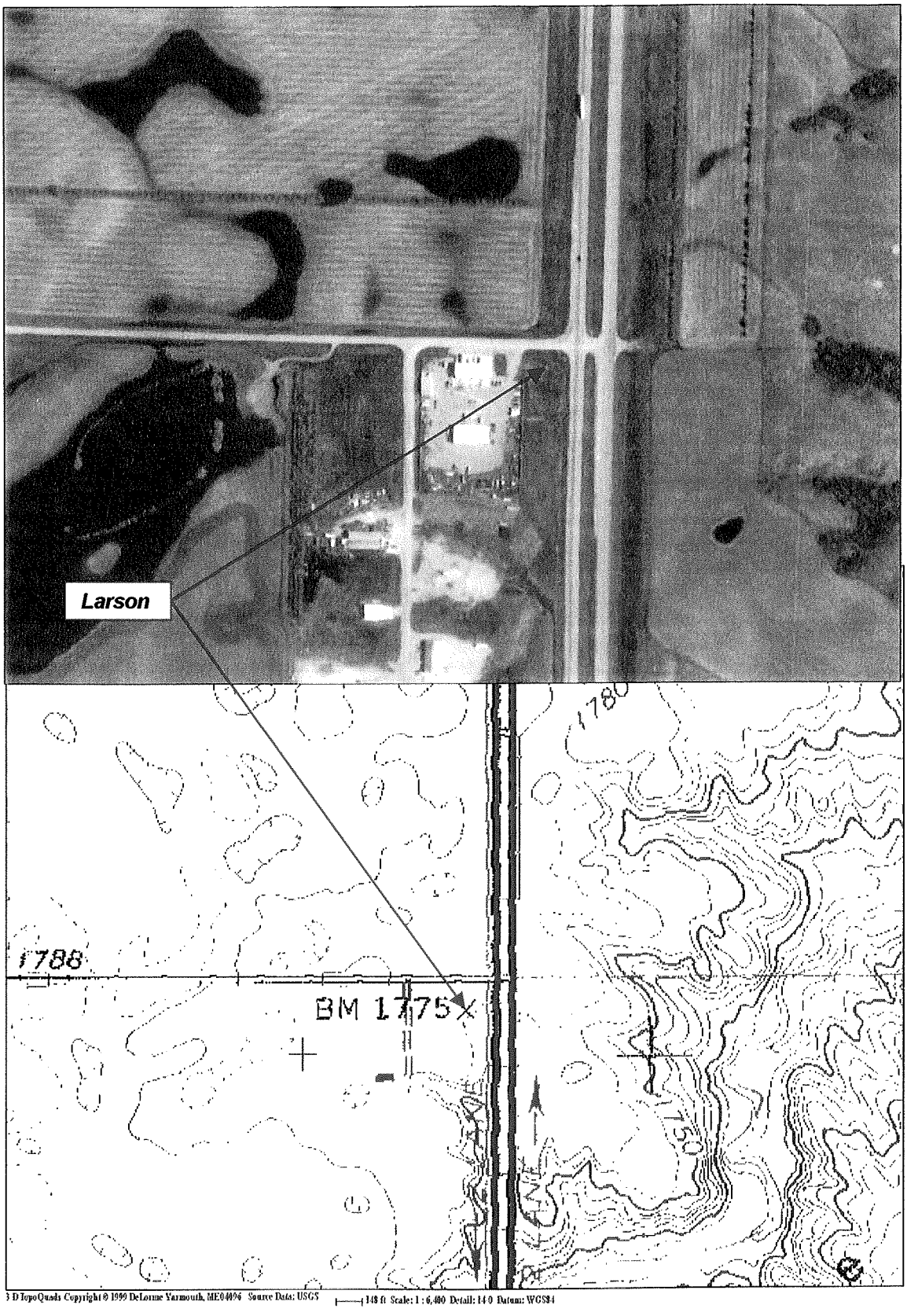
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
458585.079	1777225.154	1713.166

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
139776.732	541698.227	552.173

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.


Larson
1780
1788
BM 1775
1750
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
148 ft Scale: 1 : 6,480 Detail: 14-0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 101 ***Station Designation: Larson***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°10'03.61870"	W 101°17'46.00419"	1708.415

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
426932.499	1774233.322	1775.112

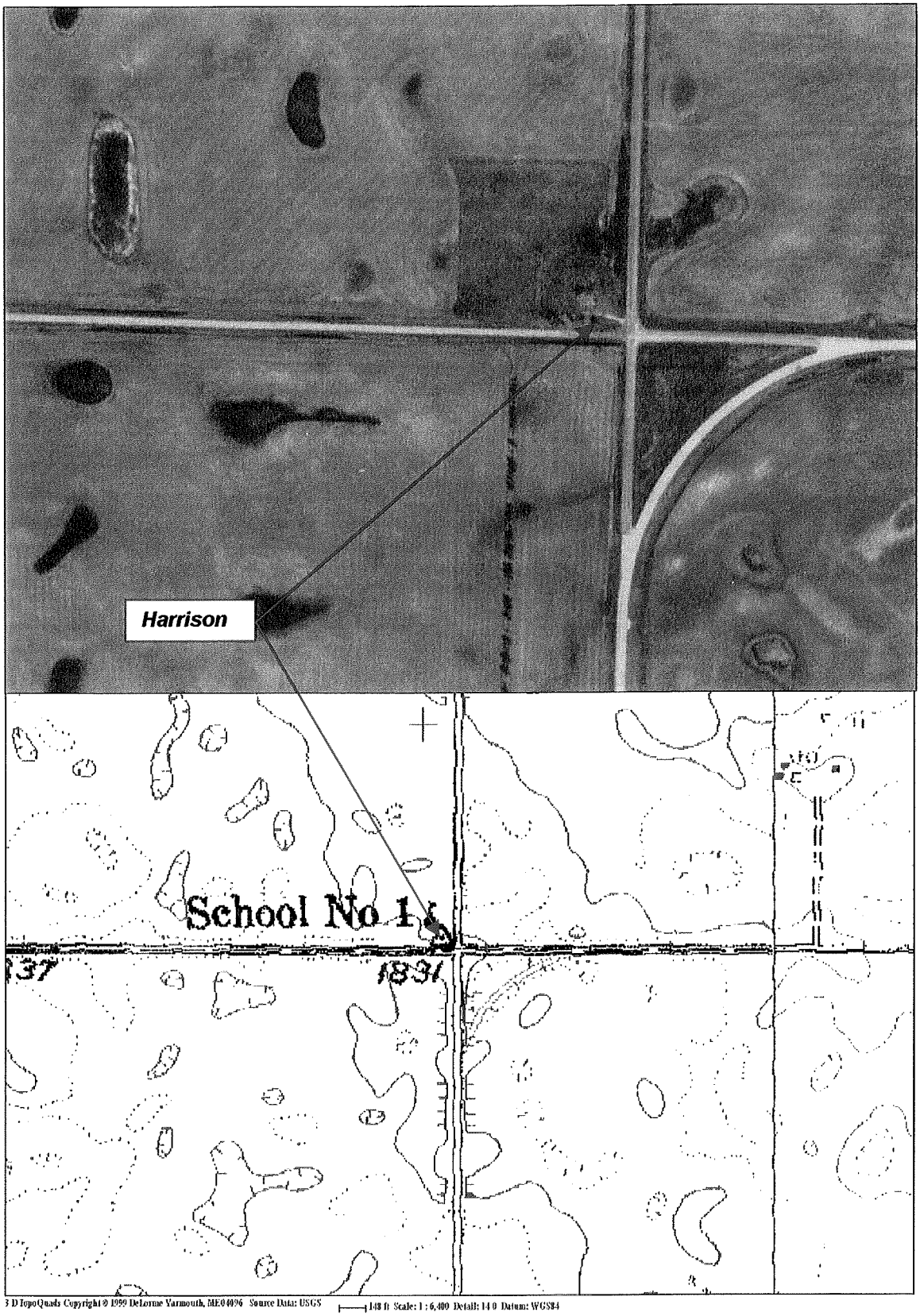
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
426933.353	1774236.870	1775.116

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
130129.286	540787.398	541.055

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.


Harrison
School No 1
1831
3 D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
148 ft Scale: 1 : 6,400 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 102 ***Station Designation: Harrison***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°11'48.68570"	W 101°22'58.68008"	1764.801

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
437809.262	1753162.147	1830.871

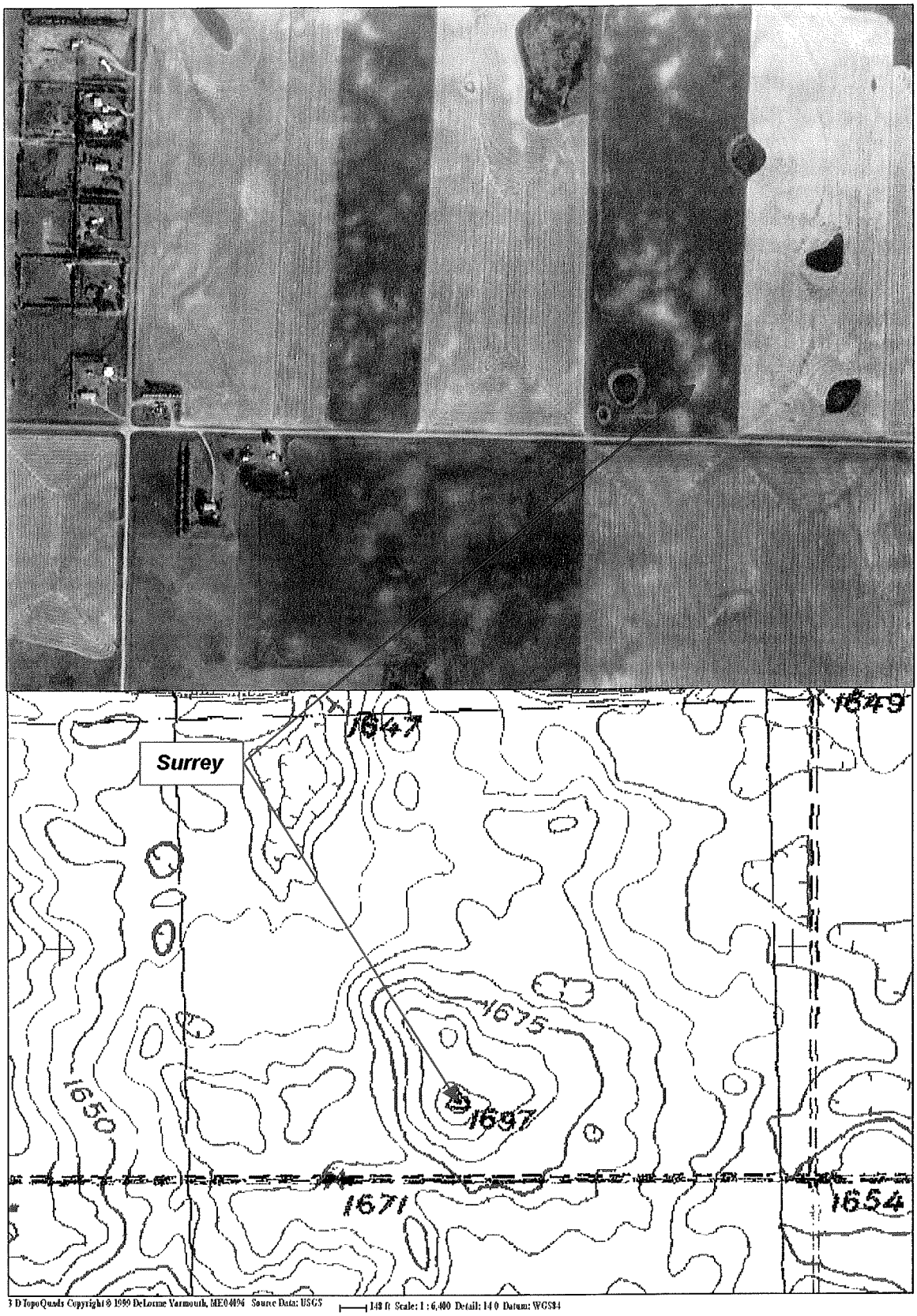
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
437810.138	1753165.653	1830.875

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
133444.530	534364.891	558.051

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.


Surrey
1647
1649
1675
1697
1650
1671
1654
3 D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
1.48 ft Scale: 1 : 6,400 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 103 ***Station Designation: Surrey***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°11'51.83434"	W 101°10'27.71053"	1624.934

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
437613.810	1804037.439	1692.600

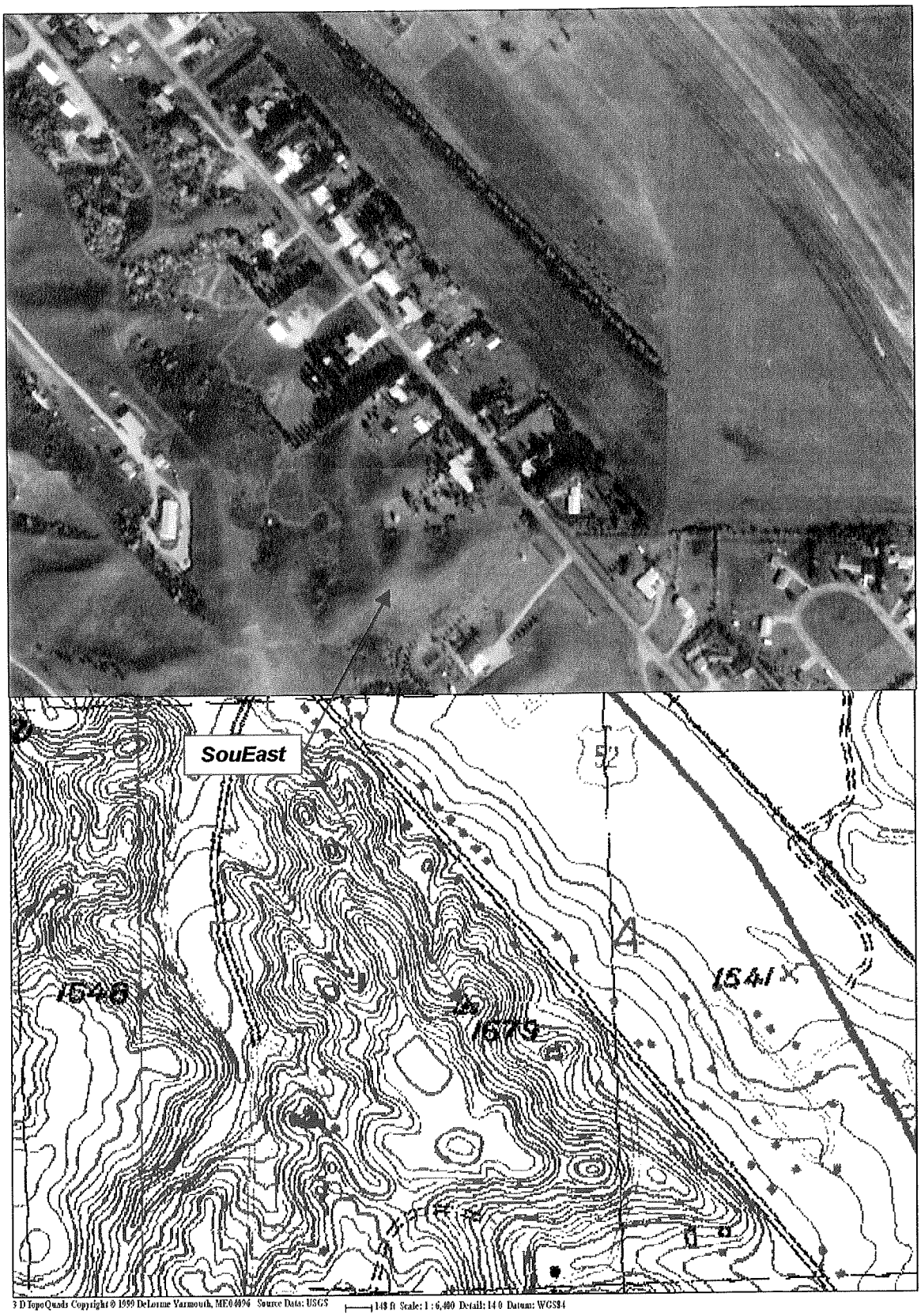
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
437614.685	1804041.047	1692.603

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
133384.956	549871.711	515.906

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.


SouEast
52
1548
1679
1541
3 D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
148 ft Scale: 1 : 6,400 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 104 ***Station Designation: SouEast***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°11'20.37532"	W 101°13'25.52020"	1610.499

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
434535.584	1791962.299	1677.835

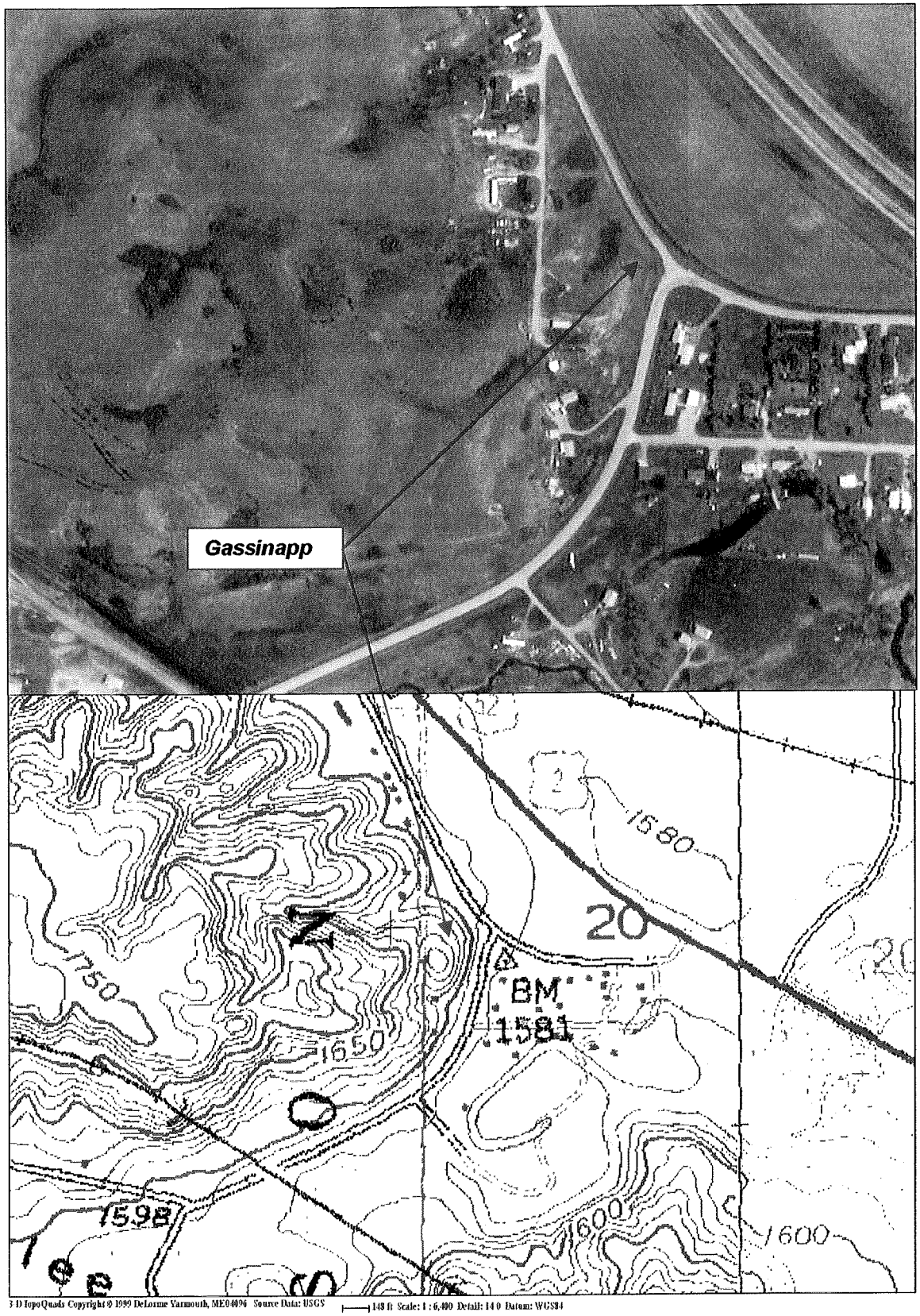
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
434536.453	1791965.883	1677.838

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
132446.711	546191.201	511.405

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 1.43 ft Scale: 1 : 6,400 Detail: 14-0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 105 ***Station Designation: Gassinapp***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°14'00.39965"	W 101°22'54.08838"	1541.477

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
451151.404	1753626.024	1607.774

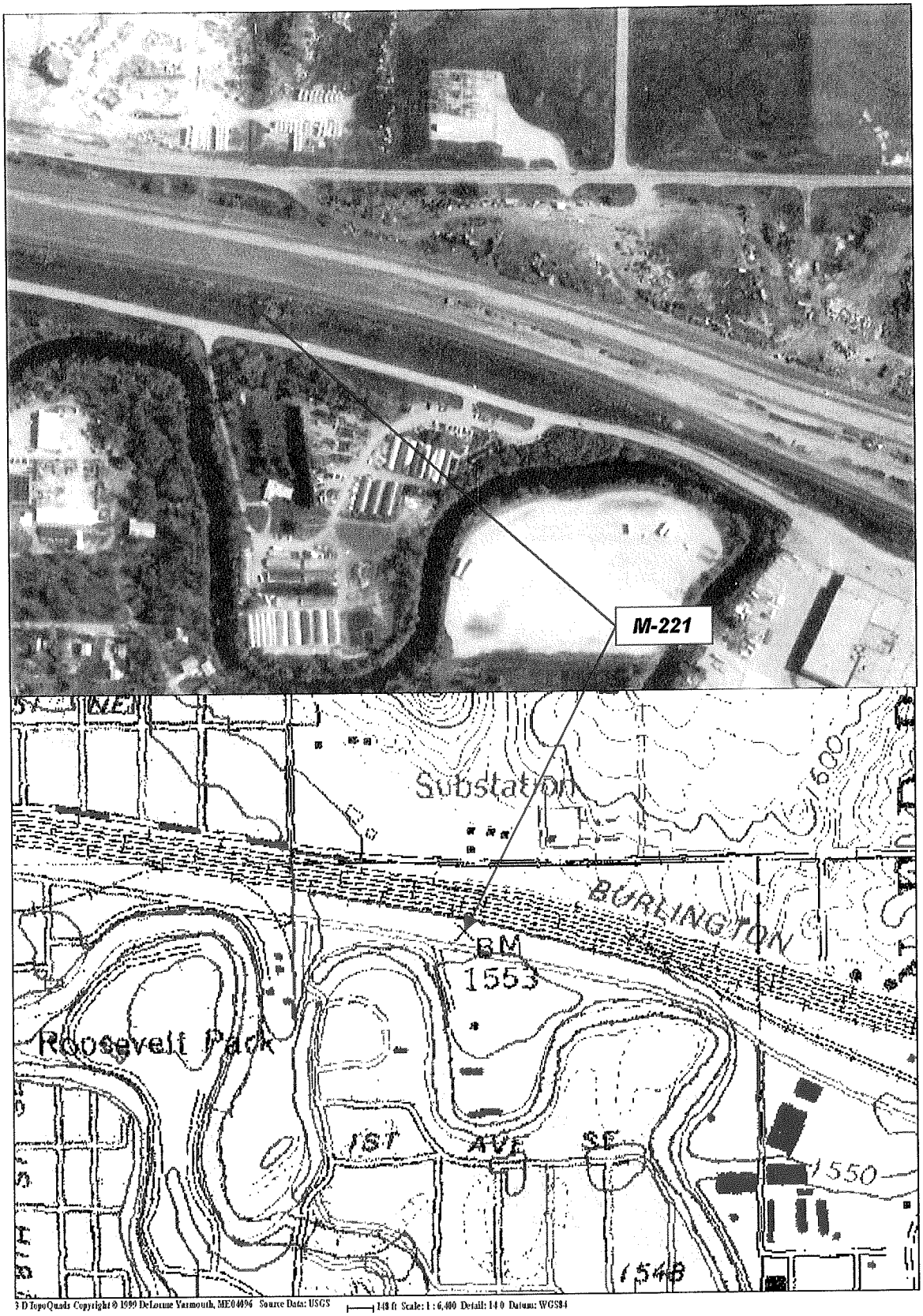
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
451152.306	1753629.531	1607.777

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
137511.223	534506.281	490.050

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.



3 D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 1.48 ft Scale: 1 : 6,400 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 106 ***Station Designation: M-221***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°14'20.09791"	W 101°16'13.26788"	1485.992

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
452856.243	1780779.080	1552.715

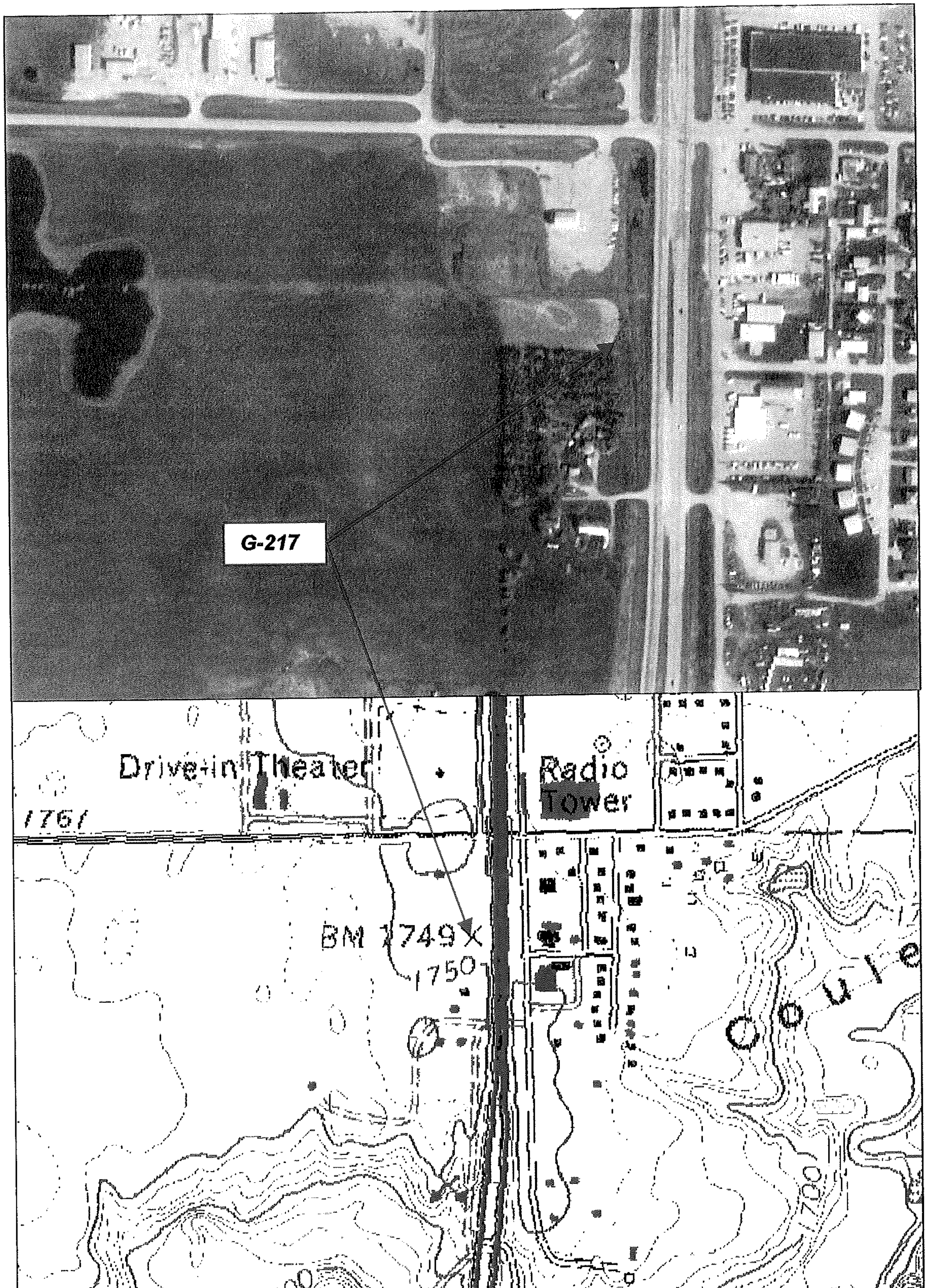
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
452857.149	1780782.642	1552.718

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
138030.859	542782.549	473.268

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 148 ft Scale: 1 : 6,400 Detail: 14-0 Datum: WGS84

ACKERMAN SURVEYING & ASSOCIATES, INC.
6008 HIGHWAY 2 EAST
MINOT, ND 58701
(701) 838-0786

GEODETIC CONTROL MONUMENT

Station No: 107 ***Station Designation: G-217***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°11'41.64296"	W 101°17'47.79692"	1682.766

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
436865.957	1774214.572	1749.148

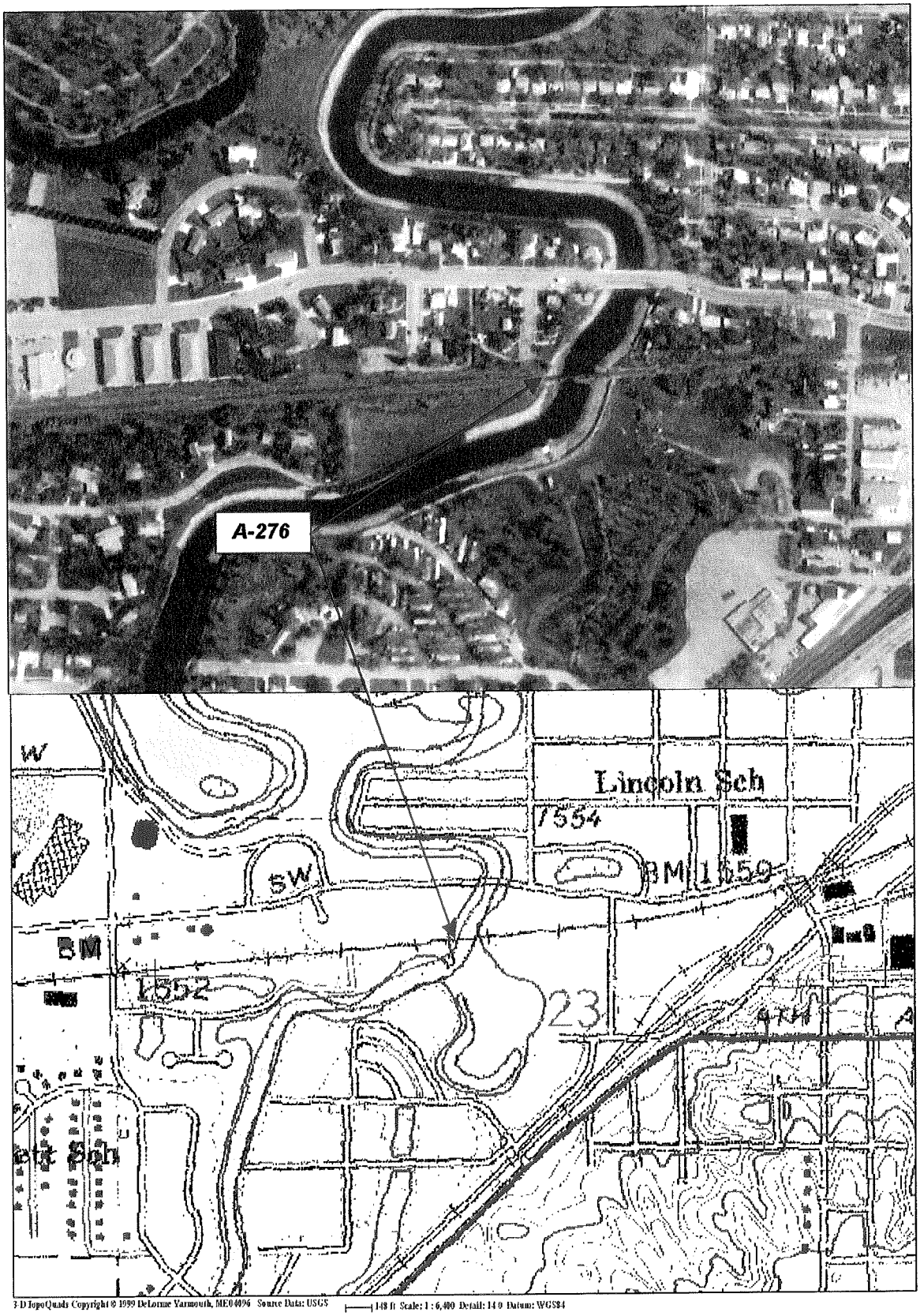
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
436866.831	1774218.120	1749.151

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
133157.010	540781.683	533.141

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.


A-276
Lincoln Sch
1554
BM 1559
SW
BM
1552
23
4TH
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
148 ft Scale: 1 : 6,400 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 108 ***Station Designation: A-276***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°14'02.04742"	W 101°18'35.86360"	1492.640

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
451126.332	1771107.964	1559.070

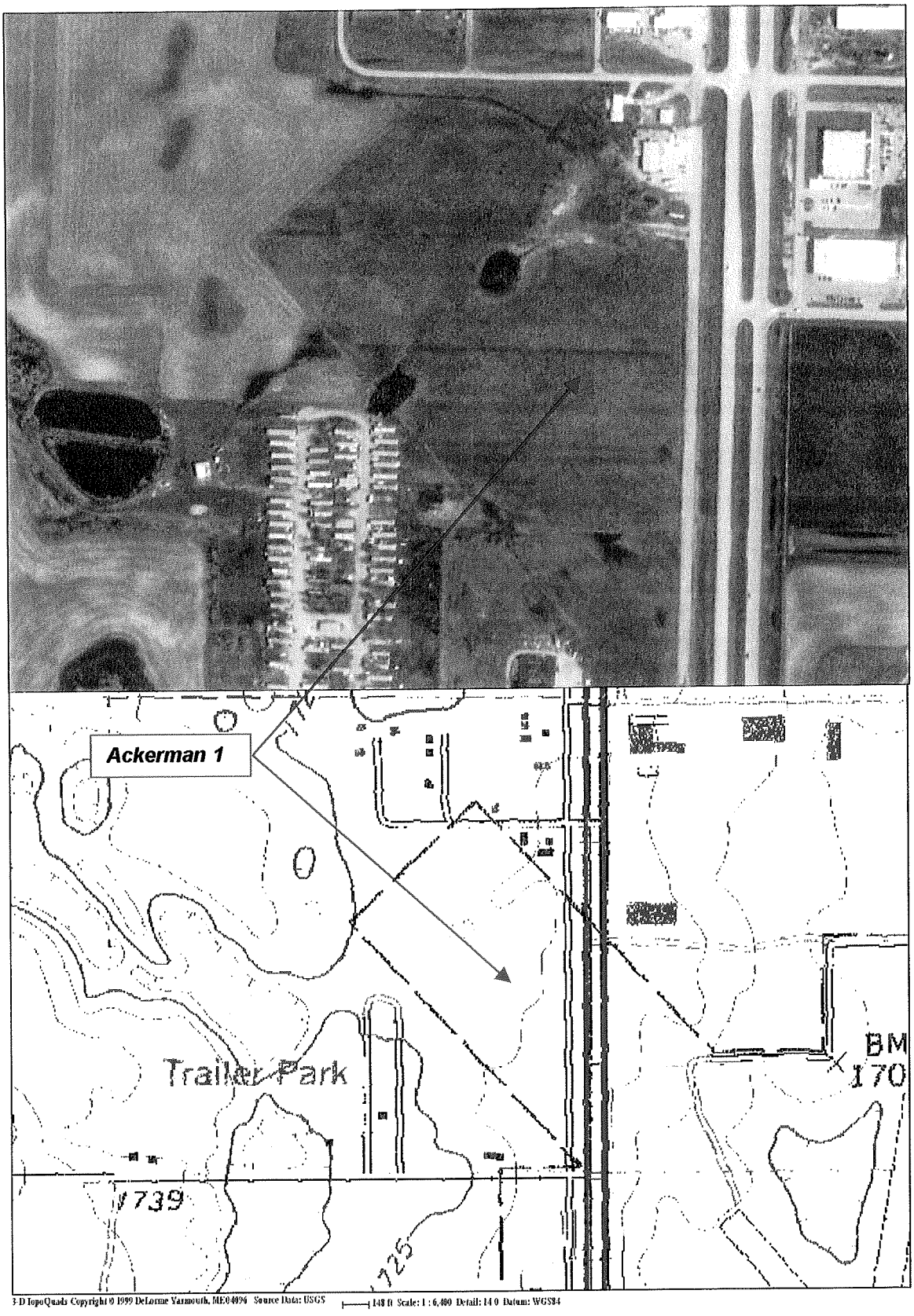
International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
451127.234	1771111.506	1559.073

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
137503.581	539834.787	475.205

A detailed station along with original coordinates derived by the National Geodetic Survey and directions to reach the station can be found in Appendix B.


Ackerman 1
Trailer Park
BM
1739
1725
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
148 ft Scale: 1 : 6,480 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 200 ***Station Designation: Ackerman 1***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°16'17.70098"	W 101°17'51.69230"	1655.782

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
464840.273	1774240.479	1722.915

International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
464841.203	1774244.027	1722.918

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
141683.599	540789.579	525.145

Directions to Reach the Station

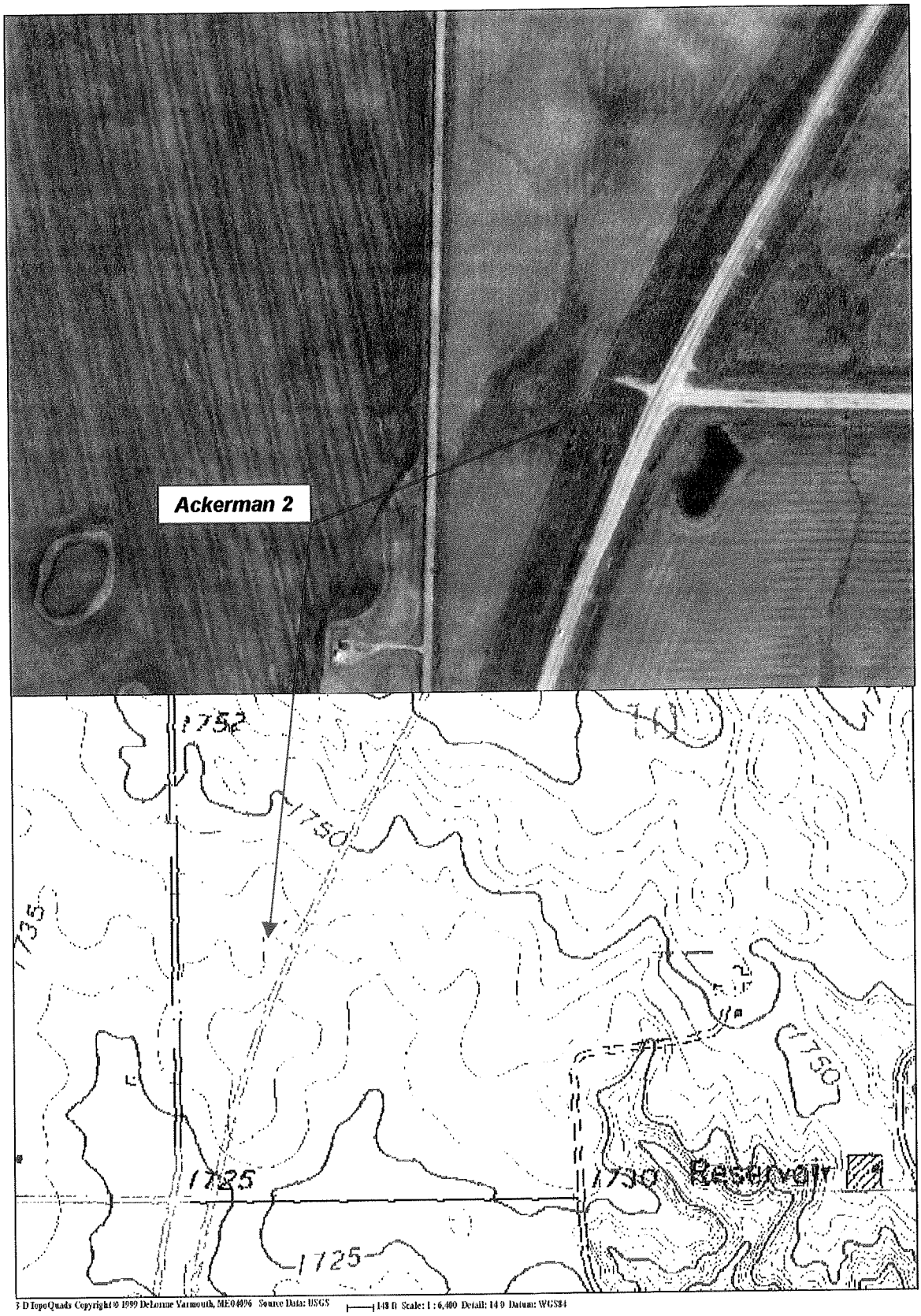
The station is located on land dedicated to the glide path of the Minot International Airport in north Minot.

Commence at the intersection of Broadway (US Highway 83) and Burdick Expressway in Minot. Travel north along Broadway for a distance of 2.53 miles to a T-intersection and a road leading west. Travel west 200 feet (0.04 miles) to a gravel frontage road. Travel north along the frontage road 990 feet (0.19 miles) to the station on the left.

The station is located inside of a standard cover, depicted in Appendix C, and stamped ACKERMAN 1. The station is 312 feet west of a gravel frontage road, 95.0 feet southwest of the projected centerline of the main runway at Minot International Airport, 43.5 feet west-northwest of a telecommunications pedestal, and 2.2 feet northeast of a Carsonite witness post.

The station is a standard 9/16" rod driven 32 feet to refusal.

Additional photographs and descriptions of the station and its surroundings are located in Appendix A.



3 D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 1.48 ft Scale: 1 : 6,400 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 201 ***Station Designation: Ackerman 2***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°15'30.45344"	W 101°20'14.55099"	1668.815

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
460155.516	1764524.914	1735.593

International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
460156.437	1764528.443	1735.596

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
140255.682	537828.269	529.010

Directions to Reach the Station

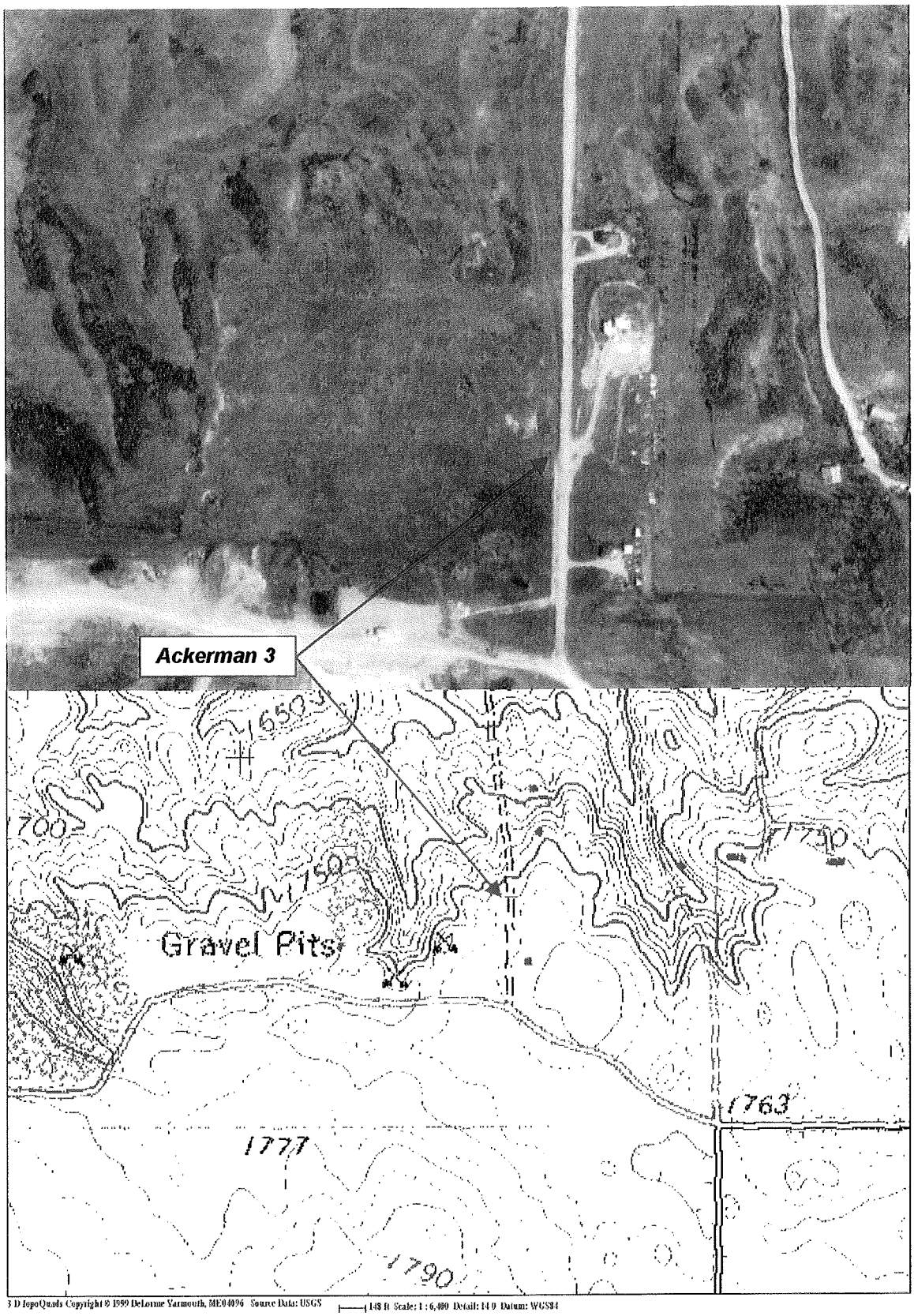
The station is located in the highway right-of-way on the west side of the US Highway 83 Bypass near the highway's intersection with 21st Avenue Northwest in Minot.

Commence at the intersection of Broadway (US Highway 83) and Burdick Expressway in Minot. Travel west then southwest along Burdick Expressway for a distance of 2.10 miles to the intersection with the US Highway 2 & 52 Bypass. Travel west along the 2 & 52 Bypass for a distance of 0.45 miles to the intersection with the US Highway 83 Bypass. Travel north along the US Highway 83 Bypass for a distance of 2.53miles to a T-intersection with 21st Avenue to the east and an approach and the station to the west. The station is located inside of a standard cover, depicted in Appendix C, and stamped ACKERMAN 2.

The station is 182.3 feet west of the centerline-centerline intersection of 21st Avenue Northwest and the US Highway 83 Bypass, 38 feet south of the centerline of an approach, 32.3 feet southwest of the south end of an 18" corrugated metal pipe running under the approach, 15.0 feet southeast of the end of a fence on the south side of the approach, and 2.0 feet northeast of a Carsonite witness post.

The station is a standard 9/16" rod driven 24 feet to refusal.

Additional photographs and descriptions of the station and its surroundings are located in Appendix A.


Ackerman 3
1650
700
1750
Gravel Pits
1790
1763
1777
1790
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
1.43 ft Scale: 1 : 6,480 Detail: 14-0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 202 ***Station Designation: Ackerman 3***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°12'52.11923"	W 101°20'38.50119"	1698.716

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
444130.087	1762728.555	1765.234

International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
444130.975	1762732.080	1765.237

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
135371.121	537280.738	538.044

Directions to Reach the Station

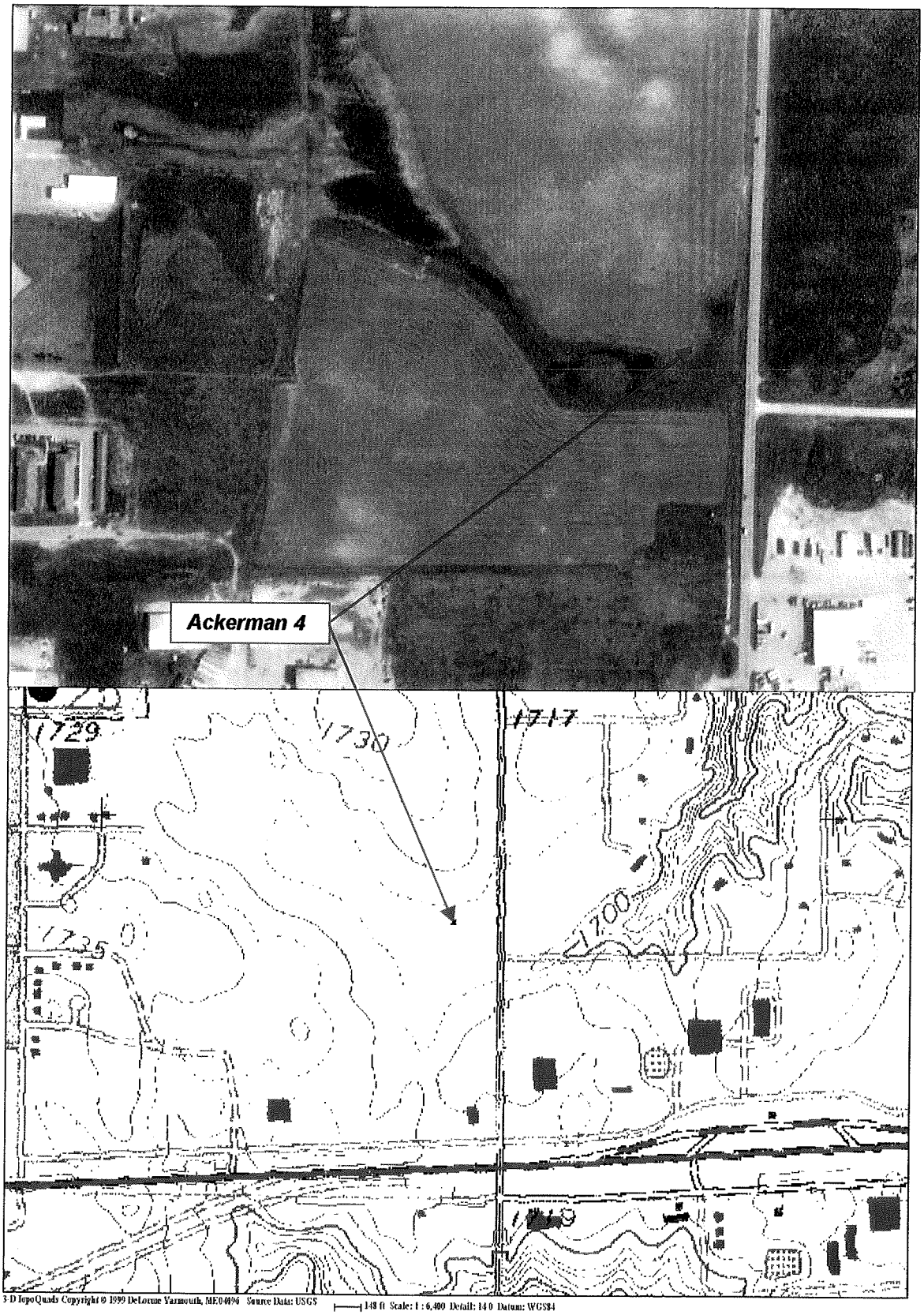
The station is located near the Minot City Landfill on a high point northeast of the landfill site.

Commence at the intersection of Broadway (US Highway 83) and Burdick Expressway in Minot. Travel west then southwest along Burdick Expressway for a distance of 2.10 miles to the intersection with the US Highway 2 & 52 Bypass. Travel west along the 2 & 52 Bypass for a distance of 0.45 miles to the intersection with the US Highway 83 Bypass. Travel south 250 feet to an intersection with a frontage road. Travel west along the frontage road for a distance of 300 feet (0.05 miles) to a T-intersection and a road leading south. Travel south along the gravel road 0.52 miles to the station on the right. The station is located inside of a standard cover, depicted in Appendix C, and stamped ACKERMAN 3.

The station is 50 feet west of the centerline of a gravel road, 2.3 feet south of an east-west fence line. 10.6 feet west of a north-south fence line, 138.5 feet east-northeast of power pole #43 in a row of poles running north and south, and 2.8 feet northeast of a Carsonite witness post.

The station is a standard 9/16" rod driven 60 feet to refusal.

Additional photographs and descriptions of the station and its surroundings are located in Appendix A.


Ackerman 4
1729
1730
1717
1700
1735
3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
1 inch = 148 ft Scale: 1 : 6,400 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 203 ***Station Designation: Ackerman 4***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°12'54.20915"	W 101°16'31.21541"	1645.379

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
444165.743	1779476.626	1712.441

International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
444166.632	1779480.185	1712.444

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
135381.989	542385.560	521.953

Directions to Reach the Station

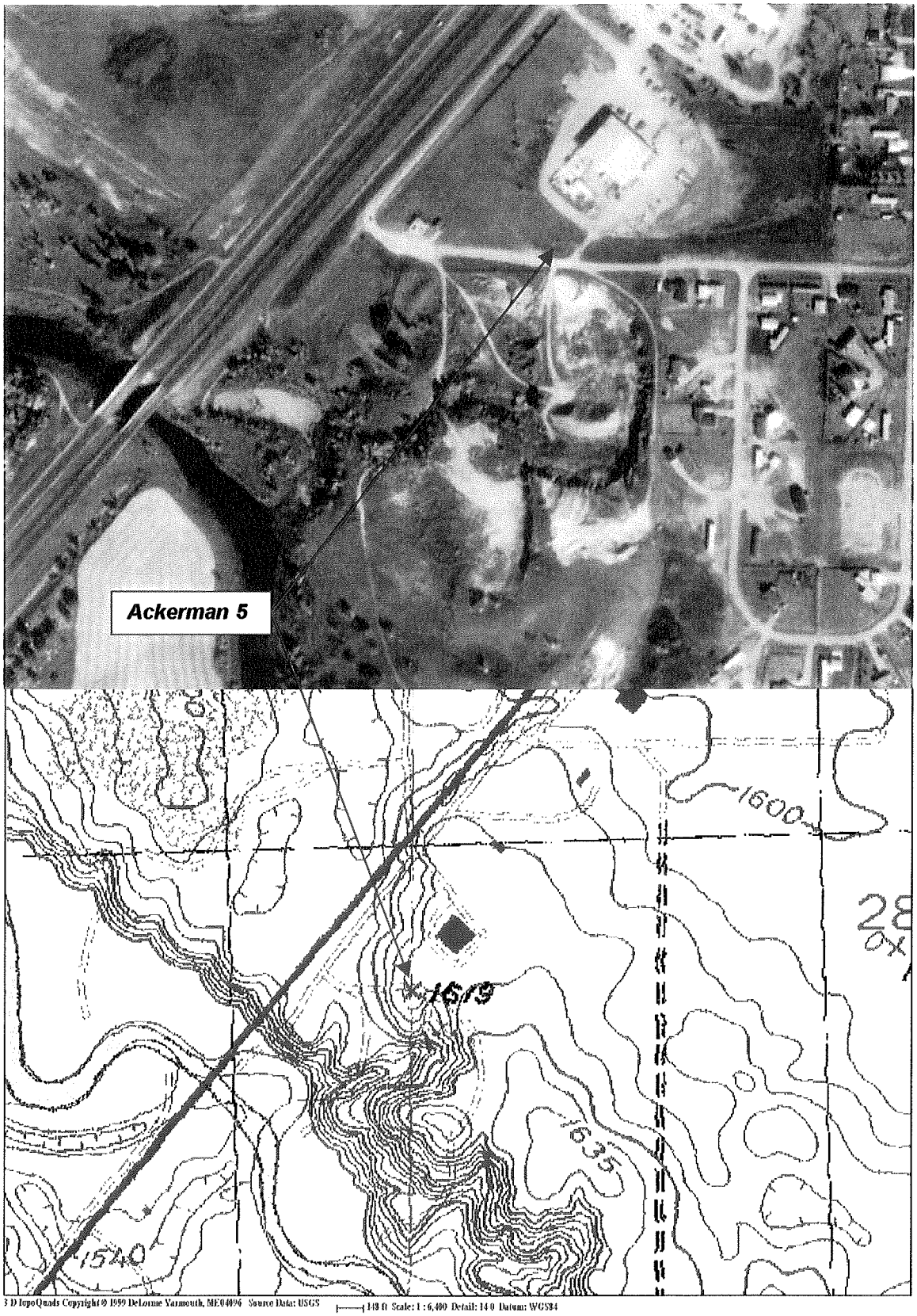
The station is located on the northwest corner of a parcel of land dedicated to a detention pond south of Edgewood Addition in southeast Minot.

Commence at the intersection of Broadway (US Highway 83) and Burdick Expressway in Minot. Travel south along Broadway, a distance of 1.51 miles to the intersection of Broadway and 20th Avenue Southwest. Travel east along 20th Avenue, a distance of 1.00 miles to the intersection of 20th Avenue Southeast and 13th Street Southeast. Travel north along 13th Street Southeast, a distance of 0.21 miles to an intersection and the station on the northwest corner of the detention pond. The station is located inside of a standard cover, depicted in Appendix C, and stamped ACKERMAN 4.

The station is 235.0 feet west of the centerline of 13th Street Southwest, 16.3 feet west of a corner of a chain link fence, 12.8 feet north of a corner of the same fence, and 2.3 feet southeast of a Carsonite witness post.

The station is a standard 9/16" rod driven 28 feet to refusal.

Additional photographs and descriptions of the station and its surroundings are located in Appendix A.


Ackerman 5
1600
1615
1635
1540
3 D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS
1.48 ft Scale: 1 : 6,480 Detail: 14 0 Datum: WGS84

GEODETIC CONTROL MONUMENT

Station No: 204 ***Station Designation: Ackerman 5***

Datum Information

Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	NGVD 1929
Geoid Model:	GEOID99 (Conus)

Geodetic Position

Latitude	*Longitude*	*Ellipsoid Height (sft)*
N 48°13'06.36898"	W 101°13'52.15180"	1550.933

State Plane Coordinates

US Survey Feet

Northing (sft)	*Easting (sft)*	*Elevation (sft)*
445292.465	1790259.910	1618.307

International Feet

Northing (ift)	*Easting (ift)*	*Elevation (ift)*
445293.356	1790263.490	1618.310

Metric

Northing (m)	*Easting (m)*	*Elevation (m)*
135725.415	545672.312	493.261

Directions to Reach the Station

The station is located in the right of way on the north side of a gravel road on the south side of Butler Machinery in southeast Minot.

Commence at the intersection of Broadway (US Highway 83) and Burdick Expressway in Minot. Travel south along Broadway, a distance of 1.71 miles to the intersection of Broadway and the US Highway 2 & 52 Bypass. Travel along the eastbound loop-ramp. From the intersection of the eastbound highway travel lane and Broadway, travel east along the US Highway 2 & 52 Bypass, a distance of 2.40 miles to the intersection of US Highway 52 and the US Highway 2 Bypass. Travel east along the US Highway 2 Bypass, a distance of 1.11 miles to an intersection. Turn right at the intersection and travel 95 feet to a frontage road. Travel southwest along the frontage road, a distance of 0.22 miles to a T-intersection. Travel east along a gravel road, a distance of 0.11 miles to the top of a hill and the station on the left. The station is located inside of a standard cover, depicted in Appendix C, and stamped ACKERMAN 5.

The station is 28.0 feet north of the centerline of a gravel road, 96.0 feet west of the centerline of a recycled asphalt approach, 64.1 feet north of a ¼ corner stone, and 2.3 feet southeast of a Carsonite witness post.

The station is a standard 9/16" rod driven 44 feet to refusal.

Additional photographs and descriptions of the station and its surroundings are located in Appendix A.

VERTICAL SURVEY CONTROL NETWORK

VERTICAL CONTROL NETWORK

LEGEND

PREVIOUSLY OCCUPIED BASELINES

CITY OF MINOT VERTICAL CONTROL SURVEY BASELINES

SCALE: 1" = 4000'

ACKERMAN 1

ACKERMAN 2

L-232

RANSPORT

F-276

S-335

GASSINAPP

D-276

S-463

N-2 1

M-221

H-4

A-276

C-276

N-472

V-463

T-463

V-467

MINOT RESET

S-221

ACKERMAN 3

ACKERMAN 4

ACKERMAN 5

U-467

HARRISON

G-217

SURREY

SOUEAST

K-13 RESET

LARSON

ACKERMAN SURVEYING & ASSOCIATES
(701) 838-0786
6008 HWY 2 EAST, MINOT, N.D. 58701

VERTICAL SURVEY CONTROL DATA

Datum Information

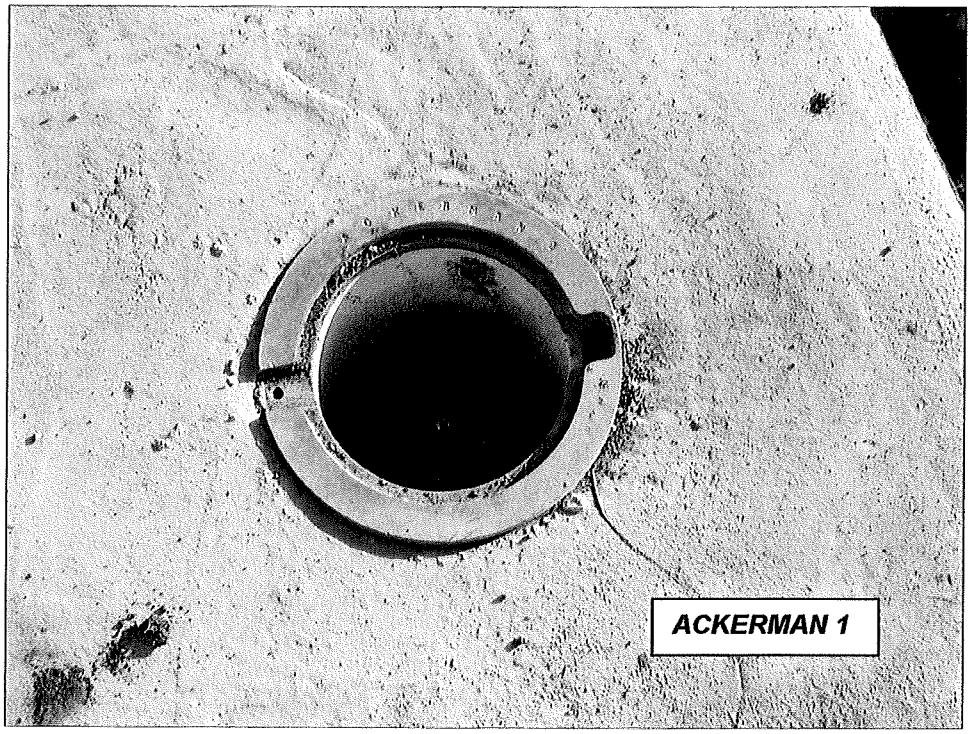
Project Datum:	NAD 1983 (Conus)
Horizontal Coordinate System:	US State Plane 1983
Horizontal Coordinate Zone:	North Dakota North – 3301
Vertical Datum:	**NGVD 1929**
Geoid Model:	GEOID99 (Conus)
Units:	U.S. Survey Feet (1m = 39.37in)

Station Designation	*Northing (sft)*	*Easting (sft)*	*Elevation (sft)*
A-276	451126.332	1771107.964	**1559.070**
C-276	450454.735	1763909.038	**1560.763**
D-276	451471.168	1757403.244	**1568.517**
F-276	456140.326	1749724.530	**1583.955**
G-217	436865.957	1774214.572	**1749.148**
Gassinapp	451151.404	1753626.024	**1607.774**
H-4	452234.133	1775283.580	**1563.709**
Harrison	437809.262	1753162.147	**1830.871**
K-13 Reset	432299.746	1774125.307	**1769.182**
L-232	458665.800	1774884.878	**1719.346**
Larson	426932.499	1774233.322	**1775.112**
M-221	452856.243	1780779.080	**1552.715**
Minot Reset	448288.335	1777837.106	**1733.475**
N-221	N/A	N/A	**1555.701**
N-472	N/A	N/A	**1551.201**
S-221	445841.783	1761811.266	**1628.253**
S-335	453470.445	1759764.795	**1568.247**
S-463	N/A	N/A	**1562.120**
Sou'East	434535.584	1791962.299	**1677.835**
Surrey	437613.810	1804037.439	**1692.600**
T-463	449006.864	1769707.071	**1546.067**
Transport	458584.162	1777221.600	**1713.163**
U-467	441355.922	1774453.600	**1730.479**
V-463	449498.949	1757151.406	**1570.395**
V-467	448733.822	1774525.308	**1675.261**

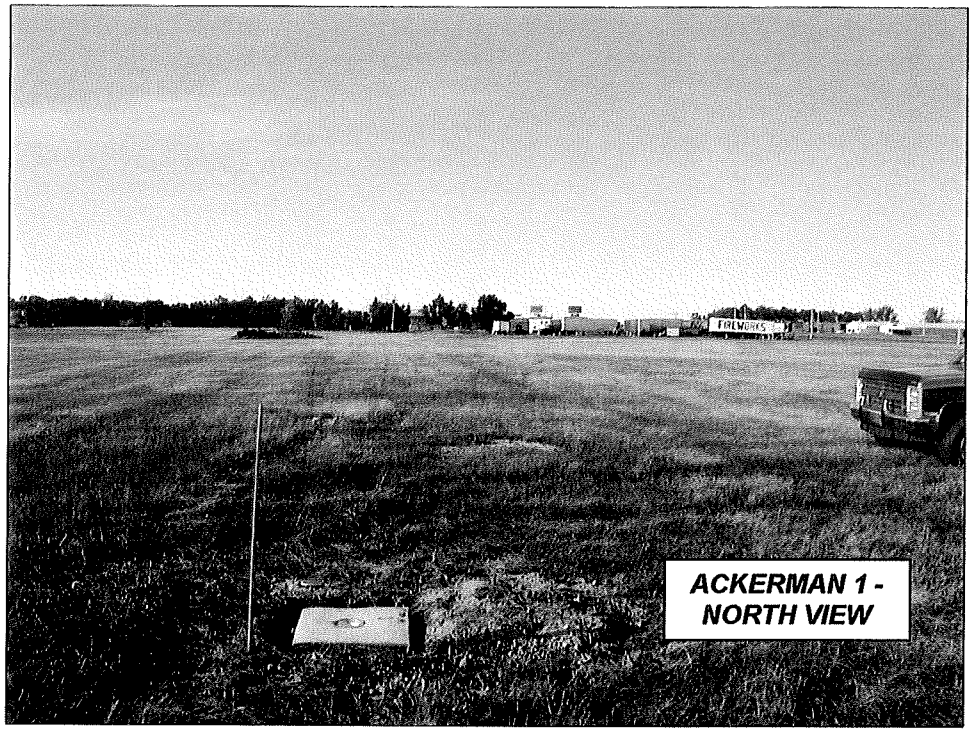
The horizontal positions of stations other than those documented previously were established using kinematic GPS techniques. Station coordinates annotated "N/A" were unable to be determined due to environmental conditions of the station. Station descriptions, including superseded control and directions to reach the station, are located in Appendix -B-.

Appendix -A-

Additional Station Descriptions



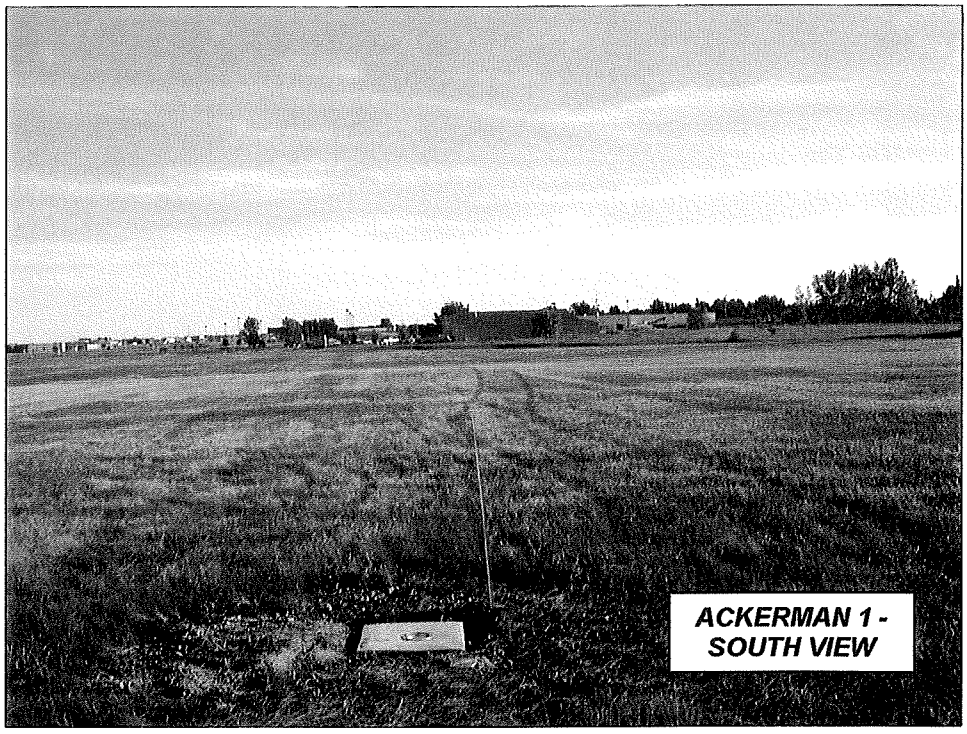
ACKERMAN 1



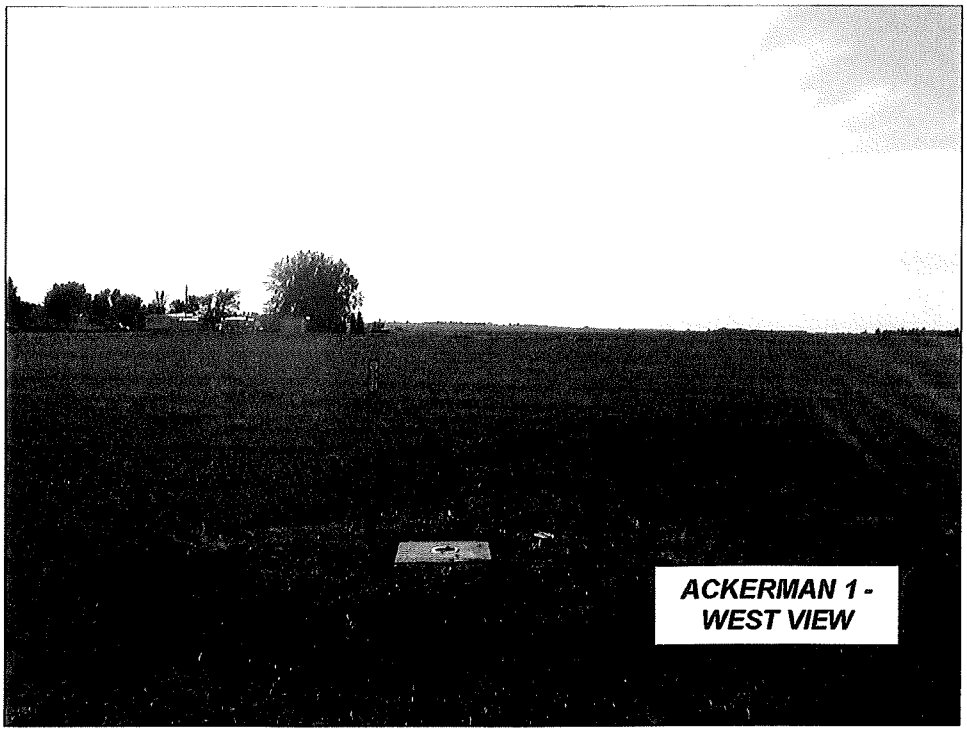
ACKERMAN 1 - NORTH VIEW


ACKERMAN 1 -
EAST VIEW

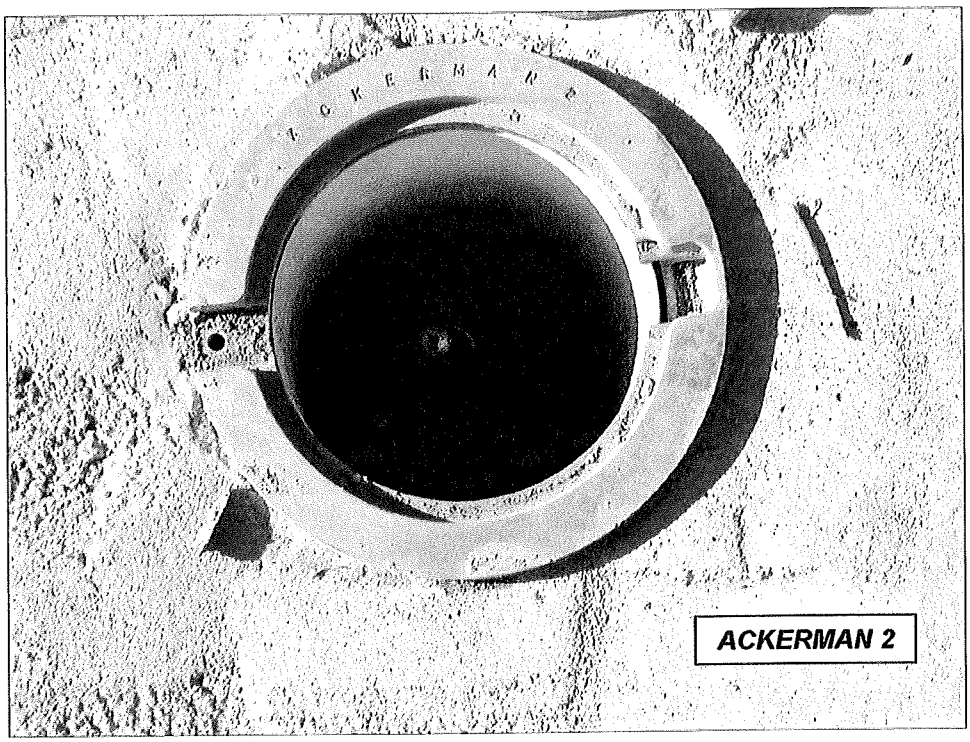

ACKERMAN 1 -
SOUTHEAST VIEW

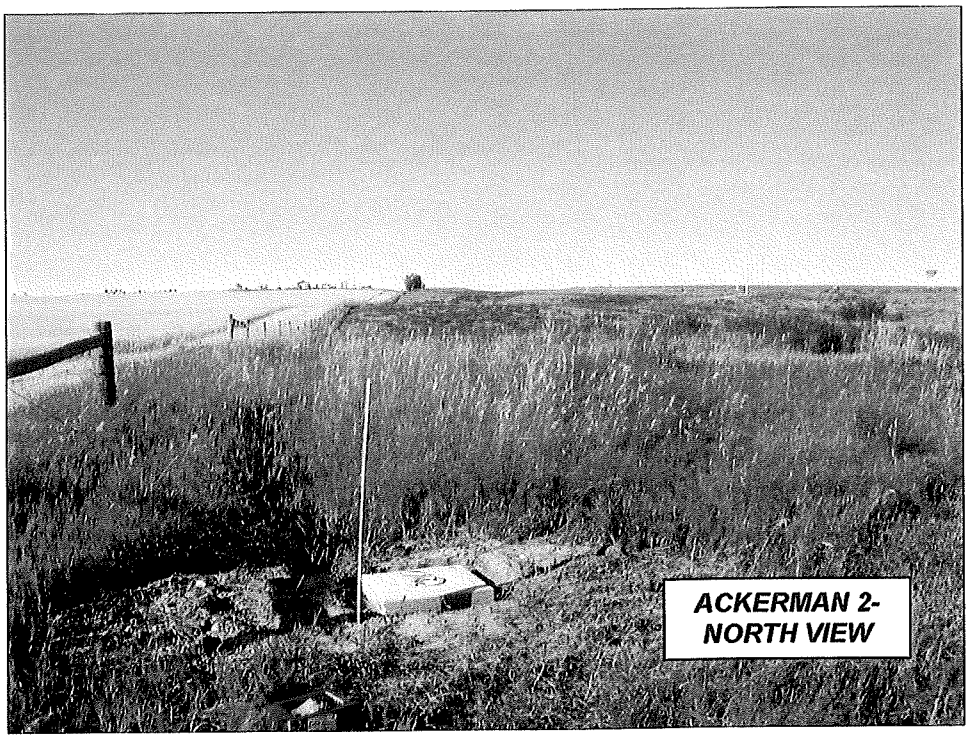


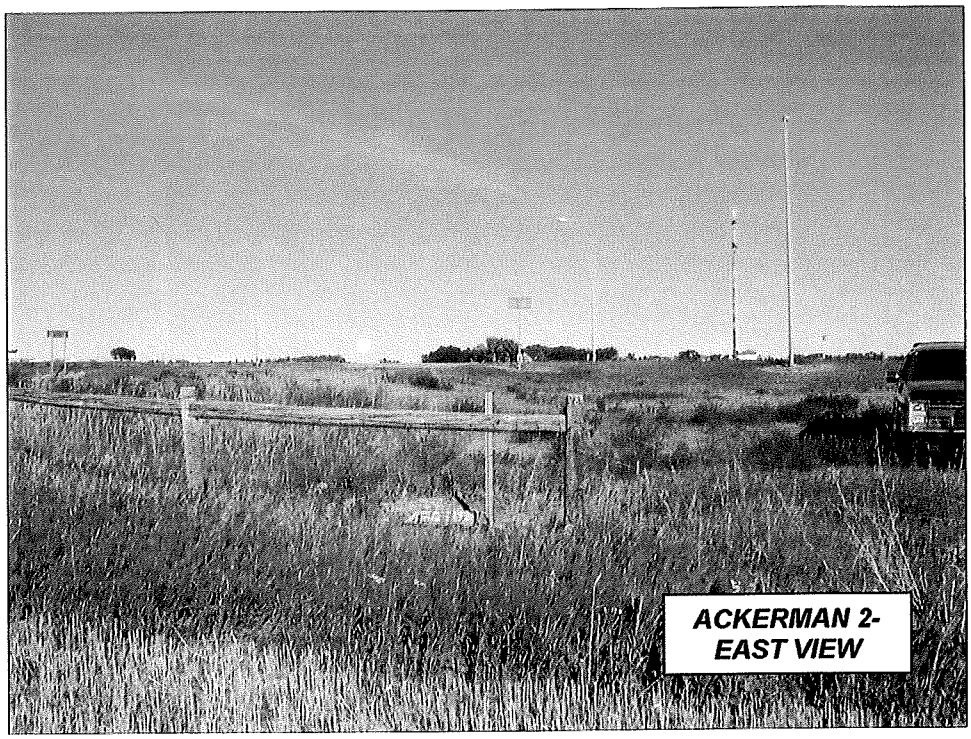
ACKERMAN 1 - SOUTH VIEW



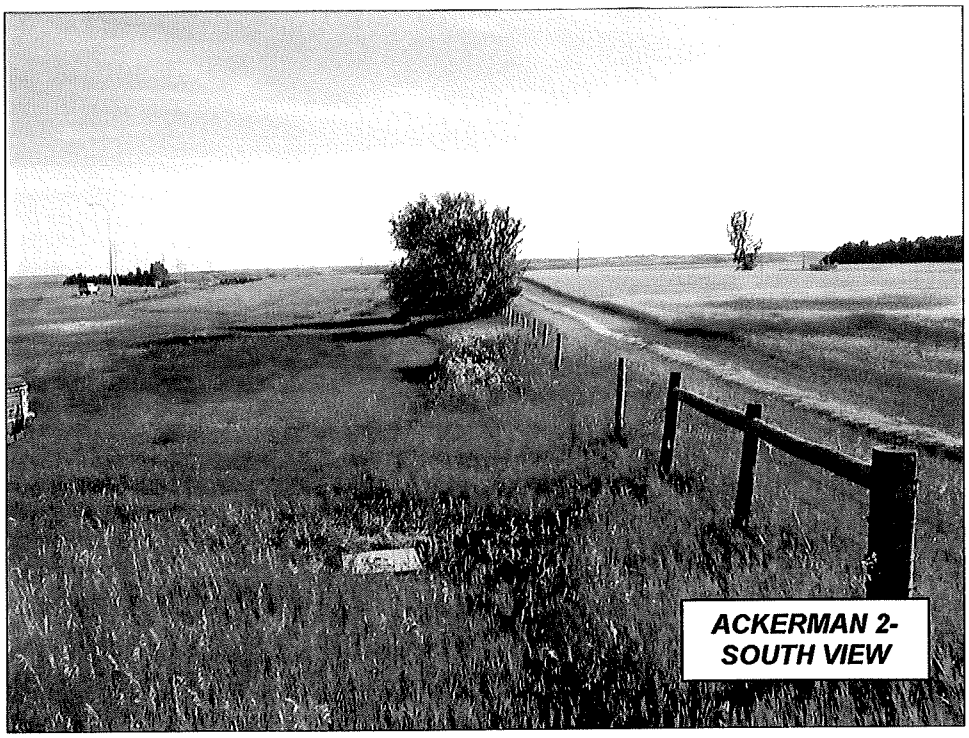
ACKERMAN 1 - WEST VIEW


ACKERMAN 2

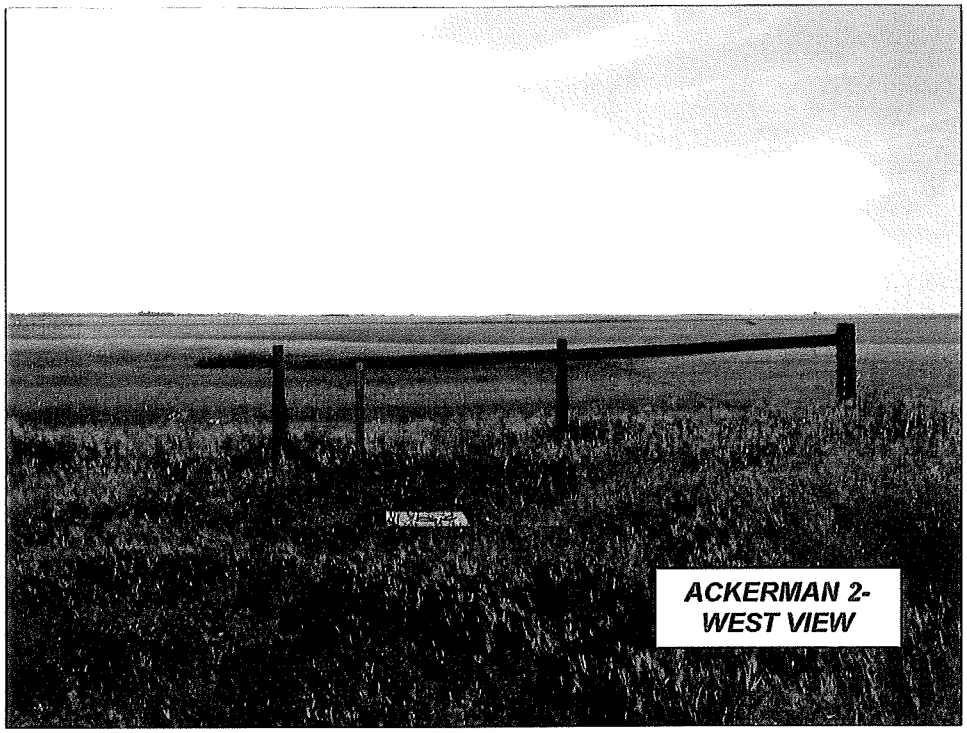

ACKERMAN 2-
NORTH VIEW

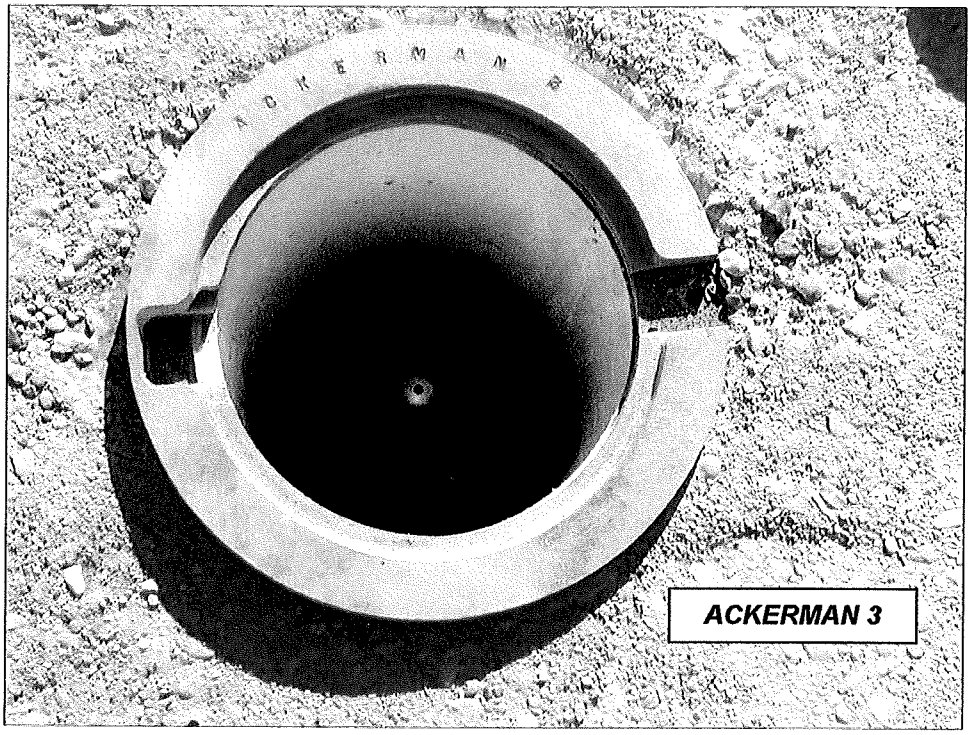


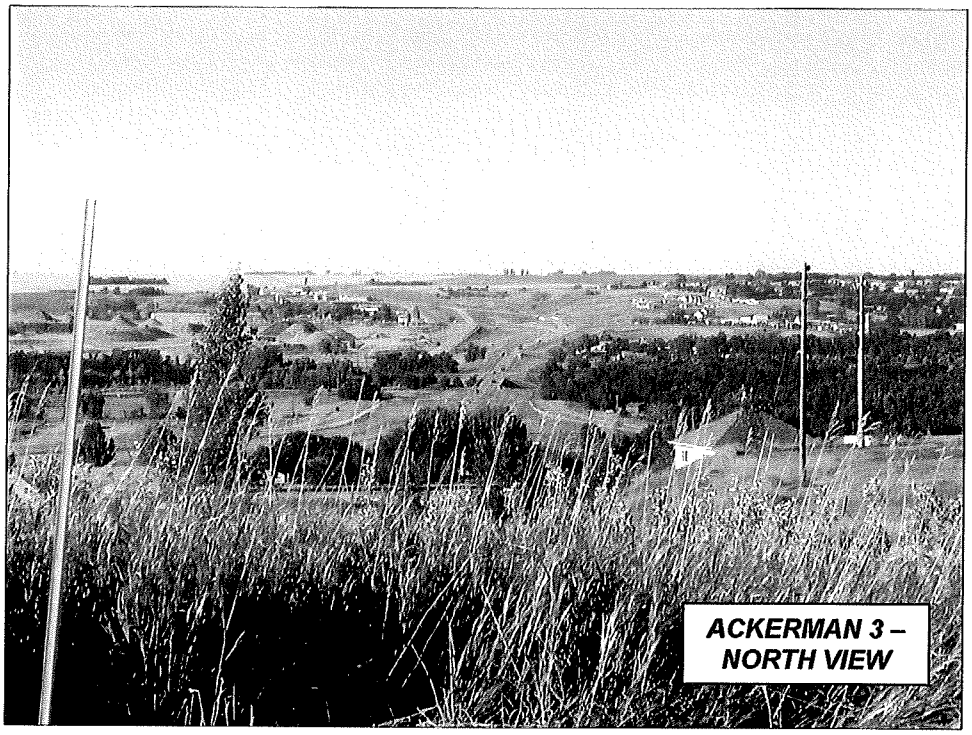
ACKERMAN 2- EAST VIEW

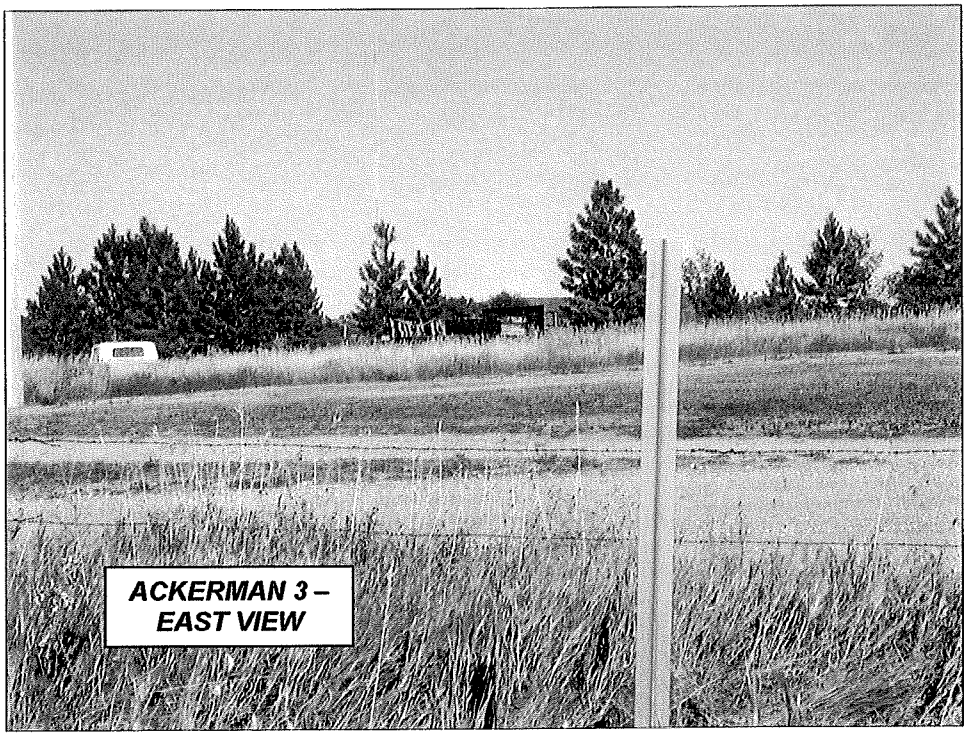


ACKERMAN 2- SOUTH VIEW

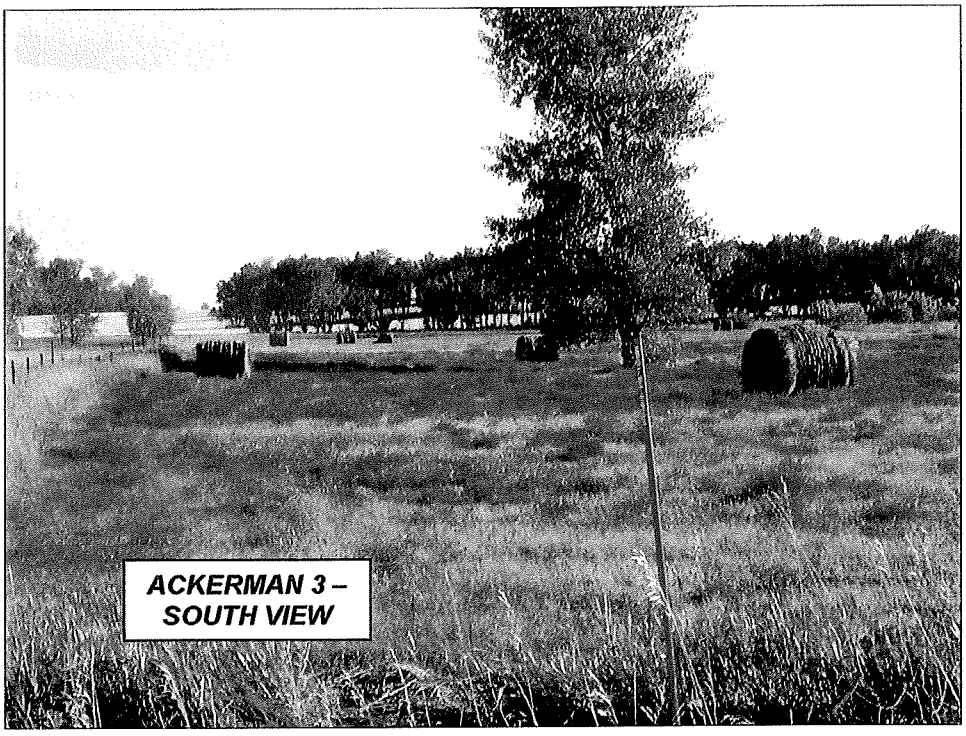

ACKERMAN 2-
WEST VIEW


ACKERMAN 3

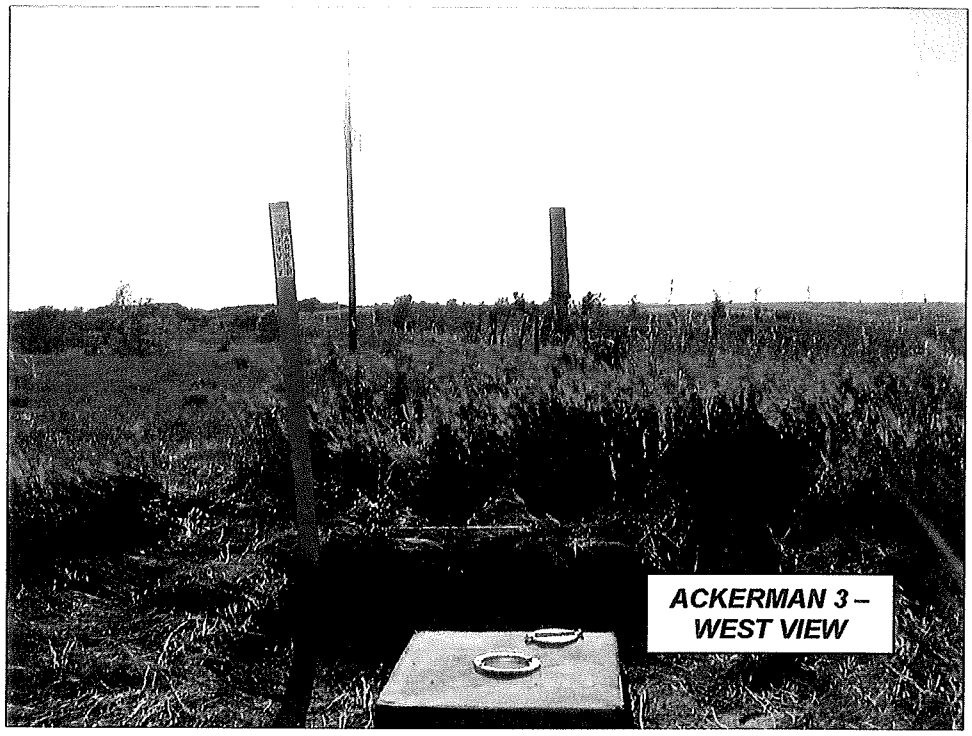

ACKERMAN 3 –
NORTH VIEW

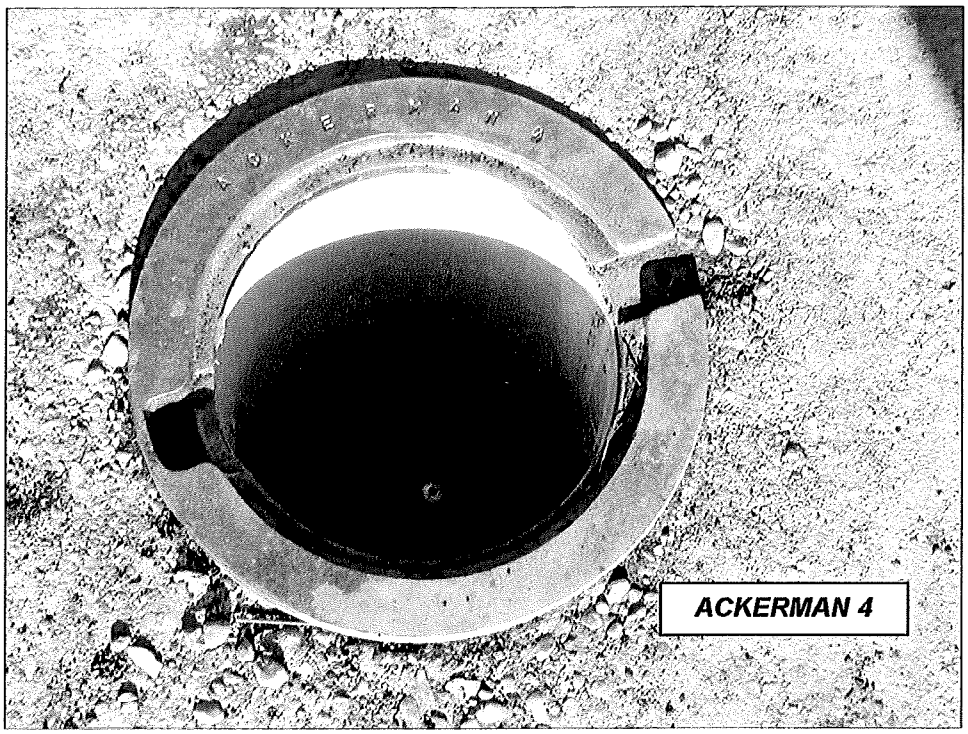


ACKERMAN 3 – EAST VIEW

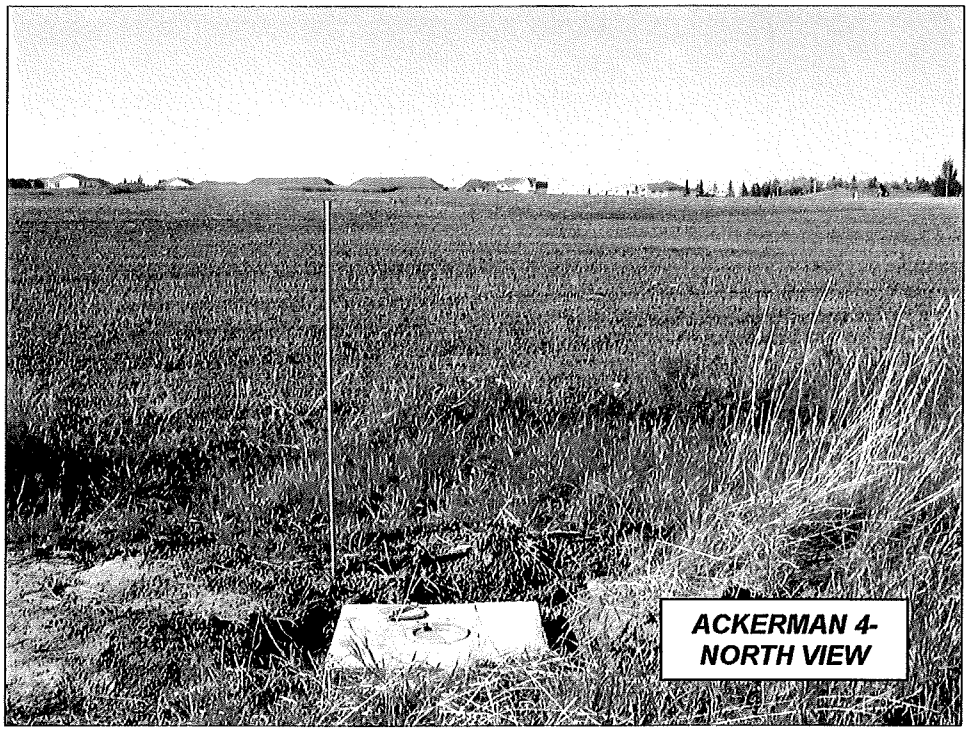


ACKERMAN 3 – SOUTH VIEW

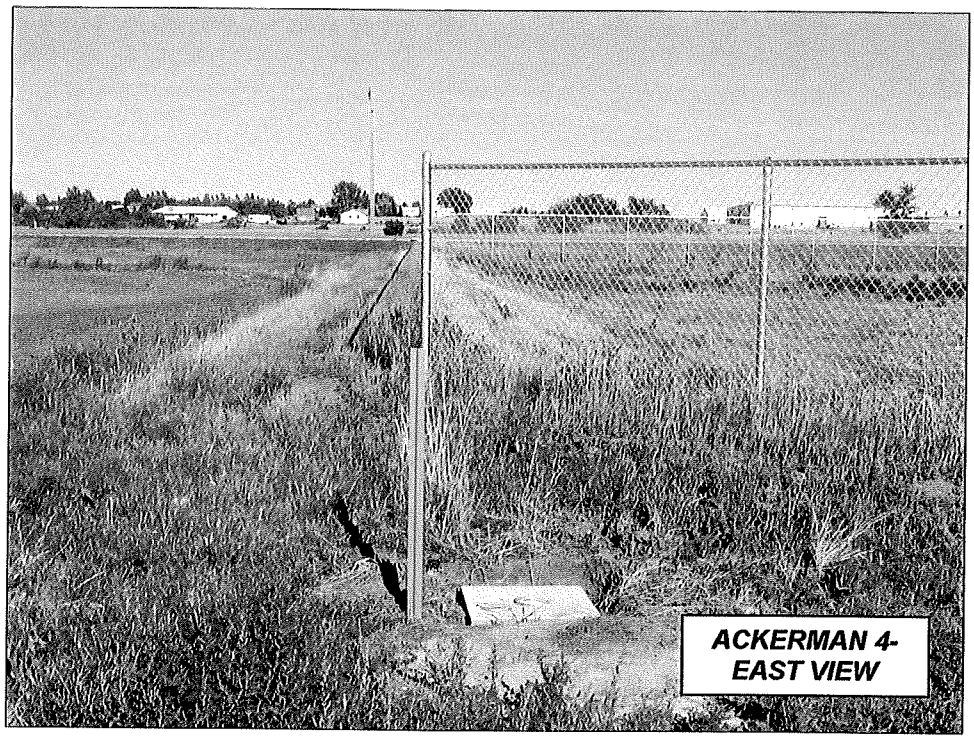

ACKERMAN 3 –
WEST VIEW



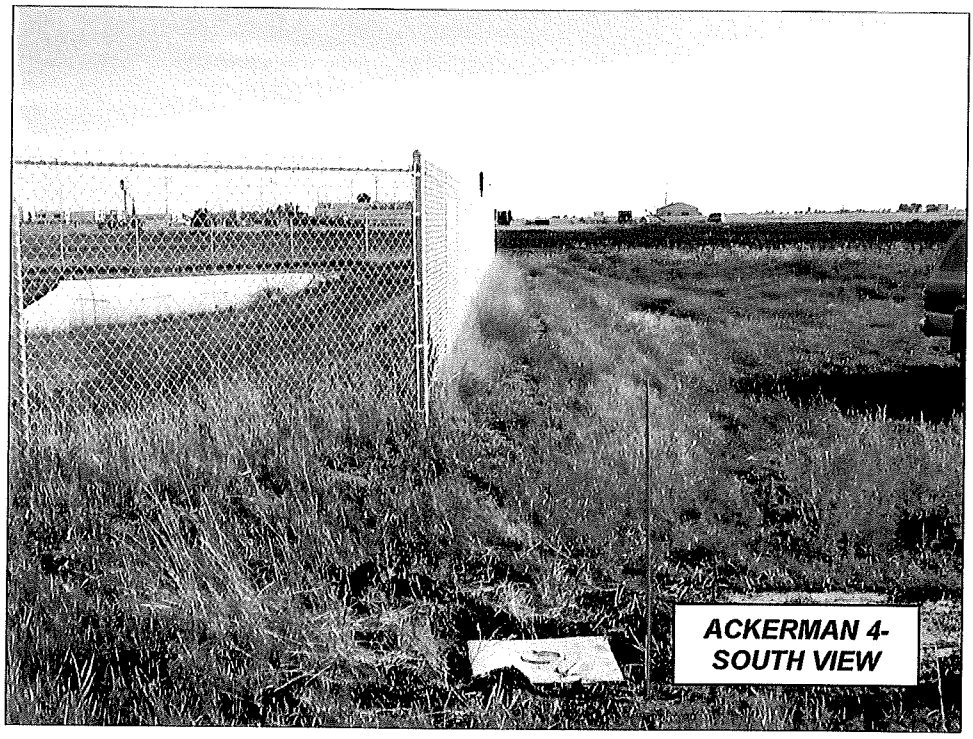
ACKERMAN 4



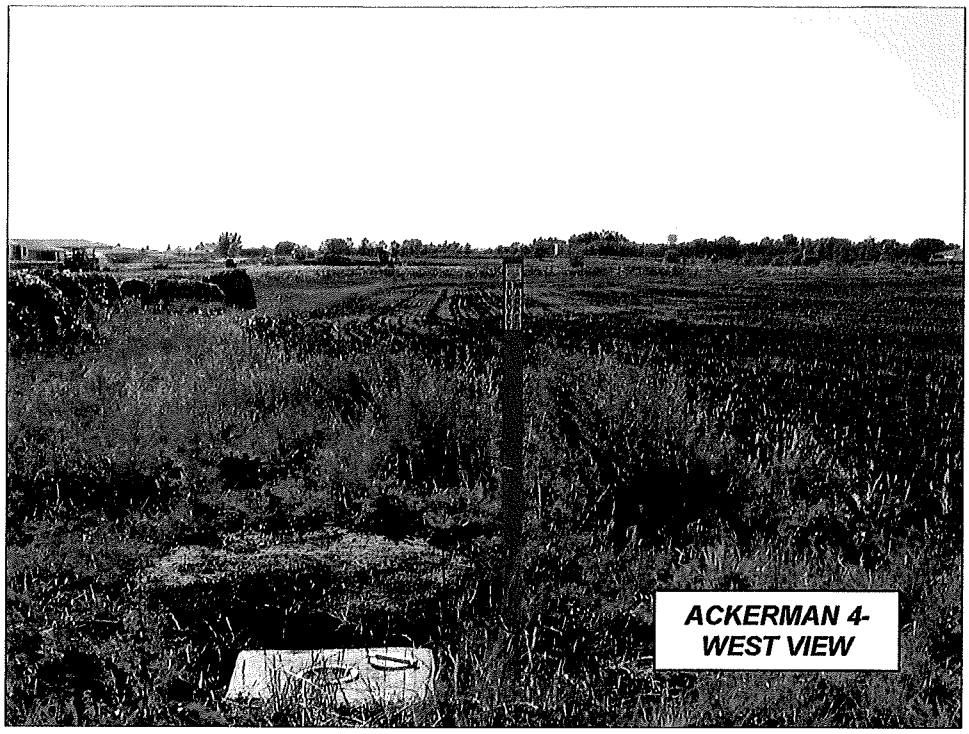
*ACKERMAN 4-
NORTH VIEW*

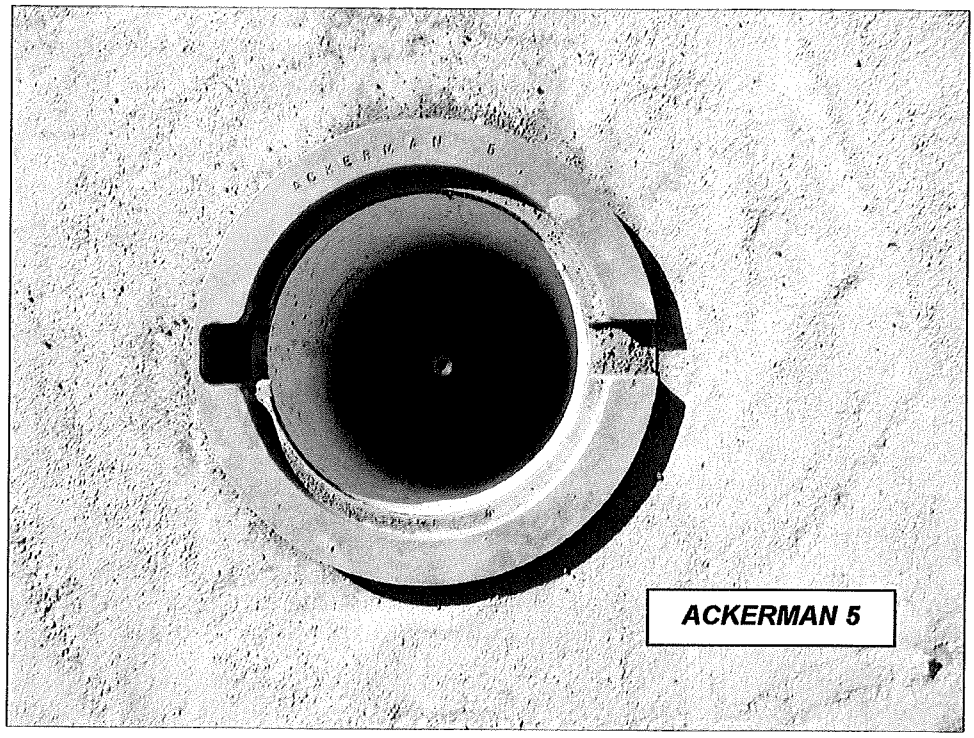


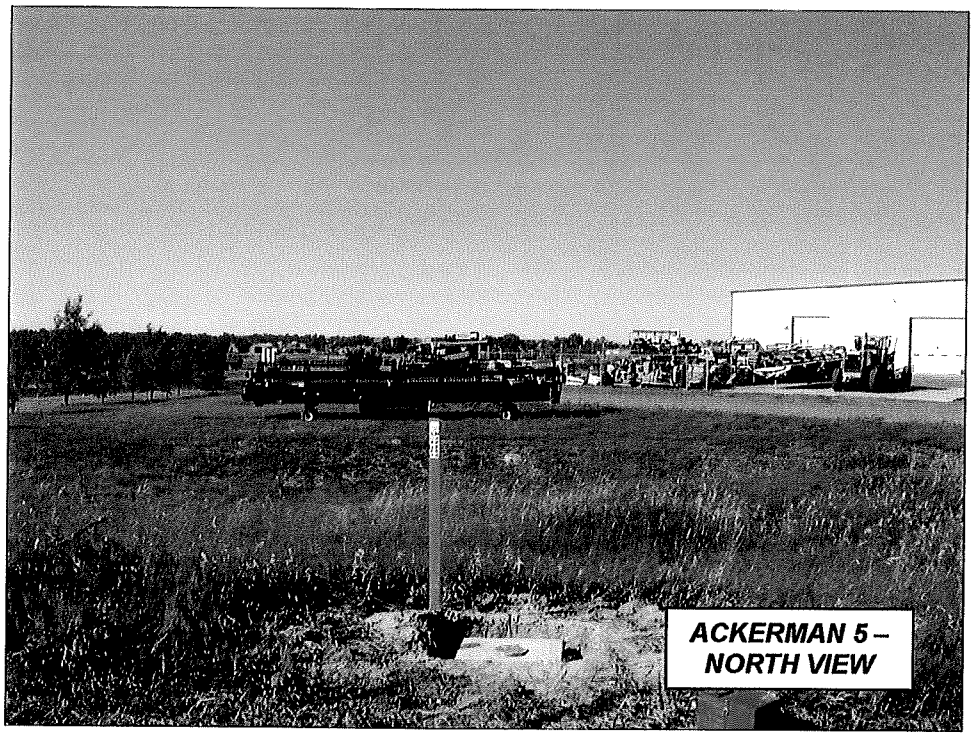
ACKERMAN 4- EAST VIEW

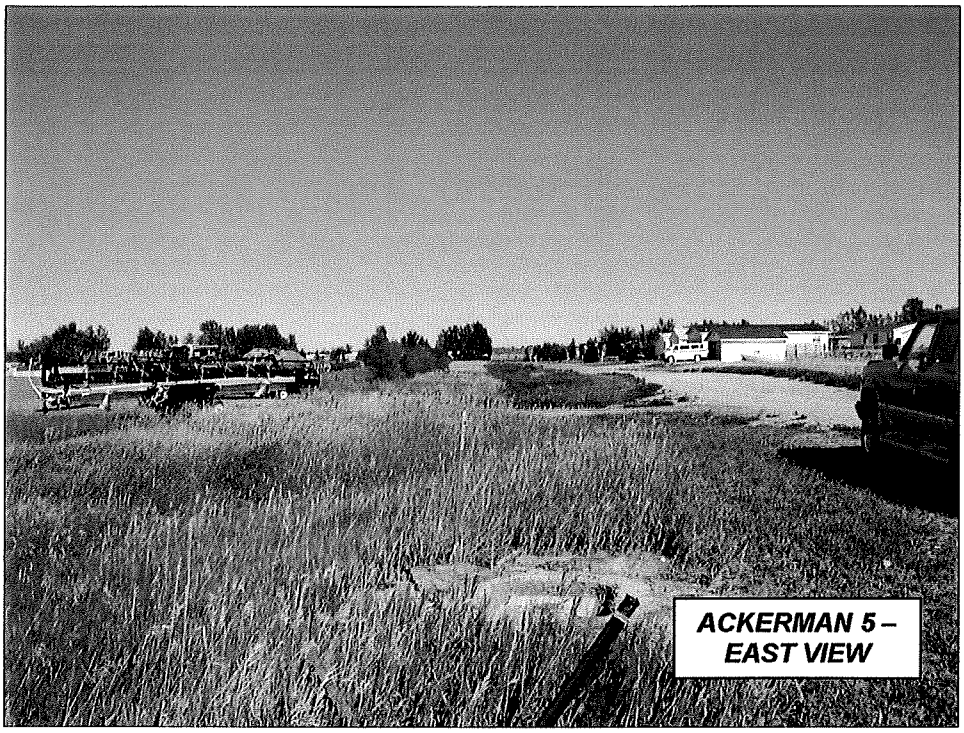


ACKERMAN 4- SOUTH VIEW


ACKERMAN 4-
WEST VIEW

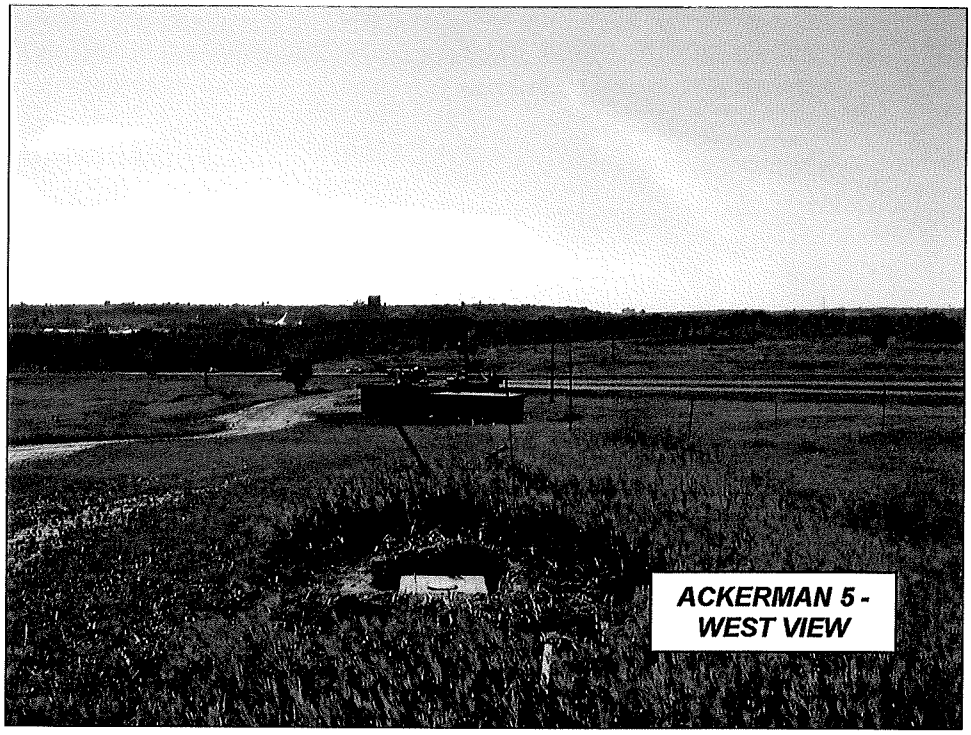

ACKERMAN 5


ACKERMAN 5 –
NORTH VIEW



ACKERMAN 5 – EAST VIEW

ACKERMAN 5 – SOUTH VIEW


ACKERMAN 5 -
WEST VIEW

Appendix -B-

NGS Data Sheets

(Listed Alphabetically by Station Name)

The NGS Data Sheet

See file _dsdata.txt for more information about the datasheet.

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 6.64
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF0893 ***********************************************************************
 TF0893  DESIGNATION -  A 276
 TF0893  PID         -  TF0893
 TF0893  STATE/COUNTY-  ND/WARD
 TF0893  USGS QUAD   -  MINOT (1979)
 TF0893
 TF0893                         *CURRENT SURVEY CONTROL
 TF0893
 TF0893* NAD 83(1986)-  48 14 02.      (N)     101 18 35.      (W)      SCALED
 TF0893* NAVD 88      -       475.723  (meters)     1560.77    (feet)   ADJUSTED
 TF0893
 TF0893  GEOID HEIGHT-          -20.25  (meters)                         GEOID99
 TF0893  DYNAMIC HT  -          475.801 (meters)     1561.02    (feet)   COMP
 TF0893  MODELED GRAV-      980,759.4   (mgal)                           NAVD 88
 TF0893
 TF0893  VERT ORDER  -  FIRST     CLASS II
 TF0893
 TF0893.The horizontal coordinates were scaled from a topographic map and have
 TF0893.an estimated accuracy of +/- 6 seconds.
 TF0893
 TF0893.The orthometric height was determined by differential leveling
 TF0893.and adjusted by the National Geodetic Survey in June 1991.
 TF0893
 TF0893.The geoid height was determined by GEOID99.
 TF0893
 TF0893.The dynamic height is computed by dividing the NAVD 88
 TF0893.geopotential number by the normal gravity value computed on the
 TF0893.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TF0893.degrees latitude (g = 980.6199 gals.).
 TF0893
 TF0893.The modeled gravity was interpolated from observed gravity values.
 TF0893
 TF0893;                    North         East     Units  Estimated Accuracy
 TF0893;SPC ND N      -   137,500.      539,850.      MT  (+/- 180 meters Scaled)
 TF0893
 TF0893                           SUPERSEDED SURVEY CONTROL
 TF0893
 TF0893  NGVD 29      -       475.353  (m)          1559.55    (f) ADJ UNCH    1 2
 TF0893
 TF0893.Superseded values are not recommended for survey control.
 TF0893.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 TF0893.See file dsdata.txt to determine how the superseded data were derived.
 TF0893
 TF0893_MARKER: DB = BENCH MARK DISK
 TF0893_SETTING: 36 = ABUTMENT
 TF0893_STAMPING: A 276 1963
 TF0893_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 TF0893
 TF0893  HISTORY      - Date     Condition        Report By
 TF0893  HISTORY      - 1963     MONUMENTED       CGS
 TF0893  HISTORY      - 1981     MARK NOT FOUND   NGS
```

```
TF0893
TF0893                          STATION DESCRIPTION
TF0893
TF0893'DESCRIBED BY COAST AND GEODETIC SURVEY 1963
TF0893'0.75 MI W FROM MINOT.
TF0893'0.75 MILE WEST ALONG THE SOO LINE RAILROAD FROM THE STATION AT MINOT,
TF0893'0.5 MILE WEST OF THE GREAT NORTHERN RAILWAY STATION, AT THE WEST END
TF0893'OF RAILROAD BRIDGE 469.66, 5 1/2 FEET NORTH OF THE NORTH RAIL, ABOUT 6
TF0893'INCHES BELOW THE LEVEL OF THE TRACKS, AND SET IN THE TOP OF THE NORTH
TF0893'END OF THE WEST CONCRETE ABUTMENT OF THE BRIDGE.
TF0893
TF0893                          STATION RECOVERY (1981)
TF0893
TF0893'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981
TF0893'MARK NOT FOUND.
1       National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF0895 ***********************************************************************
TF0895  DESIGNATION -  C 276
TF0895  PID         -  TF0895
TF0895  STATE/COUNTY-  ND/WARD
TF0895  USGS QUAD   -  MINOT (1979)
TF0895
TF0895                          *CURRENT SURVEY CONTROL
TF0895 ______________________________________________________________________
TF0895* NAD 83(1986)-  48 13 54.      (N)     101 20 22.      (W)      SCALED
TF0895* NAVD 88     -       476.152   (meters)     1562.18    (feet)   ADJUSTED
TF0895 ______________________________________________________________________
TF0895  GEOID HEIGHT-         -20.18  (meters)                         GEOID99
TF0895  DYNAMIC HT  -         476.229 (meters)     1562.43    (feet)   COMP
TF0895  MODELED GRAV-     980,758.5   (mgal)                           NAVD 88
TF0895
TF0895  VERT ORDER  -  FIRST     CLASS II
TF0895
TF0895.The horizontal coordinates were scaled from a topographic map and have
TF0895.an estimated accuracy of +/- 6 seconds.
TF0895
TF0895.The orthometric height was determined by differential leveling
TF0895.and adjusted by the National Geodetic Survey in June 1991.
TF0895
TF0895.The geoid height was determined by GEOID99.
TF0895
TF0895.The dynamic height is computed by dividing the NAVD 88
TF0895.geopotential number by the normal gravity value computed on the
TF0895.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF0895.degrees latitude (g = 980.6199 gals.).
TF0895
TF0895.The modeled gravity was interpolated from observed gravity values.
TF0895
TF0895;                    North         East     Units  Estimated Accuracy
TF0895;SPC ND N     -   137,280.      537,640.      MT  (+/- 180 meters Scaled)
TF0895
TF0895                          SUPERSEDED SURVEY CONTROL
TF0895
TF0895  NGVD 29     -       475.780  (m)          1560.95    (f) ADJ UNCH    1 2
TF0895
TF0895.Superseded values are not recommended for survey control.
TF0895.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0895.See file dsdata.txt to determine how the superseded data were derived.
TF0895
TF0895_MARKER: DB = BENCH MARK DISK
```

```
TF0895 SETTING: 46 = COPPER-CLAD STEEL ROD W/O SLEEVE (10 FT.+)
TF0895 STAMPING: C 276 1963
TF0895 STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
TF0895
TF0895  HISTORY      - Date      Condition       Report By
TF0895  HISTORY      - 1963      MONUMENTED      CGS
TF0895
TF0895                          STATION DESCRIPTION
TF0895
TF0895'DESCRIBED BY COAST AND GEODETIC SURVEY 1963
TF0895'2.15 MI W FROM MINOT.
TF0895'2.15 MILES WEST ALONG THE SOO LINE RAILROAD FROM THE STATION AT MINOT,
TF0895'72 FEET SOUTHWEST OF THE CENTER OF A CROSSING OF THE RAILROAD AND A
TF0895'ROAD CROSSING, 2 POLES WEST OF MILE POST 471, 51 1/2 FEET SOUTH OF THE
TF0895'SOUTH RAIL, 42 FEET WEST OF THE CENTER LINE OF A GRAVELED ROAD, 5 FEET
TF0895'SOUTH OF A FENCE CORNER, 1 FOOT EAST OF A FENCE, 1.5 FEET NORTHWEST OF
TF0895'A METAL WITNESS POST, ABOUT LEVEL WITH THE TRACKS, AND ON THE TOP OF A
TF0895'5/8-INCH COPPER COATED ROD THAT IS DRIVEN TO A DEPTH OF 16 FEET AND
TF0895'ENCASED IN A 6-INCH TILE WHICH PROJECTS 5 INCHES.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF0897 ***********************************************************************
TF0897  DESIGNATION -  D 276
TF0897  PID         -  TF0897
TF0897  STATE/COUNTY-  ND/WARD
TF0897  USGS QUAD   -  MINOT (1979)
TF0897
TF0897                          *CURRENT SURVEY CONTROL
TF0897
TF0897* NAD 83(1986)-  48 14 04.      (N)     101 21 57.      (W)      SCALED
TF0897* NAVD 88      -       478.468  (meters)     1569.77    (feet)  ADJUSTED
TF0897
TF0897  GEOID HEIGHT-          -20.11  (meters)                         GEOID99
TF0897  DYNAMIC HT  -          478.546 (meters)     1570.03    (feet)  COMP
TF0897  MODELED GRAV-      980,759.4   (mgal)                           NAVD 88
TF0897
TF0897  VERT ORDER  -  FIRST     CLASS II
TF0897
TF0897.The horizontal coordinates were scaled from a topographic map and have
TF0897.an estimated accuracy of +/- 6 seconds.
TF0897
TF0897.The orthometric height was determined by differential leveling
TF0897.and adjusted by the National Geodetic Survey in June 1991.
TF0897.WARNING-Repeat measurements at this control monument indicate possible
TF0897.vertical movement.
TF0897
TF0897.The geoid height was determined by GEOID99.
TF0897
TF0897.The dynamic height is computed by dividing the NAVD 88
TF0897.geopotential number by the normal gravity value computed on the
TF0897.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF0897.degrees latitude (g = 980.6199 gals.).
TF0897
TF0897.The modeled gravity was interpolated from observed gravity values.
TF0897
TF0897;                    North         East     Units  Estimated Accuracy
TF0897;SPC ND N      -   137,610.      535,690.      MT  (+/- 180 meters Scaled)
TF0897
TF0897                          SUPERSEDED SURVEY CONTROL
TF0897
TF0897  NGVD 29      -       478.109  (m)          1568.60    (f) ADJ UNCH    1 2
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TF0897
TF0897.Superseded values are not recommended for survey control.
TF0897.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0897.See file dsdata.txt to determine how the superseded data were derived.
TF0897
TF0897_MARKER: DB = BENCH MARK DISK
TF0897_SETTING: 36 = ABUTMENT
TF0897_STAMPING: D 276 1963
TF0897_MARK LOGO: CGS
TF0897_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
TF0897
TF0897  HISTORY      - Date      Condition         Report By
TF0897  HISTORY      - 1963      MONUMENTED        CGS
TF0897  HISTORY      - 1981      GOOD              NGS
TF0897
TF0897                            STATION DESCRIPTION
TF0897
TF0897'DESCRIBED BY COAST AND GEODETIC SURVEY 1963
TF0897'3.4 MI W FROM MINOT.
TF0897'3.4 MILES WEST ALONG THE SOO LINE RAILROAD FROM THE STATION AT MINOT,
TF0897'OR 4.4 MILES SOUTHEAST ALONG THE SOO LINE RAILROAD FROM THE STATION AT
TF0897'BURLINGTON, 9 1/2 POLES WEST OF MILE POST 472, 114 FEET WEST OF THE
TF0897'CENTER OF A CROSSING OF THE RAILROAD AND A PRIVATE ROAD, 6 FEET NORTH
TF0897'OF THE NORTH RAIL, ABOUT 6 INCHES BELOW THE LEVEL OF THE TRACKS, AND
TF0897'SET IN THE TOP OF THE NORTH END OF THE EAST CONCRETE ABUTMENT OF
TF0897'BRIDGE 472 A.
TF0897
TF0897                            STATION RECOVERY (1981)
TF0897
TF0897'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981
TF0897'RECOVERED IN GOOD CONDITION.
1       National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF0899 ***********************************************************************
TF0899  DESIGNATION -  F 276
TF0899  PID         -  TF0899
TF0899  STATE/COUNTY-  ND/WARD
TF0899  USGS QUAD   -  MINOT NW (1979)
TF0899
TF0899                          *CURRENT SURVEY CONTROL
TF0899
TF0899* NAD 83(1986)-  48 14 50.      (N)     101 23 48.      (W)      SCALED
TF0899* NAVD 88     -       483.185   (meters)     1585.25    (feet)   ADJUSTED
TF0899
TF0899  GEOID HEIGHT-          -20.05  (meters)                          GEOID99
TF0899  DYNAMIC HT  -          483.266 (meters)     1585.52    (feet)   COMP
TF0899  MODELED GRAV-      980,763.6   (mgal)                            NAVD 88
TF0899
TF0899  VERT ORDER  -  FIRST      CLASS II
TF0899
TF0899.The horizontal coordinates were scaled from a topographic map and have
TF0899.an estimated accuracy of +/- 6 seconds.
TF0899
TF0899.The orthometric height was determined by differential leveling
TF0899.and adjusted by the National Geodetic Survey in June 1991.
TF0899
TF0899.The geoid height was determined by GEOID99.
TF0899
TF0899.The dynamic height is computed by dividing the NAVD 88
TF0899.geopotential number by the normal gravity value computed on the
TF0899.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
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TF0899.degrees latitude (g = 980.6199 gals.).
TF0899
TF0899.The modeled gravity was interpolated from observed gravity values.
TF0899
TF0899;                    North         East     Units  Estimated Accuracy
TF0899;SPC ND N      -   139,060.      533,410.      MT  (+/- 180 meters Scaled)
TF0899
TF0899                           SUPERSEDED SURVEY CONTROL
TF0899
TF0899  NGVD 29      -       482.815  (m)          1584.04   (f) ADJ UNCH    1 2
TF0899
TF0899.Superseded values are not recommended for survey control.
TF0899.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0899.See file dsdata.txt to determine how the superseded data were derived.
TF0899
TF0899_MARKER: DB = BENCH MARK DISK
TF0899_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF0899_STAMPING: F 276 1963
TF0899_MARK LOGO: CGS
TF0899_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF0899+STABILITY: SURFACE MOTION
TF0899
TF0899  HISTORY      - Date      Condition         Report By
TF0899  HISTORY      - 1963      MONUMENTED        CGS
TF0899  HISTORY      - 1981      GOOD              NGS
TF0899
TF0899                            STATION DESCRIPTION
TF0899
TF0899'DESCRIBED BY COAST AND GEODETIC SURVEY 1963
TF0899'2.45 MI SE FROM BURLINGTON.
TF0899'2.45 MILES SOUTHEAST ALONG THE SOO LINE RAILROAD FROM THE STATION AT
TF0899'BURLINGTON, 2 TELEPHONE POLES NORTHWEST OF MILE POST 474, 280 FEET
TF0899'SOUTHWEST OF AND ACROSS U.S. HIGHWAY 52 FROM THE SOUTHWEST RAIL OF THE
TF0899'TRACK, 178 1/2 FEET SOUTHWEST OF THE CENTER LINE OF U.S. HIGHWAY 52,
TF0899'76 FEET NORTHWEST OF THE CENTER LINE OF A GRAVELED ROAD, 12 FEET
TF0899'SOUTHEAST OF A POWER POLE, 2 FEET NORTHEAST OF A FENCE, 2.0 FEET WEST
TF0899'OF A METAL WITNESS POST, ABOUT LEVEL WITH THE RAILS AND HIGHWAY, AND
TF0899'SET IN THE TOP OF A CONCRETE POST PROJECTING 5 INCHES.
TF0899
TF0899                            STATION RECOVERY (1981)
TF0899
TF0899'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981
TF0899'RECOVERED IN GOOD CONDITION.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF1068 ***********************************************************************
TF1068  DESIGNATION -  G 217
TF1068  PID         -  TF1068
TF1068  STATE/COUNTY-  ND/WARD
TF1068  USGS QUAD   -  MINOT (1979)
TF1068
TF1068                           *CURRENT SURVEY CONTROL
TF1068  ______________________________________________________________________
TF1068* NAD 83(1986)-  48 11 41.     (N)     101 17 46.     (W)      SCALED
TF1068* NAVD 88     -       533.515  (meters)    1750.37   (feet)   ADJUSTED
TF1068  ______________________________________________________________________
TF1068  GEOID HEIGHT-         -20.23  (meters)                       GEOID99
TF1068  DYNAMIC HT  -         533.601 (meters)    1750.66   (feet)   COMP
TF1068  MODELED GRAV-     980,754.1   (mgal)                         NAVD 88
TF1068
TF1068  VERT ORDER  -  FIRST     CLASS II
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TF1068
TF1068.The horizontal coordinates were scaled from a topographic map and have
TF1068.an estimated accuracy of +/- 6 seconds.
TF1068
TF1068.The orthometric height was determined by differential leveling
TF1068.and adjusted by the National Geodetic Survey in June 1991.
TF1068.WARNING-Repeat measurements at this control monument indicate possible
TF1068.vertical movement.
TF1068
TF1068.The geoid height was determined by GEOID99.
TF1068
TF1068.The dynamic height is computed by dividing the NAVD 88
TF1068.geopotential number by the normal gravity value computed on the
TF1068.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF1068.degrees latitude (g = 980.6199 gals.).
TF1068
TF1068.The modeled gravity was interpolated from observed gravity values.
TF1068
TF1068;   North   East   Units Estimated Accuracy
TF1068;SPC ND N   -   133,140.   540,820.   MT (+/- 180 meters Scaled)
TF1068
TF1068   SUPERSEDED SURVEY CONTROL
TF1068
TF1068 NGVD 29   -   533.167 (m)   1749.23   (f) ADJ UNCH   1 2
TF1068
TF1068.Superseded values are not recommended for survey control.
TF1068.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF1068.See file dsdata.txt to determine how the superseded data were derived.
TF1068
TF1068_MARKER: DB = BENCH MARK DISK
TF1068_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF1068_STAMPING: G 217 1962
TF1068_MARK LOGO: CGS
TF1068_PROJECTION: PROJECTING 10 CENTIMETERS
TF1068_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF1068+STABILITY: SURFACE MOTION
TF1068
TF1068 HISTORY   - Date   Condition   Report By
TF1068 HISTORY   - 1962   MONUMENTED   CGS
TF1068 HISTORY   - 1982   GOOD   NGS
TF1068
TF1068   STATION DESCRIPTION
TF1068
TF1068'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
TF1068'2.5 MI S FROM MINOT.
TF1068'2.5 MILE SOUTH ALONG U.S. HIGHWAY 83 FROM THE POST OFFICE AT MINOT,
TF1068'ABOUT 0.1 MILE SOUTH OF A GRADED ROAD INTERSECTION, AT THE SOUTHEAST
TF1068'CORNER OF A FIELD, 134 FEET WEST OF THE CENTERLINE OF THE WEST LANE OF
TF1068'A FOUR LANE HIGHWAY, 2 FEET NORTHEAST OF A POWER POLE, 1 FOOT EAST OF
TF1068'A FENCE LINE, 2 FEET SOUTH OF A WITNESS POST, ABOUT 4 FEET BELOW THE
TF1068'HIGHWAY, A CONCRETE POST WHICH PROJECTS 0.5 OF A FOOT.
TF1068
TF1068   STATION RECOVERY (1982)
TF1068
TF1068'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF1068'RECOVERED IN GOOD CONDITION. NEW DESCRIPTION FOLLOWS.
TF1068'4.0 KM (2.5 MI) SOUTHERLY ALONG U. S. HIGHWAY 83 FROM THE POST OFFICE
TF1068'IN MINOT, 38.1 METERS (125.0 FT) WEST OF THE CENTERLINE OF THE SOUTH
TF1068'BOUND LANES OF THE HIGHWAY, 26.1 METERS (85.6 FT) WEST OF MILEPOST 198
TF1068'AND 15.3 METERS (50.2 FT) NORTH OF THE SOUTHEAST CORNER OF A

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 TF1068'CULTIVATED FIELD.
 TF1068'THE MARK IS 0.6 METERS  S FROM A WITNESS POST.
 TF1068'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF1839 ***********************************************************************
 TF1839  DESIGNATION -  GASSINAPP
 TF1839  PID         -  TF1839
 TF1839  STATE/COUNTY-  ND/WARD
 TF1839  USGS QUAD   -  MINOT NW (1979)
 TF1839
 TF1839                          *CURRENT SURVEY CONTROL
 TF1839 ______________________________________________________________________
 TF1839* NAD 83(1996)-  48 14 00.39826(N)     101 22 54.09196(W)      ADJUSTED
 TF1839* NAVD 88     -       490.431  (meters)     1609.02   (feet)  ADJUSTED
 TF1839 ______________________________________________________________________
 TF1839  LAPLACE CORR-          -8.33  (seconds)                      DEFLEC99
 TF1839  GEOID HEIGHT-         -20.07  (meters)                       GEOID99
 TF1839  DYNAMIC HT  -         490.512 (meters)     1609.29   (feet)  COMP
 TF1839  MODELED GRAV-     980,760.1   (mgal)                         NAVD 88
 TF1839
 TF1839  HORZ ORDER  -  SECOND
 TF1839  VERT ORDER  -  FIRST     CLASS II
 TF1839
 TF1839.The horizontal coordinates were established by classical geodetic methods
 TF1839.and adjusted by the National Geodetic Survey in January 1998.
 TF1839
 TF1839.The orthometric height was determined by differential leveling
 TF1839.and adjusted by the National Geodetic Survey in June 1991.
 TF1839
 TF1839.The Laplace correction was computed from DEFLEC99 derived deflections.
 TF1839
 TF1839.The geoid height was determined by GEOID99.
 TF1839
 TF1839.The dynamic height is computed by dividing the NAVD 88
 TF1839.geopotential number by the normal gravity value computed on the
 TF1839.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TF1839.degrees latitude (g = 980.6199 gals.).
 TF1839
 TF1839.The modeled gravity was interpolated from observed gravity values.
 TF1839
 TF1839;                   North         East      Units   Scale      Converg.
 TF1839;SPC ND N      -   137,511.181   534,506.207   MT  0.99993920 -0 39 21.9
 TF1839;UTM  14       - 5,344,989.468   323,145.154   MT  0.99998432 -1 46 36.8
 TF1839
 TF1839:                Primary Azimuth Mark                     Grid Az
 TF1839:SPC ND N      -  MINOT MUNICIPAL TANK                    096 59 01.2
 TF1839:UTM  14       -  MINOT MUNICIPAL TANK                    098 06 16.1
 TF1839
 TF1839|-----------------------------------------------------------------------|
 TF1839| PID    Reference Object                        Distance      Geod. Az  |
 TF1839|                                                              dddmmss.s |
 TF1839| TF1840 GASSINAPP RM 1                                        06306     |
 TF1839| TF2153 MINOT MILLER MILLING CO TANK        APPROX. 7.0 KM 0875347.8 |
 TF1839| TF2155 MINOT ST LEOS CATH CH SPIRE         APPROX. 6.7 KM 0895225.9 |
 TF1839| TF2152 MINOT MUNICIPAL TANK                APPROX. 7.0 KM 0961939.3 |
 TF1839| CQ7655 GASSINAPP AZ MK                                       1010953.7 |
 TF1839| TF2173 PTS 80                               91.470 METERS    13508     |
 TF1839| TF1841 GASSINAPP RM 2                                        16844     |
 TF1839|-----------------------------------------------------------------------|
 TF1839
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TF1839                          SUPERSEDED SURVEY CONTROL
TF1839
TF1839  NAD 83(1986)-  48 14 00.39800(N)     101 22 54.08960(W) AD(        ) 2
TF1839  NAD 27      -  48 14 00.35940(N)     101 22 52.48720(W) AD(        ) 2
TF1839
TF1839.Superseded values are not recommended for survey control.
TF1839.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF1839.See file dsdata.txt to determine how the superseded data were derived.
TF1839
TF1839_MARKER: DS = TRIANGULATION STATION DISK
TF1839_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF1839_STAMPING: GASSINAPP 1946
TF1839_MARK LOGO: CGS
TF1839_PROJECTION: PROJECTING 20 CENTIMETERS
TF1839_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF1839+STABILITY: SURFACE MOTION
TF1839
TF1839  HISTORY     - Date     Condition        Report By
TF1839  HISTORY     - 1946     MONUMENTED       CGS
TF1839  HISTORY     - 1954     GOOD             CGS
TF1839  HISTORY     - 1981     GOOD             NGS
TF1839  HISTORY     - 1981     GOOD             NGS
TF1839
TF1839                           STATION DESCRIPTION
TF1839
TF1839'DESCRIBED BY COAST AND GEODETIC SURVEY 1946 (RAM)
TF1839'THE STATION IS LOCATED ABOUT 4.5 MILES WEST OF MINOT ALONG
TF1839'THE SOUTH SIDE OF U.S. HIGHWAY NO. 2.  IT IS IN THE FORK OF THE
TF1839'HIGHWAY TO THE NORTHWEST AND THE GRADED ROAD TO THE SOUTH
TF1839'UP GASSINAP COULEE WHICH IS CROSSED BY A HIGH STEEL BRIDGE
TF1839'OF THE GREAT NORTHERN RAILROAD 0.4 MILE SOUTH.  IT IS ON THE
TF1839'FIRST GRASSY BENCH ABOVE THE HIGHWAY, 147 FEET WEST OF THE
TF1839'INTERSECTION OF THE HIGHWAY AND THE GRAVEL ROAD, 85 FEET
TF1839'SOUTHWEST OF THE APPROXIMATE CENTER LINE OF THE HIGHWAY, AND
TF1839'11 FEET SOUTHEAST OF A WITNESS POST.  THE MARK PROJECTS ABOUT
TF1839'6 INCHES AND THE DISK IS STAMPED GASSINAPP 1946.
TF1839'
TF1839'REFERENCE MARK NO. 1 IS 25.49 FEET NORTHEAST OF THE STATION
TF1839'AND 60 FEET SOUTHWEST OF THE APPROXIMATE CENTER LINE OF THE
TF1839'HIGHWAY.  THE MARK PROJECTS ABOUT 1 INCH AND THE DISK IS STAMPED
TF1839'GASSINAPP NO 1 1946.
TF1839'
TF1839'REFERENCE MARK NO. 2 IS 31.84 FEET SOUTH OF THE STATION AND
TF1839'150 FEET WEST OF THE INTERSECTION OF THE HIGHWAY AND THE GRAVEL
TF1839'ROAD.  THE MARK PROJECTS ABOUT 4 INCHES AND THE DISK IS STAMPED
TF1839'GASSINAPP NO 2 1946.
TF1839'
TF1839'THE AZIMUTH MARK IS APPROXIMATELY 0.4 MILE EAST-SOUTHEAST OF
TF1839'THE STATION, 33 FEET SOUTH OF THE APPROXIMATE CENTER LINE OF
TF1839'THE HIGHWAY, 8 FEET WEST-NORTHWEST OF A WITNESS POST AND 1
TF1839'FOOT NORTH OF A FENCE LINE.  THE MARK PROJECTS ABOUT 1 INCH
TF1839'AND THE DISK IS STAMPED GASSINAPP 1946.
TF1839'
TF1839'TO REACH THE STATION FROM MINOT AT THE JUNCTION OF U.S. HIGHWAYS
TF1839'2, 83, AND 52, GO WEST ON NO. 2 FOR 4.1 MILES TO THE AZIMUTH
TF1839'MARK ON THE LEFT AS DESCRIBED.  CONTINUE 0.4 MILE TO A ROAD
TF1839'FORK ON THE LEFT.  FOLLOW THE HIGHWAY TO THE RIGHT ABOUT
TF1839'100 YARDS THEN TURN BACK TO THE LEFT AND GO UP ON THE FIRST
TF1839'BENCH ABOVE THE HIGHWAY CUT AND THE STATION AS DESCRIBED.
TF1839'
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TF1839'*U.S.G.S., P.T. STA. NO. 80, 1925, IS ABOUT 100 YARDS SOUTHEAST,
TF1839'5 PACES SOUTH OF A MC QUAY-NORRIS SIGN AND 29 PACES EAST FROM
TF1839'THE FENCE CORNER.
TF1839'
TF1839'*COPIED FROM RECONNAISSANCE DESCRIPTION.
TF1839'
TF1839'HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.
TF1839
TF1839 STATION RECOVERY (1954)
TF1839
TF1839'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1954 (LWQ)
TF1839'THE STATION AND REFERENCE MARKS WERE RECOVERED AS DESCRIBED
TF1839'IN GOOD CONDITION. THE AZIMUTH MARK WAS NOT RECOVERED. A
TF1839'SEARCH OF ABOUT 1/2 HOUR WAS MADE AND THERE DID NOT APPEAR
TF1839'TO BE ANY CHANGES AT THE SITE, BUT IT WAS NOT FOUND.
TF1839
TF1839 STATION RECOVERY (1981)
TF1839
TF1839'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981
TF1839'7.5 KM (4.65 MI) WEST FROM MINOT.
TF1839'3.7 KM (2.3 MI) SOUTHWESTERLY ALONG THE BURLINGTON NORTHERN RAILROAD
TF1839'FROM THE RAILROAD STATION IN MINOT, THENCE 3.4 KM (2.1 MI) WESTERLY
TF1839'ALONG U.S. HIGHWAY 2, THENCE 0.4 KM (0.25 MI) WESTERLY ALONG A PAVED
TF1839'ROAD, AT THE JUNCTION OF COUNTY ROAD 17 LEADING SOUTH UNDER A LARGE
TF1839'RAILROAD TRESSEL, ON TOP OF THE FIRST GRASSY BENCH SOUTH OF THE PAVED
TF1839'ROAD, 44.8 METERS (147.0 FT) WEST OF THE CENTER OF THE INTERSECTION
TF1839'AND 26.5 METERS (86.9 FT) SOUTHWEST OF THE CENTER OF THE ROAD.
TF1839'THE MARK IS 6.0 M ABOVE THE HIGHWAY.
TF1839
TF1839 STATION RECOVERY (1981)
TF1839
TF1839'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981
TF1839'RECOVERED IN GOOD CONDITION.
1 National Geodetic Survey, Retrieval Date = OCTOBER 3, 2002
TF0926 **
TF0926 DESIGNATION - H 4
TF0926 PID - TF0926
TF0926 STATE/COUNTY- ND/WARD
TF0926 USGS QUAD - MINOT (1979)
TF0926
TF0926 *CURRENT SURVEY CONTROL
TF0926 ____
TF0926* NAD 83(1986)- 48 14 14. (N) 101 17 33. (W) SCALED
TF0926* NAVD 88 - 477.037 (meters) 1565.08 (feet) ADJUSTED
TF0926 ____
TF0926 GEOID HEIGHT- -20.29 (meters) GEOID99
TF0926 DYNAMIC HT - 477.115 (meters) 1565.33 (feet) COMP
TF0926 MODELED GRAV- 980,760.6 (mgal) NAVD 88
TF0926
TF0926 VERT ORDER - FIRST CLASS II
TF0926
TF0926.The horizontal coordinates were scaled from a topographic map and have
TF0926.an estimated accuracy of +/- 6 seconds.
TF0926
TF0926.The orthometric height was determined by differential leveling
TF0926.and adjusted by the National Geodetic Survey in June 1991.
TF0926.WARNING-Repeat measurements at this control monument indicate possible
TF0926.vertical movement.
TF0926
TF0926.The geoid height was determined by GEOID99.

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TF0926
TF0926.The dynamic height is computed by dividing the NAVD 88
TF0926.geopotential number by the normal gravity value computed on the
TF0926.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF0926.degrees latitude (g = 980.6199 gals.).
TF0926
TF0926.The modeled gravity was interpolated from observed gravity values.
TF0926
TF0926;                    North          East     Units  Estimated Accuracy
TF0926;SPC ND N      -   137,860.       541,140.      MT  (+/- 180 meters Scaled)
TF0926
TF0926                            SUPERSEDED SURVEY CONTROL
TF0926
TF0926  NGVD 29      -        476.670  (m)             1563.87    (f) ADJ UNCH    1 2
TF0926
TF0926.Superseded values are not recommended for survey control.
TF0926.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0926.See file dsdata.txt to determine how the superseded data were derived.
TF0926
TF0926_MARKER: Z = SEE DESCRIPTION
TF0926_SETTING: 30 = STEPS
TF0926_MARK LOGO: CGS
TF0926_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
TF0926
TF0926  HISTORY      - Date      Condition         Report By
TF0926  HISTORY      - UNK       MONUMENTED        SOORR
TF0926  HISTORY      - 1962      GOOD              NGS
TF0926  HISTORY      - 1981      GOOD              NGS
TF0926  HISTORY      - 1982      GOOD              NGS
TF0926
TF0926                              STATION DESCRIPTION
TF0926
TF0926'DESCRIBED BY NATIONAL GEODETIC SURVEY 1962
TF0926'IN MINOT.
TF0926'0.2 MILE EAST ALONG THE MINNEAPOLIS, ST. PAUL AND SAULT STE. MARIE
TF0926'RAILROAD FROM THE GREAT NORTHERN RAILROAD STATION AT MINOT, AT THE
TF0926'CROSSING OF NORTH MAIN STREET, AT THE EAST EDGE OF THE SIDEWALK ALONG
TF0926'THE EAST SIDE OF MAIN STREET AND ACROSS MAIN STREET FROM THE
TF0926'MINNEAPOLIS, ST. PAUL AND SAULT STE. MARIE RAILROAD STATION, 5.1 FEET
TF0926'NORTH OF THE NORTHWEST CORNER OF THE MAIN RADIO AND RECORD SHOP, AT
TF0926'THE TOP OF THE STEPS LEADING TO THE BASEMENT OF THE BUILDING, 29.1
TF0926'FEET SOUTH OF THE SOUTH RAIL, A 2-INCH STEEL POST, AND ABOUT 2 INCHES
TF0926'ABOVE THE LEVEL OF THE SIDEWALK.  NOTE-- THE MINNEAPOLIS, ST. PAUL AND
TF0926'SAULT STE. MARIE RAILROAD IS NOW THE SOO LINE RAILROAD.
TF0926
TF0926                              STATION RECOVERY (1981)
TF0926
TF0926'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981
TF0926'RECOVERED IN GOOD CONDITION. THE DESCRIPTION IS ADEQUATE WITH
TF0926'THE EXCEPTION THAT THE MAIN RADIO AND RECORD SHOP IS NOW THE S.D.
TF0926'KIVLEY JEWELRY STORE.
TF0926
TF0926                              STATION RECOVERY (1982)
TF0926
TF0926'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF0926'RECOVERED THIS DATE, NOTE, THE MAIN RADIO AND RECORD SHOP IS NOW S.D.
TF0926'KIVLEY JEWELRY STORE.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF2171 ***********************************************************************
 TF2171  DESIGNATION -  HARRISON
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TF2171  PID          -  TF2171
TF2171  STATE/COUNTY-  ND/WARD
TF2171  USGS QUAD    -  MINOT NW (1979)
TF2171
TF2171                          *CURRENT SURVEY CONTROL
TF2171
TF2171* NAD 83(1996)-  48 11 48.68483(N)     101 22 58.68061(W)      ADJUSTED
TF2171* NAVD 88      -       558.22   (+/-2cm)     1831.4     (feet)  VERTCON
TF2171
TF2171  LAPLACE CORR-          -8.50  (seconds)                       DEFLEC99
TF2171  GEOID HEIGHT-         -20.01  (meters)                        GEOID99
TF2171
TF2171  HORZ ORDER   -  FIRST
TF2171  VERT ORDER   -  THIRD ? (See Below)
TF2171
TF2171.The horizontal coordinates were established by classical geodetic methods
TF2171.and adjusted by the National Geodetic Survey in January 1998.
TF2171
TF2171.The NAVD 88 height was computed by applying the VERTCON shift value to
TF2171.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
TF2171.The vertical order pertains to the superseded datum.
TF2171
TF2171.The Laplace correction was computed from DEFLEC99 derived deflections.
TF2171
TF2171.The geoid height was determined by GEOID99.
TF2171
TF2171;                    North         East      Units   Scale      Converg.
TF2171;SPC ND N      -   133,444.503   534,364.880   MT  0.99993775 -0 39 25.4
TF2171;UTM  14       - 5,340,926.142   322,924.335   MT  0.99998528 -1 46 36.5
TF2171
TF2171:                Primary Azimuth Mark                     Grid Az
TF2171:SPC ND N      -  HARRISON AZ MK                          093 04 28.6
TF2171:UTM  14       -  HARRISON AZ MK                          094 11 39.7
TF2171
TF2171|-----------------------------------------------------------------------|
TF2171| PID    Reference Object                      Distance      Geod. Az  |
TF2171|                                                            dddmmss.s |
TF2171| CQ7779 HARRISON RM 1                        22.592 METERS 02608     |
TF2171| TF2152 MINOT MUNICIPAL TANK                APPROX. 7.8 KM 0645753.2 |
TF2171| CQ7778 HARRISON AZ MK                                     0922503.2 |
TF2171| TF2162 SARON LUTHERAN CHURCH SPIRE         APPROX.12.4 KM 1565916.7 |
TF2171| TF2172 GETESMANE SK EVAN LUTH CHURCH       APPROX. 5.7 KM 2134637.6 |
TF2171| CQ7780 HARRISON RM 2                        22.717 METERS 26505     |
TF2171|-----------------------------------------------------------------------|
TF2171
TF2171                          SUPERSEDED SURVEY CONTROL
TF2171
TF2171  NAD 83(1986)-  48 11 48.68469(N)     101 22 58.67835(W) AD(       ) 1
TF2171  NAD 27       -  48 11 48.64500(N)     101 22 57.08900(W) AD(       ) 1
TF2171  NGVD 29      -       557.84   (m)          1830.2     (f) LEVELING   3
TF2171
TF2171.Superseded values are not recommended for survey control.
TF2171.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF2171.See file dsdata.txt to determine how the superseded data were derived.
TF2171
TF2171_MARKER: DS = TRIANGULATION STATION DISK
TF2171_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF2171
TF2171  HISTORY      - Date      Condition         Report By
TF2171  HISTORY      - 1946      MONUMENTED        CGS
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TF2171
TF2171 STATION DESCRIPTION
TF2171
TF2171'DESCRIBED BY COAST AND GEODETIC SURVEY 1946 (RAM)
TF2171'THE STATION IS LOCATED IN THE SOUTHEAST CORNER OF THE HARRISON
TF2171'SCHOOL YARD, 83 FEET SOUTHEAST OF THE SOUTHEAST CORNER OF THE
TF2171'STUCCO SCHOOL, 89 FEET NORTHWEST OF CROSSROADS, 78 FEET WEST
TF2171'OF THE CENTERLINE OF ROAD, 40 FEET NORTH OF THE CENTERLINE OF
TF2171'ROAD, 11 FEET NORTHEAST OF WITNESS POST AND 8 FEET NORTH OF
TF2171'FENCE. THE MARK PROJECTS 1 INCH AND THE DISK IS STAMPED
TF2171'HARRISON 1946.
TF2171'
TF2171'REFERENCE MARK NO. 1 IS 74.12 FEET NORTH-NORTHEAST OF THE
TF2171'STATION, 72 FEET EAST OF THE SOUTHEAST CORNER OF SCHOOL, 46
TF2171'FEET WEST OF THE CENTERLINE OF ROAD AND 1 FOOT WEST OF FENCE.
TF2171'THE MARK PROJECTS 1 INCH AND THE DISK IS STAMPED HARRISON NO
TF2171'1 1946.
TF2171'
TF2171'REFERENCE MARK NO. 2 IS 74.53 FEET WEST OF THE STATION, 80
TF2171'FEET SOUTH OF THE SOUTHWEST CORNER OF THE SCHOOL, 35 FEET
TF2171'NORTH OF THE CENTERLINE OF ROAD AND 2 FEET NORTH OF FENCE.
TF2171'THE MARK PROJECTS 1 INCH AND THE DISK IS STAMPED HARRISON
TF2171'NO 2 1946.
TF2171'
TF2171'THE AZIMUTH MARK IS 0.45 MILE EAST OF THE STATION, 42 FEET
TF2171'SOUTH OF THE CENTERLINE OF ROAD, 5 FEET WEST OF WITNESS POST AND
TF2171'2 FEET NORTH OF FENCE. THE MARK PROJECTS 1 INCH AND THE DISK
TF2171'IS STAMPED HARRISON 1946.
TF2171'
TF2171'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAYS 83,
TF2171'52 AND 2 IN THE WEST PART OF MINOT, GO SOUTH ON U.S. HIGHWAY
TF2171'83 FOR 2.6 MILES TO CROSSROADS. TURN RIGHT AND GO WEST 4.0
TF2171'MILES TO CROSSROADS, SCHOOL AND THE STATION.
TF2171'
TF2171'TO REACH THE AZIMUTH MARK FROM THE STATION, DRIVE EAST 0.45
TF2171'MILE TO THE AZIMUTH MARK ON THE RIGHT.
TF2171'
TF2171'HEIGHT OF LIGHT ABOVE STATION MARK 23 METERS.
1 National Geodetic Survey, Retrieval Date = OCTOBER 3, 2002
TF1067 ***
TF1067 DESIGNATION - K 13 RESET
TF1067 PID - TF1067
TF1067 STATE/COUNTY- ND/WARD
TF1067 USGS QUAD - MINOT (1979)
TF1067
TF1067 *CURRENT SURVEY CONTROL
TF1067
TF1067* NAD 83(1986)- 48 10 57. (N) 101 17 46. (W) SCALED
TF1067* NAVD 88 - 539.631 (meters) 1770.44 (feet) ADJUSTED
TF1067
TF1067 GEOID HEIGHT- -20.22 (meters) GEOID99
TF1067 DYNAMIC HT - 539.716 (meters) 1770.72 (feet) COMP
TF1067 MODELED GRAV- 980,752.0 (mgal) NAVD 88
TF1067
TF1067 VERT ORDER - FIRST CLASS II
TF1067
TF1067.The horizontal coordinates were scaled from a topographic map and have
TF1067.an estimated accuracy of +/- 6 seconds.
TF1067
TF1067.The orthometric height was determined by differential leveling

TF1067.and adjusted by the National Geodetic Survey in June 1991.
TF1067
TF1067.The geoid height was determined by GEOID99.
TF1067
TF1067.The dynamic height is computed by dividing the NAVD 88
TF1067.geopotential number by the normal gravity value computed on the
TF1067.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF1067.degrees latitude (g = 980.6199 gals.).
TF1067
TF1067.The modeled gravity was interpolated from observed gravity values.
TF1067
TF1067;   North   East   Units Estimated Accuracy
TF1067;SPC ND N   -   131,780.   540,810.   MT (+/- 180 meters Scaled)
TF1067
TF1067   SUPERSEDED SURVEY CONTROL
TF1067
TF1067.No superseded survey control is available for this station.
TF1067
TF1067_MARKER: DB = BENCH MARK DISK
TF1067_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF1067_STAMPING: K 13 RESET 1964
TF1067_MARK LOGO: CGS
TF1067_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF1067+STABILITY: SURFACE MOTION
TF1067
TF1067 HISTORY   - Date   Condition   Report By
TF1067 HISTORY   - 1964   MONUMENTED   CGS
TF1067 HISTORY   - 1982   GOOD   NGS
TF1067
TF1067   STATION DESCRIPTION
TF1067
TF1067'DESCRIBED BY COAST AND GEODETIC SURVEY 1964
TF1067'3.4 MI S FROM MINOT.
TF1067'ABOUT 3.4 MILES SOUTH ALONG U.S. HIGHWAY 83 FROM THE POST OFFICE AT
TF1067'MINOT, WARD COUNTY, IN THE NORTHWEST ANGLE OF CROSSROADS, ABOUT 200
TF1067'FEET WEST OF THE CENTERLINE OF DUAL HIGHWAY, 33 FEET NORTH OF THE
TF1067'CENTERLINE OF THE EAST-WEST ROAD, 2 FEET EAST OF A TELEPHONE POLE AND
TF1067'2 FEET NORTH OF A METAL WITNESS POST. SET IN THE TOP OF A CONCRETE
TF1067'POST PROJECTING ABOUT 3 INCHES.
TF1067
TF1067   STATION RECOVERY (1982)
TF1067
TF1067'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF1067'RECOVERED IN GOOD CONDITION. THE DESCRIPTION IS ADEQUATE EXCEPT ADD
TF1067'0.2 KM (0.1 MI) NORTH OF MILEPOST 197, DELETE 2 FT EAST OF A TELEPHONE
TF1067'POLE.
1   National Geodetic Survey,   Retrieval Date = OCTOBER 3, 2002
TF0931 ***
TF0931 DESIGNATION - L 232
TF0931 PID   - TF0931
TF0931 STATE/COUNTY- ND/WARD
TF0931 USGS QUAD   - BURLINGTON SE (1979)
TF0931
TF0931   *CURRENT SURVEY CONTROL
TF0931 ____
TF0931* NAD 83(1986)- 48 15 16.   (N)   101 17 40.   (W)   SCALED
TF0931* NAVD 88   -   524.472 (meters)   1720.71   (feet) ADJUSTED
TF0931 ____
TF0931 GEOID HEIGHT-   -20.30 (meters)   GEOID99
TF0931 DYNAMIC HT -   524.561 (meters)   1721.00   (feet) COMP

TF0931 MODELED GRAV- 980,762.8 (mgal) NAVD 88
TF0931
TF0931 VERT ORDER - FIRST CLASS II
TF0931
TF0931.This mark is at Minot Airport (MOT)
TF0931
TF0931.The horizontal coordinates were scaled from a topographic map and have
TF0931.an estimated accuracy of +/- 6 seconds.
TF0931
TF0931.The orthometric height was determined by differential leveling
TF0931.and adjusted by the National Geodetic Survey in June 1991.
TF0931
TF0931.The geoid height was determined by GEOID99.
TF0931
TF0931.The dynamic height is computed by dividing the NAVD 88
TF0931.geopotential number by the normal gravity value computed on the
TF0931.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF0931.degrees latitude (g = 980.6199 gals.).
TF0931
TF0931.The modeled gravity was interpolated from observed gravity values.
TF0931
TF0931; North East Units Estimated Accuracy
TF0931;SPC ND N - 139,780. 541,010. MT (+/- 180 meters Scaled)
TF0931
TF0931 SUPERSEDED SURVEY CONTROL
TF0931
TF0931 NGVD 29 - 524.105 (m) 1719.50 (f) ADJ UNCH 1 2
TF0931
TF0931.Superseded values are not recommended for survey control.
TF0931.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0931.See file dsdata.txt to determine how the superseded data were derived.
TF0931
TF0931_MARKER: DB = BENCH MARK DISK
TF0931_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF0931_STAMPING: L 232 1962
TF0931_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF0931+STABILITY: SURFACE MOTION
TF0931

TF0931 HISTORY	- Date	Condition	Report By
TF0931 HISTORY	- 1962	MONUMENTED	CGS
TF0931 HISTORY	- 1968	GOOD	NGS
TF0931 HISTORY	- 1978	GOOD	LOCENG

TF0931
TF0931 STATION DESCRIPTION
TF0931
TF0931'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
TF0931'0.9 MI N FROM MINOT.
TF0931'0.9 MILE NORTH ALONG U.S. HIGHWAY 83 FROM THE FIRST LUTHERAN CHURCH AT
TF0931'MINOT, AT THE SOUTHWEST CORNER OF THE PORT O MINOT AIRPORT, AT THE
TF0931'JUNCTION OF A GRAVELED ROAD LEADING SOUTHEAST AND AROUND THE SOUTH
TF0931'SIDE OF THE AIRPORT, 131.5 FEET EAST OF THE CENTERLINE OF THE EAST
TF0931'LANE OF THE HIGHWAY, 100.5 FEET NORTH OF THE CENTERLINE OF THE
TF0931'GRAVELED ROAD, 41.0 FEET NORTHEAST OF A HIGHWAY RIGHT-OF-WAY POST, 2.5
TF0931'FEET SOUTH OF THE EAST-WEST AIRPORT FENCE, 1.6 FEET WEST OF A METAL
TF0931'WITNESS POST, ABOUT 10 FEET ABOVE THE LEVEL OF THE HIGHWAY, AND SET IN
TF0931'THE TOP OF A CONCRETE POST PROJECTING 6 INCHES.
TF0931
TF0931 STATION RECOVERY (1968)
TF0931
TF0931'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1968

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 TF0931'RECOVERED IN GOOD CONDITION.
 TF0931
 TF0931                          STATION RECOVERY (1978)
 TF0931
 TF0931'RECOVERY NOTE BY LOCAL ENGINEER (INDIVIDUAL OR FIRM) 1978
 TF0931'RECOVERED IN GOOD CONDITION.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF1803 ***********************************************************************
 TF1803  DESIGNATION -  LARSON
 TF1803  PID         -  TF1803
 TF1803  STATE/COUNTY-  ND/WARD
 TF1803  USGS QUAD   -  MINOT (1979)
 TF1803
 TF1803                         *CURRENT SURVEY CONTROL
 TF1803 ______________________________________________________________________
 TF1803* NAD 83(1996)-  48 10 03.61873(N)     101 17 46.00553(W)      ADJUSTED
 TF1803* NAVD 88     -       541.433  (meters)     1776.35   (feet)  ADJUSTED
 TF1803 ______________________________________________________________________
 TF1803  LAPLACE CORR-          -8.06  (seconds)                      DEFLEC99
 TF1803  GEOID HEIGHT-         -20.20  (meters)                       GEOID99
 TF1803  DYNAMIC HT  -         541.517 (meters)     1776.63   (feet)  COMP
 TF1803  MODELED GRAV-     980,749.4   (mgal)                         NAVD 88
 TF1803
 TF1803  HORZ ORDER  -  FIRST
 TF1803  VERT ORDER  -  FIRST     CLASS II
 TF1803
 TF1803.The horizontal coordinates were established by classical geodetic methods
 TF1803.and adjusted by the National Geodetic Survey in January 1998.
 TF1803
 TF1803.The orthometric height was determined by differential leveling
 TF1803.and adjusted by the National Geodetic Survey in June 1991.
 TF1803
 TF1803.The Laplace correction was computed from DEFLEC99 derived deflections.
 TF1803
 TF1803.The geoid height was determined by GEOID99.
 TF1803
 TF1803.The dynamic height is computed by dividing the NAVD 88
 TF1803.geopotential number by the normal gravity value computed on the
 TF1803.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TF1803.degrees latitude (g = 980.6199 gals.).
 TF1803
 TF1803.The modeled gravity was interpolated from observed gravity values.
 TF1803
 TF1803;                    North         East      Units   Scale      Converg.
 TF1803;SPC ND N     -   130,129.287   540,787.370   MT  0.99993689 -0 35 32.7
 TF1803;UTM  14      - 5,337,485.983   329,281.059   MT  0.99995812 -1 42 40.5
 TF1803
 TF1803:                Primary Azimuth Mark                     Grid Az
 TF1803:SPC ND N     -  LARSON AZ MK RESET                       271 00 06.5
 TF1803:UTM  14      -  LARSON AZ MK RESET                       272 07 14.3
 TF1803
 TF1803|---------------------------------------------------------------------|
 TF1803| PID    Reference Object                    Distance      Geod. Az  |
 TF1803|                                                          dddmmss.s |
 TF1803| CQ7975 LARSON AZ MK                                      0015415.0 |
 TF1803| TF2152 MINOT MUNICIPAL TANK              APPROX. 6.6 KM 0051659.1 |
 TF1803| TF1804 LARSON RM 1                        27.338 METERS 17855     |
 TF1803| TF2162 SARON LUTHERAN CHURCH SPIRE        APPROX. 8.3 KM 1911813.2 |
 TF1803| TF1065 H 217 RESET                        38.252 METERS 20858     |
 TF1803| TF2172 GETESMANE SK EVAN LUTH CHURCH      APPROX. 9.8 KM 2610115.8 |
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TF1803| TF1805 LARSON RM 2                                32.370 METERS 26801     |
TF1803| TF1802 LARSON AZ MK RESET                                      2702433.8 |
TF1803|-----------------------------------------------------------------------|
TF1803
TF1803                          SUPERSEDED SURVEY CONTROL
TF1803
TF1803  NAD 83(1986)-  48 10 03.61875(N)     101 17 46.00338(W) AD(       ) 1
TF1803  NAD 27      -  48 10 03.57800(N)     101 17 44.41700(W) AD(       ) 1
TF1803
TF1803.Superseded values are not recommended for survey control.
TF1803.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF1803.See file dsdata.txt to determine how the superseded data were derived.
TF1803
TF1803_MARKER: DS = TRIANGULATION STATION DISK
TF1803_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF1803_STAMPING: LARSON 1946
TF1803_MARK LOGO: CGS
TF1803_PROJECTION: FLUSH
TF1803_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF1803+STABILITY: SURFACE MOTION
TF1803
TF1803  HISTORY     - Date     Condition        Report By
TF1803  HISTORY     - 1946     MONUMENTED       CGS
TF1803  HISTORY     - 1954     MARK NOT FOUND   CGS
TF1803  HISTORY     - 1964     GOOD             CGS
TF1803  HISTORY     - 1982     GOOD             NGS
TF1803  HISTORY     - 1982     GOOD             NGS
TF1803
TF1803                           STATION DESCRIPTION
TF1803
TF1803'DESCRIBED BY COAST AND GEODETIC SURVEY 1946 (RAM)
TF1803'THE STATION IS LOCATED ON THE NORTH SIDE OF LARSON COULEE
TF1803'ABOUT 5 MILES SOUTH OF MINOT, 50 FEET WEST OF THE CENTERLINE
TF1803'OF U.S. HIGHWAY 83, 53 FEET SOUTH OF THE CENTERLINE OF GRAVEL
TF1803'ROAD, 14 FEET EAST-NORTHEAST OF FENCE CORNER AND 7 FEET WEST
TF1803'OF WITNESS POST.  THE MARK PROJECTS 1 INCH AND THE DISK IS
TF1803'STAMPED LARSON 1946.
TF1803'
TF1803'REFERENCE MARK NO. 1 IS 89.69 FEET SOUTH OF THE STATION, 54
TF1803'FEET WEST OF THE CENTERLINE OF U.S. HIGHWAY 83 AND 1 FOOT
TF1803'EAST OF FENCE.  THE MARK PROJECTS 1 INCH AND THE DISK IS
TF1803'STAMPED LARSON NO 1 1946.
TF1803'
TF1803'REFERENCE MARK NO. 2 IS 106.20 FEET WEST OF THE STATION, 58
TF1803'FEET SOUTH OF THE CENTERLINE OF GRADED ROAD AND 2 FEET NORTH
TF1803'OF FENCE.  THE MARK PROJECTS 1 INCH AND THE DISK IS STAMPED
TF1803'LARSON NO 2 1946.
TF1803'
TF1803'THE AZIMUTH MARK IS 0.5 MILE NORTH OF THE STATION, 55 FEET
TF1803'EAST OF THE CENTERLINE OF U.S. HIGHWAY 83, 17 FEET SOUTH
TF1803'OF CENTERLINE OF DRIVEWAY, 7 FEET SOUTH OF FENCE CORNER AND
TF1803'6 FEET NORTH OF WITNESS POST.  THE MARK PROJECTS 2 INCHES
TF1803'AND THE DISK IS STAMPED LARSON 1946.
TF1803'
TF1803'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAYS 83,
TF1803'52 AND 2 IN THE WEST PART OF MINOT, GO SOUTH ON U.S. HIGHWAY
TF1803'83 FOR 4.5 MILES TO CROSSROADS AND THE STATION IN THE SOUTHWEST
TF1803'CORNER OF THE INTERSECTION.
TF1803'
TF1803'TO REACH THE AZIMUTH MARK FROM THE STATION, DRIVE NORTH ON
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TF1803'U.S. HIGHWAY 83 FOR 0.5 MILE TO THE AZIMUTH MARK ON THE RIGHT.
TF1803'
TF1803'HEIGHT OF LIGHT ABOVE STATION MARK 23 METERS.
TF1803
TF1803 STATION RECOVERY (1954)
TF1803
TF1803'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1954 (LWQ)
TF1803'A SEARCH OF ABOUT 1/2 HOUR WAS MADE FOR THE STATION AND REFERENCE
TF1803'MARKS BUT THEY WERE NOT FOUND. THE AZIMUTH MARK WAS RECOVERED
TF1803'IN GOOD CONDITION AS DESCRIBED. U.S. HWY 83 HAS BEEN WIDENED
TF1803'AND DITCHED AT THE SITE AND IT IS BELEIVED THAT THE STATION
TF1803'AND REFERENCE MARKS HAVE BEEN DESTROYED.
TF1803
TF1803 STATION RECOVERY (1964)
TF1803
TF1803'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1964 (WGT)
TF1803'STATION RECOVERED AND ALL MARKS FOUND IN GOOD CONDITION.
TF1803'THE AZIMUTH MARK WAS IN THE WAY OF HIGHWAY CONSTRUCTION SO A
TF1803'NEW MARK WAS SET. THE ORIGINAL AZIMUTH MARK WAS NOT VISABLE
TF1803'FROM THE GROUND AT THE STATION SO THE NEW MARK WAS RESET
TF1803'TO WEST OF THE STATION.
TF1803'
TF1803'THE STATION IS ON THE NORTH SIDE OF LARSON COULEE AND ABOUT
TF1803'5 MILES SOUTH OF MINOT. THE HIGHWAY IS BEING MOVED TO THE
TF1803'EAST NEAR THE STATION AND THE STATION MARK IS NEAR THE EDGE
TF1803'OF THE WEST RIGHT OF WAY. A METAL WITNESS POST WAS SET ABOUT
TF1803'1 FOOT NORTH OF THE STATION MARK.
TF1803'
TF1803'R.M. NO. 1 IS ALSO AT THE WEST EDGE OF THE NEW RIGHT OF WAY
TF1803'OF HIGHWAY. AN IRON POST WAS DRIVEN IN THE GROUND ABOUT 1
TF1803'FOOT SOUTH OF THIS MARK.
TF1803'
TF1803'BENCH MARK H 217 RESET 1964 IS SOUTHWEST OF THE STATION,
TF1803'ABOUT 200 FEET WEST OF THE CENTER OF DUAL HIGHWAY, ABOUT
TF1803'160 FEET SOUTH OF CENTERLINE OF EAST-WEST ROAD, 3 FEET NORTHEAST
TF1803'OF A TELEPHONE POLE AND 2 FEET SOUTH OF A METAL WITNESS POST.
TF1803'
TF1803'R.M. NO. 2 IS IN THE PASTURE TO THE WEST OF THE STATION AND
TF1803'IS ABOUT 58 FEET SOUTH OF CENTERLINE OF EAST-WEST ROAD.
TF1803'
TF1803'THE AZIMUTH MARK IS ABOUT 0.3 MILE WEST OF THE STATION, 40
TF1803'FEET SOUTH OF THE CENTERLINE OF EAST-WEST ROAD, 2.5 FEET WEST
TF1803'OF A METAL WITNESS POST AND 1 FOOT NORTH OF A FENCE. MARK
TF1803'PROJECTS 3 INCHES AND DISK IS STAMPED LARSON 1946 RESET 1964.
TF1803'
TF1803'TO REACH THE STATION FROM MINOT, FROM THE JUNCTION OF U.S.
TF1803'HIGHWAY 83 AND U.S. 52 BYPASS ABOUT 1.5 MILE SOUTH OF CENTER
TF1803'OF TOWN, GO SOUTH ON U.S. 83 FOR 3.0 MILES TO A SIDE ROAD
TF1803'RIGHT AND STATION IN SOUTHWEST ANGLE OF INTERSECTION.
TF1803
TF1803 STATION RECOVERY (1982)
TF1803
TF1803'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF1803'7.1 KM (4.4 MI) SOUTH FROM MINOT.
TF1803'7.1 KM (4.4 MI) SOUTHERLY ALONG U. S. HIGHWAY 83 FROM THE POST OFFICE
TF1803'IN MINOT, 38.3 METERS (125.7 FT) NORTHEAST OF BENCH MARK H 217 RESET
TF1803'1964, 32.4 METERS (106.3 FT) EAST OF REFERENCE MARK 2, 30.5 METERS
TF1803'(100.1 FT) WEST OF THE CENTERLINE OF THE SOUTH BOUND LANES OF THE
TF1803'HIGHWAY, 27.3 METERS (89.6 FT) NORTH OF REFERENCE MARK 1 AND 16.2
TF1803'METERS (53.1 FT) SOUTH OF THE CENTER OF A GRAVELED ROAD LEADING WEST.

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TF1803'THE MARK IS 0.3 METERS  N FROM A WITNESS POST.
TF1803'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.
TF1803
TF1803                          STATION RECOVERY (1982)
TF1803
TF1803'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF1803'RECOVERED IN GOOD CONDITION.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF0924 ***********************************************************************
TF0924  DESIGNATION -  M 221
TF0924  PID         -  TF0924
TF0924  STATE/COUNTY-  ND/WARD
TF0924  USGS QUAD   -  MINOT (1979)
TF0924
TF0924                          *CURRENT SURVEY CONTROL
TF0924
TF0924* NAD 83(1986)-  48 14 19.      (N)     101 16 16.      (W)      SCALED
TF0924* NAVD 88     -       473.687   (meters)     1554.09    (feet)   ADJUSTED
TF0924
TF0924  GEOID HEIGHT-          -20.34  (meters)                         GEOID99
TF0924  DYNAMIC HT  -          473.765 (meters)     1554.34    (feet)   COMP
TF0924  MODELED GRAV-      980,762.0   (mgal)                           NAVD 88
TF0924
TF0924  VERT ORDER  -  FIRST      CLASS II
TF0924
TF0924.The horizontal coordinates were scaled from a topographic map and have
TF0924.an estimated accuracy of +/- 6 seconds.
TF0924
TF0924.The orthometric height was determined by differential leveling
TF0924.and adjusted by the National Geodetic Survey in June 1991.
TF0924.WARNING-Repeat measurements at this control monument indicate possible
TF0924.vertical movement.
TF0924
TF0924.The geoid height was determined by GEOID99.
TF0924
TF0924.The dynamic height is computed by dividing the NAVD 88
TF0924.geopotential number by the normal gravity value computed on the
TF0924.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF0924.degrees latitude (g = 980.6199 gals.).
TF0924
TF0924.The modeled gravity was interpolated from observed gravity values.
TF0924
TF0924;                    North         East     Units  Estimated Accuracy
TF0924;SPC ND N     -   138,000.      542,730.       MT  (+/- 180 meters Scaled)
TF0924
TF0924                          SUPERSEDED SURVEY CONTROL
TF0924
TF0924  NGVD 29     -       473.358  (m)          1553.01    (f) ADJ UNCH    1 2
TF0924
TF0924.Superseded values are not recommended for survey control.
TF0924.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0924.See file dsdata.txt to determine how the superseded data were derived.
TF0924
TF0924_MARKER: DB = BENCH MARK DISK
TF0924_SETTING: 30 = CULVERT
TF0924_STAMPING: M 221 1962
TF0924_MARK LOGO: CGS
TF0924_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
TF0924
TF0924  HISTORY     - Date     Condition        Report By
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TF0924  HISTORY      - 1962     MONUMENTED       CGS
TF0924  HISTORY      - 1982     GOOD             NGS
TF0924
TF0924                          STATION DESCRIPTION
TF0924
TF0924'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
TF0924'1.2 MI E FROM MINOT.
TF0924'1.2 MILES EAST ALONG THE GREAT NORTHERN RAILROAD FROM THE STATION AT
TF0924'MINOT, ABOUT 0.2 MILE OR 8 POLES EAST OF MILEPOST 202, SET IN THE TOP
TF0924'OF THE WEST END OF THE SOUTH HEADWALL OF A 20-FOOT CONCRETE CULVERT,
TF0924'28 FEET SOUTH OF THE SOUTH RAIL OF THE MAIN TRACK, 1.2 FEET EAST OF
TF0924'THE WEST END OF THE HEADWALL, AND ABOUT 8 FEET BELOW THE LEVEL OF THE
TF0924'TRACK.
TF0924
TF0924                          STATION RECOVERY (1982)
TF0924
TF0924'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF0924'RECOVERED IN GOOD CONDITION.
1       National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF1799 ***********************************************************************
TF1799  DESIGNATION -  MINOT RESET
TF1799  PID         -  TF1799
TF1799  STATE/COUNTY-  ND/WARD
TF1799  USGS QUAD   -  MINOT (1979)
TF1799
TF1799                          *CURRENT SURVEY CONTROL
TF1799 ______________________________________________________________________
TF1799* NAD 83(1996)-  48 13 34.72912(N)    101 16 56.04367(W)      ADJUSTED
TF1799* NAVD 88     -       528.753  (meters)    1734.75   (feet)  ADJUSTED
TF1799 ______________________________________________________________________
TF1799  LAPLACE CORR-          -6.70  (seconds)                     DEFLEC99
TF1799  GEOID HEIGHT-         -20.30  (meters)                      GEOID99
TF1799  DYNAMIC HT  -         528.840 (meters)    1735.04   (feet)  COMP
TF1799  MODELED GRAV-     980,759.5   (mgal)                        NAVD 88
TF1799
TF1799  HORZ ORDER  -  FIRST
TF1799  VERT ORDER  -  FIRST      CLASS II
TF1799
TF1799.The horizontal coordinates were established by classical geodetic methods
TF1799.and adjusted by the National Geodetic Survey in January 1998.
TF1799
TF1799.The orthometric height was determined by differential leveling
TF1799.and adjusted by the National Geodetic Survey in June 1991.
TF1799
TF1799.The Laplace correction was computed from DEFLEC99 derived deflections.
TF1799
TF1799.The geoid height was determined by GEOID99.
TF1799
TF1799.The dynamic height is computed by dividing the NAVD 88
TF1799.geopotential number by the normal gravity value computed on the
TF1799.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF1799.degrees latitude (g = 980.6199 gals.).
TF1799
TF1799.The modeled gravity was interpolated from observed gravity values.
TF1799
TF1799;                    North         East      Units   Scale      Converg.
TF1799;SPC ND N     -   136,638.588   541,885.803   MT  0.99993889 -0 34 55.5
TF1799;UTM  14      - 5,343,972.693   330,506.492   MT  0.99995299 -1 42 08.8
TF1799
TF1799:               Primary Azimuth Mark                    Grid Az
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TF1799:SPC ND N      -  MINOT INTL AIRPORT BEACON                356 33 34.0
TF1799:UTM  14       -  MINOT INTL AIRPORT BEACON                357 40 47.3
TF1799
TF1799|---------------------------------------------------------------------|
TF1799| PID    Reference Object                          Distance      Geod. Az  |
TF1799|                                                                dddmmss.s |
TF1799| TF1800 MINOT RM 3                                 33.040 METERS 06526     |
TF1799| TF2145 SURREY PUBLIC SCHOOL FLAGPOLE             APPROX.11.3 KM 0840122.1 |
TF1799| CS9194 MINOT AZ MK                                             0890805.4 |
TF1799| TF2146 MINOT USCAA RADIO RANGE STATION           APPROX. 4.0 KM 0984046.6 |
TF1799| TF2148 MINOT KLPM RADIO TRANSM TOWER             APPROX. 3.5 KM 1200004.2 |
TF1799| CS9195 MINOT RM 1                                 32.376 METERS 15128     |
TF1799| TF2164 SOUTH PRAIRIE TV STA KXMC MAST            APPROX.20.1 KM 1925637.0 |
TF1799| CS9196 MINOT RM 2                                 41.157 METERS 22548     |
TF1799| TF2156 MINOT SOUTH MUNICIPAL TANK                APPROX. 1.8 KM 2413642.6 |
TF1799| TF2157 MINOT MEYER BROADCST MICRO MST            APPROX. 3.0 KM 2454806.2 |
TF1799| TF2152 MINOT MUNICIPAL TANK                      426.963 METERS 2721303.2 |
TF1799| TF2155 MINOT ST LEOS CATH CH SPIRE               APPROX. 1.1 KM 3184201.0 |
TF1799| TF2186 MINOT NORTH MUNICIPAL TANK                APPROX. 4.9 KM 3270254.3 |
TF1799| TF2154 MONOT FIRST LUTHERAN CHURCH SPIRE         APPROX. 1.9 KM 3292607.2 |
TF1799| TF2153 MINOT MILLER MILLING CO TANK              APPROX. 1.1 KM 3391831.1 |
TF1799| TF2191 MINOT INTL AIRPORT BEACON                 APPROX. 3.1 KM 3555838.5 |
TF1799|---------------------------------------------------------------------|
TF1799
TF1799                          SUPERSEDED SURVEY CONTROL
TF1799
TF1799  NAD 83(1986)-  48 13 34.72903(N)     101 16 56.04173(W) AD(       ) 1
TF1799  NAD 27       -  48 13 34.69290(N)     101 16 54.45720(W) AD(       ) 1
TF1799
TF1799.Superseded values are not recommended for survey control.
TF1799.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF1799.See file dsdata.txt to determine how the superseded data were derived.
TF1799
TF1799_MARKER: DS = TRIANGULATION STATION DISK
TF1799_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF1799_STAMPING: MINOT 1934 1967
TF1799_MARK LOGO: CGS
TF1799_PROJECTION: FLUSH
TF1799_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF1799+STABILITY: SURFACE MOTION
TF1799
TF1799  HISTORY      - Date     Condition        Report By
TF1799  HISTORY      - 1934     MONUMENTED       CGS
TF1799  HISTORY      - 1938     GOOD             CGS
TF1799  HISTORY      - 1946     GOOD             CGS
TF1799  HISTORY      - 1954     GOOD             CGS
TF1799  HISTORY      - 1957     GOOD             CGS
TF1799  HISTORY      - 1963     GOOD             CGS
TF1799  HISTORY      - 1967     SEE DESCRIPTION  CGS
TF1799  HISTORY      - 1968     GOOD             CGS
TF1799  HISTORY      - 1982     GOOD             NGS
TF1799
TF1799                           STATION DESCRIPTION
TF1799
TF1799'DESCRIBED BY COAST AND GEODETIC SURVEY 1934 (WRP)
TF1799'STATION IS ON HIGH BLUFFS AT SOUTH EDGE OF MINOT AND OVERLOOKS
TF1799'THE CITY AND THE MOUSE RIVER VALLEY.  STATION IS LOCATED NEAR
TF1799'A SMALL FRAME TWO-STORY HOUSE HAVING A CONCRETE BASE AND BEARING
TF1799'THE NUMBER 700-10TH AVE. SE., AND IS SOUTH-SOUTHEAST OF IT.
TF1799'THE STATION IS 147 FEET FROM THE SOUTHEAST CORNER AND 154 FEET
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TF1799'FROM THE NORTHEAST CORNER. IT IS ALSO 321 FEET FROM THE
TF1799'NORTHWEST CORNER OF A SMALL HOUSE HAVING NO NUMBER THAT IS
TF1799'EAST-SOUTHEAST OF STATION.
TF1799'
TF1799'STATION MAY BE REACHED BY LEAVING WARD COUNTY COURTHOUSE AND
TF1799'GOING SOUTH ON 4TH STREET SE. TO TOP OF HILL AND INTERSECTION
TF1799'OF THIS STREET AND 11TH AVE. AT THIS POINT, BY ROSEHILL CEMETERY,
TF1799'TURN EAST AND GO 0.1 MILE, LEAVE 11TH AVE. AND GO NORTH 0.1
TF1799'MILE TO HIGH GROUND ON EDGE OF BLUFF AND STATION.
TF1799'
TF1799'SURFACE, UNDERGROUND, REFERENCE AND AZIMUTH MARKS ARE STANDARD
TF1799'BRONZE DISKS SET IN CONCRETE.
TF1799'
TF1799'REFERENCE MARK NO. 1 IS EAST-SOUTHEAST OF THE STATION. REFERENCE
TF1799'MARK NO. 2 IS SOUTH OF THE STATION. DISTANCE BETWEEN REFERENCE
TF1799'MARKS (HORIZONTAL MEASUREMENT) 147.30 FEET.
TF1799'
TF1799'AZIMUTH MARK IS EAST OF STATION, ON SAME BLUFF ON WHICH STATION
TF1799'IS LOCATED. A TEN-FOOT STAND WILL CLEAR ALL LINES.
TF1799
TF1799 STATION RECOVERY (1938)
TF1799
TF1799'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1938 (CDM)
TF1799'THE STATION AND ALL MARKS WERE RECOVERED AS DESCRIBED IN 1934
TF1799'AND THE MARKS ARE IN GOOD CONDITION. REFERENCE MARK NO. 2 IS
TF1799'SOUTHWEST OF THE STATION AND NOT SOUTH AS DESCRIBED IN 1934.
TF1799
TF1799 STATION RECOVERY (1946)
TF1799
TF1799'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1946 (RAM)
TF1799'THE STATION WAS RECOVERED AS DESCRIBED IN 1934 AND ALL MARKS
TF1799'WERE FOUND IN GOOD CONDITION. A NEW DESCRIPTION FOLLOWS.
TF1799'
TF1799'THE STATION IS LOCATED ON A HIGH BLUFF ON THE SOUTHERN EDGE
TF1799'OF THE CITY OF MINOT, 0.15 MILE NORTHEAST OF THE ROSEHILL
TF1799'CEMETERY AND 0.15 MILE EAST OF THE MINOT MUNICIPAL WATER TANK.
TF1799'THE MARK PROJECTS 6 INCHES AND THE DISK IS STAMPED MINOT 1934.
TF1799'
TF1799'SURFACE, UNDERGROUND, REFERENCE MARKS AND AZIMUTH MARK ARE A
TF1799'STANDARD BRONZE DISK SET IN CONCRETE.
TF1799'
TF1799'REFERENCE MARK NO. 1 IS 32.376 METERS (106.22 FEET) EAST-SOUTHEAST
TF1799'OF THE STATION. IT IS ABOUT 9 FEET LOWER IN ELEVATION THAN THE
TF1799'STATION MARK. THE MARK PROJECTS 2 INCHES AND THE DISK IS
TF1799'STAMPED MINOT NO 1 1934.
TF1799'
TF1799'REFERENCE MARK NO. 2 IS 41.185 METERS (135.12 FEET) SOUTH-SOUTHWEST
TF1799'OF THE STATION. IT IS ABOUT 15 FEET LOWER IN ELEVATION THAN
TF1799'THE STATION MARK. THE MARK PROJECTS 2 INCHES AND THE DISK IS
TF1799'STAMPED MINOT NO 2 1934.
TF1799'
TF1799'THE AZIMUTH MARK IS 0.15 MILE (AIRLINE) EAST OF THE STATION
TF1799'AND ON THE FIRST BLUFF EAST OF THE STATION. IT IS 4 FEET WEST
TF1799'OF A NORTH-SOUTH FENCE LINE. THE MARK PROJECTS 4 INCHES AND
TF1799'THE DISK IS STAMPED MINOT AZIMUTH 1934.
TF1799'
TF1799'TO REACH THE STATION FROM THE SOUTHEAST CORNER OF THE WARD
TF1799'COUNTY COURTHOUSE, GO SOUTH ON FOURTH STREET TO THE MAIN
TF1799'ENTRANCE OF THE ROSEHILL CEMETERY, TURN LEFT ON ELEVENTH STREET
TF1799'AND GO EAST 0.1 MILE, THENCE LEFT ON GRAVELED ROAD FOR 0.1 MILE

TF1799'TO THE SUMMIT OF BLUFF AND STATION AS DESCRIBED.
TF1799'
TF1799'TO REACH THE AZIMUTH MARK FROM THE STATION, GO SOUTH 0.1 MILE
TF1799'ON GRAVELED ROAD TO CROSSROAD, THENCE LEFT FOR 0.1 MILE TO
TF1799'WHERE MAIN ROAD TURNS LEFT. CONTINUE ON EAST ON TRACK ROAD FOR
TF1799'0.05 MILE, THENCE LEFT ALONG THE WEST SIDE OF A NORTH-SOUTH
TF1799'FENCE LINE FOR 0.05 MILE TO THE MARK ON THE RIGHT AS DESCRIBED.
TF1799'
TF1799'OBSERVATIONS MADE FROM A 10 FOOT WOOD STAND.
TF1799'
TF1799'HEIGHT OF LIGHT ABOVE STATION MARK - 22 METERS.
TF1799
TF1799 STATION RECOVERY (1954)
TF1799
TF1799'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1954 (LWQ)
TF1799'THE STATION, REFERENCE MARK NO. 2 AND THE AZIMUTH MARK WERE
TF1799'RECOVERED IN GOOD CONDITION. REFERENCE MARK NO. 1 WAS NOT FOUND.
TF1799'THE STREET HAS BEEN GRADED AND IT IS BELIEVED THAT THE MARK
TF1799'WAS DESTROYED.
TF1799'
TF1799'DESCRIPTION IS ADEQUATE.
TF1799
TF1799 STATION RECOVERY (1957)
TF1799
TF1799'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1957 (HJS)
TF1799'STATION RECOVERED AS DESCRIBED AND STATION AND REFERENCE MARKS
TF1799'FOUND IN GOOD CONDITION. ABOUT 2 FEET OF ONE SIDE OF THE
TF1799'AZIMUTH MARK IS EXPOSED BUT IT WAS NOT MOVED AS IT IS NO LONGER
TF1799'VISABLE FROM THE GROUND. THE AREA AROUND THE STATION IS BEING
TF1799'DEVELOPED AND NEW HOUSES ARE BEING ERECTED AND IT WOULD BE
TF1799'DIFFICULT TO FIND A SUITABLE SITE FOR AN AZIMUTH MARK. THE
TF1799'MINOT MUNICIPAL WATER TANK IS VISABLE FROM THE GROUND AT THE
TF1799'STATION AND CAN BE USED FOR AN AZIMUTH.
TF1799'
TF1799'R.M. NO. 1 IS EAST-SOUTHEAST OF THE STATION AND R.M. NO. 2 IS
TF1799'SOUTHWEST OF STATION IN SOUTHWEST ANGLE OF STREET INTERSECTION.
TF1799'
TF1799'THE STATION MARK IS IN THE FRONT YARD OF A RESIDENCE AND IS
TF1799'NEAR A CLOTHES LINE POLE.
TF1799'
TF1799'THE DESCRIPTION TO REACH FROM THE COURT HOUSE IS ADEQUATE.
TF1799
TF1799 STATION RECOVERY (1963)
TF1799
TF1799'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1963 (DJF)
TF1799'THE STATION MARK AND REFERENCE MARK NUMBER 2 WERE RECOVERED
TF1799'UNDISTURBED AND IN GOOD CONDITION. REFERENCE MARK NUMBER 1
TF1799'HAS BEEN DESTROYED AND A NEW REFERENCE MARK NUMBER 3 WAS SET.
TF1799'THE AZIMUTH MARK WAS NOT RECOVERED. BUILDINGS AND HOMES NOW
TF1799'SURROUND THE STATION BUT THE BEACON AT THE MUNICIPAL AIRPORT
TF1799'IS VISIBLE FROM THE GROUND SO IT MAY BE USED FOR AN AZIMUTH.
TF1799'A COMPLETE DESCRIPTION FOLLOWS--
TF1799'
TF1799'THE STATION IS LOCATED IN THE SOUTHEAST PART OF THE CITY OF MINOT,
TF1799'ON A LOW HILL BEHIND A WHITE HOUSE WITH A RED ROOF, NUMBER 702
TF1799'10TH AVENUE S.E.
TF1799'
TF1799'TO REACH THE STATION FROM THE FRONT OF THE WARD COUNTY COURTHOUSE
TF1799'ON 3RD STREET IN MINOT GO SOUTH 0.6 MILE TO 11TH AVENUE S.E.
TF1799'TURN LEFT AND GO EAST 0.3 MILE TO A GRAVELED SIDE STREET ON

TF1799'THE LEFT (7TH STREET S.E.). TURN LEFT AND GO NORTH 1/2 BLOCK
TF1799'THEN RIGHT TO TOP OF SMALL HILL AND STATION.
TF1799'
TF1799'THE STATION MARK IS A STANDARD DISK STAMPED MINOT 1934 SET IN
TF1799'THE TOP OF A 12-INCH-SQUARE CONCRETE MONUMENT PROJECTING 4
TF1799'INCHES ABOVE GROUND. IT IS 52.9 FEET SOUTHEAST OF THE SOUTHEAST
TF1799'CORNER OF A WHITE HOUSE, AND 1.3 FEET NORTHEAST OF A METAL
TF1799'WITNESS POST WITH SIGN.
TF1799'
TF1799'REFERENCE MARK NUMBER TWO IS A STANDARD DISK STAMPED MINOT NO 2
TF1799'1934 SET IN THE TOP OF A 12-INCH-SQUARE CONCRETE MONUMENT
TF1799'PROJECTING 2 INCHES ABOVE GROUND. IT IS 41.1 FEET WEST OF A
TF1799'FIRE HYDRANT, AND 5 FEET LOWER THAN STATION ELEVATION.
TF1799'
TF1799'REFERENCE MARK NUMBER THREE IS A STANDARD DISK STAMPED MINOT
TF1799'NO 3 1934 SET IN THE TOP OF A 12-INCH CONCRETE CYLINDER SET
TF1799'FLUSH WITH THE SURFACE OF THE GROUND. IT IS 92.6 FEET SOUTH
TF1799'OF THE CENTER OF 10TH AVENUE, 2.8 FEET WEST OF THE BASE OF A
TF1799'POWERLINE POLE, AND 4 FEET LOWER THAN STATION ELEVATION.
TF1799
TF1799 STATION RECOVERY (1967)
TF1799
TF1799'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1967 (LFS)
TF1799'STATION RECOVERED AND STATION AND REFERENCE MARKS FOUND IN
TF1799'GOOD CONDITION. A REQUEST WAS RECEIVED TO MOVE THE STATION
TF1799'MARK OUT OF THE YARD. THE LAND OWNER WAS CONTACTED AND HE
TF1799'AGREED TO PERMIT THE MARK TO BE LOWERED VERTICALLY. THE SURFACE
TF1799'AND UNDERGROUND MARKS WERE LOWERED VERTICALLY AND THE DISKS
TF1799'WERE RESTAMPED MINOT 1934 1967. AT THE TIME OF RECOVERY THE
TF1799'YARD HAD BEEN LANDSCAPED AND THE SURFACE MARK WAS FOUND TO BE
TF1799'PROJECTING ABOUT 18 INCHES. IT WAS LOWERED TO A POSITION
TF1799'ABOUT FLUSH WITH THE SURFACE OF THE GROUND.
TF1799'
TF1799'TO REACH THE STATION FROM THE FRONT OF THE WARD COUNTY COURT
TF1799'HOUSE IN MINOT GO SOUTH ON 3RD STREET FOR 0.5 MILE TO INTERSECTION
TF1799'WITH 11TH AVENUE SE, TURN LEFT AND GO EAST FOR 0.3 MILE TO
TF1799'INTERSECTION WITH 7TH STREET SE, TURN LEFT AND GO NORTH FOR
TF1799'ABOUT 3/4 BLOCK TO THE STATION IN THE BACK YARD OF A HOUSE
TF1799'ON RIGHT.
TF1799'
TF1799'THE STATION MARK IS 75 FEET EAST OF THE CENTERLINE OF 7TH
TF1799'STREET, 52.9 FEET SOUTH-SOUTHEAST OF THE SOUTHEAST CORNER OF
TF1799'THE HOUSE AT 702 10TH AVENUE AND 23.7 FEET SOUTH-SOUTHWEST OF
TF1799'THE SOUTHWEST CORNER OF A HOUSE THAT WAS UNDER CONSTRUCTION
TF1799'AT THE TIME THE STATION WAS RECOVERED. MARK IS ABOUT FLUSH
TF1799'WITH THE GROUND.
TF1799'
TF1799'R.M. NO. 2 IS AT THE SOUTHWEST INTERSECTION OF TWO STREETS TO
TF1799'SOUTHWEST OF STATION AND IS 41 FEET WEST OF A FIRE HYDRANT.
TF1799'THE MARK IS FLUSH AND THE DISK IS STAMPED MINOT NO 2 1934.
TF1799'
TF1799'R.M. NO. 3 IS 68.5 FEET EAST-NORTHEAST OF THE SOUTHEAST CORNER
TF1799'OF A NEW HOUSE, 92.5 FEET SOUTH OF THE CENTERLINE OF 10TH AVENUE
TF1799'AND 2.8 FEET WEST OF A POWERLINE POLE. THE MARK IS FLUSH AND
TF1799'THE DISK IS STAMPED MINOT NO 3 1934.
TF1799'
TF1799'THE AZIMUTH MARK WAS NOT RECOVERED BUT IT WOULD NOT BE VISIBLE
TF1799'FROM THE GROUND AT THE STATION. THERE WAS NO SUITABLE PLACE
TF1799'TO ESTABLISH A NEW AZIMUTH MARK.
TF1799'

TF1799'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--AT MINOT
TF1799
TF1799 STATION RECOVERY (1968)
TF1799
TF1799'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1968 (DLW)
TF1799'STATION WAS RECOVERED AS DESCRIBED IN HORIZONTAL CONTROL DATA
TF1799'SUPPLIMENT DATED JULY 1961. DESCRIPTION
TF1799'IS ADEQUATE.
TF1799'
TF1799'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--1/2 MILE
TF1799'SOUTH EAST OF DOWNTOWN MINOT
TF1799
TF1799 STATION RECOVERY (1982)
TF1799
TF1799'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF1799'IN MINOT.
TF1799'IN MINOT, AT 702 10TH AVENUE SOUTHEAST, 25.8 METERS (84.6 FT) NORTH OF
TF1799'THE CENTER OF AN ALLEY, 22.1 METERS (72.5 FT) EAST OF THE CENTER OF
TF1799'7TH STREET SOUTHEAST, 3.4 METERS (11.2 FT) EAST OF THE SOUTHEAST
TF1799'CORNER OF A DOUBLE GARAGE, 0.7 METER (2.3 FT) WEST OF A FENCE AND 0.5
TF1799'METER (1.6 FT) NORTH OF A UTILITY POLE.
TF1799'THE MARK IS 1.5 M ABOVE THE STREET.
1 National Geodetic Survey, Retrieval Date = OCTOBER 3, 2002
TF0925 **********
TF0925 DESIGNATION - N 221
TF0925 PID - TF0925
TF0925 STATE/COUNTY- ND/WARD
TF0925 USGS QUAD - MINOT (1979)
TF0925
TF0925 *CURRENT SURVEY CONTROL
TF0925
TF0925* NAD 83(1986)- 48 14 16. (N) 101 17 18. (W) SCALED
TF0925* NAVD 88 - 474.591 (meters) 1557.05 (feet) ADJUSTED
TF0925
TF0925 GEOID HEIGHT- -20.30 (meters) GEOID99
TF0925 DYNAMIC HT - 474.669 (meters) 1557.31 (feet) COMP
TF0925 MODELED GRAV- 980,760.9 (mgal) NAVD 88
TF0925
TF0925 VERT ORDER - FIRST CLASS II
TF0925
TF0925.The horizontal coordinates were scaled from a topographic map and have
TF0925.an estimated accuracy of +/- 6 seconds.
TF0925
TF0925.The orthometric height was determined by differential leveling
TF0925.and adjusted by the National Geodetic Survey in June 1991.
TF0925.WARNING-Repeat measurements at this control monument indicate possible
TF0925.vertical movement.
TF0925
TF0925.The geoid height was determined by GEOID99.
TF0925
TF0925.The dynamic height is computed by dividing the NAVD 88
TF0925.geopotential number by the normal gravity value computed on the
TF0925.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF0925.degrees latitude (g = 980.6199 gals.).
TF0925
TF0925.The modeled gravity was interpolated from observed gravity values.
TF0925
TF0925; North East Units Estimated Accuracy
TF0925;SPC ND N - 137,920. 541,450. MT (+/- 180 meters Scaled)
TF0925

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TF0925                          SUPERSEDED SURVEY CONTROL
TF0925
TF0925  NGVD 29      -       474.252  (m)          1555.94   (f) ADJ UNCH    1 2
TF0925
TF0925.Superseded values are not recommended for survey control.
TF0925.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0925.See file dsdata.txt to determine how the superseded data were derived.
TF0925
TF0925_MARKER: DB = BENCH MARK DISK
TF0925_SETTING: 36 = PIER
TF0925_STAMPING: N 221 1962
TF0925_MARK LOGO: CGS
TF0925_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
TF0925
TF0925  HISTORY      - Date      Condition        Report By
TF0925  HISTORY      - 1962      MONUMENTED       CGS
TF0925  HISTORY      - 1981      GOOD             NGS
TF0925  HISTORY      - 1982      GOOD             NGS
TF0925
TF0925                           STATION DESCRIPTION
TF0925
TF0925'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
TF0925'0.5 MI E FROM MINOT.
TF0925'0.5 MILE EAST ALONG THE GREAT NORTHERN RAILROAD FROM THE STATION AT
TF0925'MINOT, SET VERTICALLY IN THE SOUTH FACE OF THE WEST LEG OF THE CENTER
TF0925'PIER OF THE OVERPASS OF THIRD STREET NORTHEAST, 10 FEET NORTH OF THE
TF0925'NORTH RAIL OF THE MAIN TRACK, 2 1/2 FEET ABOVE THE GROUND, AND ABOUT 1
TF0925'1/2 FEET ABOVE THE LEVEL OF THE TRACK.
TF0925
TF0925                           STATION RECOVERY (1981)
TF0925
TF0925'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981
TF0925'RECOVERED IN GOOD CONDITION.
TF0925
TF0925                           STATION RECOVERY (1982)
TF0925
TF0925'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF0925'RECOVERED IN GOOD CONDITION.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF1893 ***********************************************************************
TF1893  DESIGNATION -  N 472
TF1893  PID         -  TF1893
TF1893  STATE/COUNTY-  ND/WARD
TF1893  USGS QUAD   -  MINOT (1979)
TF1893
TF1893                         *CURRENT SURVEY CONTROL
TF1893  ______________________________________________________________________
TF1893* NAD 83(1986)-  48 13 51.      (N)     101 15 07.      (W)      SCALED
TF1893* NAVD 88      -       473.193  (meters)     1552.47    (feet)   ADJUSTED
TF1893  ______________________________________________________________________
TF1893  GEOID HEIGHT-          -20.37  (meters)                         GEOID99
TF1893  DYNAMIC HT  -          473.272 (meters)     1552.73    (feet)   COMP
TF1893  MODELED GRAV-      980,762.2   (mgal)                           NAVD 88
TF1893
TF1893  VERT ORDER  -  FIRST     CLASS II
TF1893
TF1893.The horizontal coordinates were scaled from a topographic map and have
TF1893.an estimated accuracy of +/- 6 seconds.
TF1893
TF1893.The orthometric height was determined by differential leveling
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TF1893.and adjusted by the National Geodetic Survey in June 1991.
TF1893
TF1893.The geoid height was determined by GEOID99.
TF1893
TF1893.The dynamic height is computed by dividing the NAVD 88
TF1893.geopotential number by the normal gravity value computed on the
TF1893.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF1893.degrees latitude (g = 980.6199 gals.).
TF1893
TF1893.The modeled gravity was interpolated from observed gravity values.
TF1893

		North	East	Units	Estimated Accuracy
TF1893;SPC ND N	-	137,120.	544,140.	MT	(+/- 180 meters Scaled)

TF1893
TF1893 SUPERSEDED SURVEY CONTROL
TF1893
TF1893.No superseded survey control is available for this station.
TF1893
TF1893_MARKER: I = METAL ROD
TF1893_SETTING: 15 = METAL ROD DRIVEN INTO GROUND. SEE TEXT FOR ADDITIONAL
TF1893+WITH SETTING: INFORMATION.
TF1893_STAMPING: N 472 1982
TF1893_MARK LOGO: NGS
TF1893_PROJECTION: FLUSH
TF1893_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
TF1893_ROD/PIPE-DEPTH: 1.8 meters
TF1893

TF1893 HISTORY	- Date	Condition	Report By	
TF1893 HISTORY	- 1982	MONUMENTED	NGS	

TF1893
TF1893 STATION DESCRIPTION
TF1893
TF1893'DESCRIBED BY NATIONAL GEODETIC SURVEY 1982
TF1893'IN MINOT.
TF1893'2.7 KM (1.7 MI) WEST ALONG BUSINESS U.S. HIGHWAY 2 FROM THE JUNCTION
TF1893'OF U.S. HIGHWAY 2, THENCE 0.2 KM (0.1 MI) NORTH ALONG COUNTY ROAD 19,
TF1893'SET AT A LARGE METAL BUILDING, 48.3 METERS (158.5 FT) EAST OF THE
TF1893'CENTERLINE OF THE COUNTY ROAD, 54.8 METERS (180.0 FT) NORTH-NORTHWEST
TF1893'OF THE SOUTHWEST CORNER OF THE MAIN BUILDING, 4.2 METERS (14.0 FT)
TF1893'NORTHEAST OF A FLAGPOLE, AND 1.2 METERS (4.0 FT) WEST OF THE SOUTHWEST
TF1893'CORNER OF A METAL BUILDING, PRESENTLY OCCUPIED BY THE POLYCO AMERICAN
TF1893'WINDOW COMPANY, THE OFFICE ADDITION. NOTE, DRIVEN TO REFUSAL.
TF1893'THE MARK IS ABOVE LEVEL WITH PARKING LOT.
1 National Geodetic Survey, Retrieval Date = OCTOBER 3, 2002
TF0945 **********
TF0945 DESIGNATION - S 221
TF0945 PID - TF0945
TF0945 STATE/COUNTY- ND/WARD
TF0945 USGS QUAD - MINOT (1979)
TF0945
TF0945 *CURRENT SURVEY CONTROL
TF0945

TF0945* NAD 83(1986)-	48 13 09.	(N)	101 20 51.	(W)		SCALED
TF0945* NAVD 88 -	496.681	(meters)	1629.53	(feet)		ADJUSTED
TF0945 GEOID HEIGHT-	-20.14	(meters)				GEOID99
TF0945 DYNAMIC HT -	496.761	(meters)	1629.79	(feet)		COMP
TF0945 MODELED GRAV-	980,757.0	(mgal)				NAVD 88

TF0945
TF0945 VERT ORDER - FIRST CLASS II

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TF0945
TF0945.The horizontal coordinates were scaled from a topographic map and have
TF0945.an estimated accuracy of +/- 6 seconds.
TF0945
TF0945.The orthometric height was determined by differential leveling
TF0945.and adjusted by the National Geodetic Survey in June 1991.
TF0945
TF0945.The geoid height was determined by GEOID99.
TF0945
TF0945.The dynamic height is computed by dividing the NAVD 88
TF0945.geopotential number by the normal gravity value computed on the
TF0945.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF0945.degrees latitude (g = 980.6199 gals.).
TF0945
TF0945.The modeled gravity was interpolated from observed gravity values.
TF0945
TF0945;                      North         East     Units  Estimated Accuracy
TF0945;SPC ND N      -   135,900.      537,030.       MT  (+/- 180 meters Scaled)
TF0945
TF0945                            SUPERSEDED SURVEY CONTROL
TF0945
TF0945  NGVD 29      -       496.308   (m)           1628.30    (f) ADJ UNCH    1 2
TF0945
TF0945.Superseded values are not recommended for survey control.
TF0945.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0945.See file dsdata.txt to determine how the superseded data were derived.
TF0945
TF0945_MARKER: DB = BENCH MARK DISK
TF0945_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF0945_STAMPING: S 221 1962
TF0945_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF0945+STABILITY: SURFACE MOTION
TF0945
TF0945  HISTORY      - Date      Condition         Report By
TF0945  HISTORY      - 1962      MONUMENTED        CGS
TF0945  HISTORY      - 1981      GOOD              NGS
TF0945
TF0945                             STATION DESCRIPTION
TF0945
TF0945'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
TF0945'2.8 MI W FROM MINOT.
TF0945'2.8 MILES WEST ALONG THE GREAT NORTHERN RAILROAD FROM THE STATION AT
TF0945'MINOT, ABOUT 0.5 MILE WEST OF THE OVERPASS OF U.S. HIGHWAYS 2 AND 52,
TF0945'ABOUT 0.1 MILE OR 3 POLES WEST OF MILEPOST 3, AT THE NORTH END OF A
TF0945'RIDGE BETWEEN TWO DEEP RAVINES, 106.5 FEET SOUTHWEST AND ACROSS THE
TF0945'TRACK FROM A STEEL POST SUPPORTING A SIGN WHICH READS 21.02, 28.2 FEET
TF0945'SOUTH OF THE SOUTH RAIL OF THE SOUTH TRACK, 1.5 FEET WEST OF A METAL
TF0945'WITNESS POST, ABOUT 2 1/2 FEET BELOW THE LEVEL OF THE TRACK, AND SET
TF0945'IN THE TOP OF A CONCRETE POST PROJECTING 3 INCHES.
TF0945
TF0945                             STATION RECOVERY (1981)
TF0945
TF0945'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1981
TF0945'RECOVERED IN GOOD CONDITION.
1       National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF0977 ***********************************************************************
TF0977  DESIGNATION -  S 335
TF0977  PID         -  TF0977
TF0977  STATE/COUNTY-  ND/WARD
TF0977  USGS QUAD   -  MINOT (1979)
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TF0977
TF0977                          *CURRENT SURVEY CONTROL
TF0977
TF0977* NAD 83(1986)-  48 14 24.      (N)     101 21 23.      (W)      SCALED
TF0977* NAVD 88      -       478.529  (meters)    1569.97    (feet)   ADJUSTED
TF0977
TF0977  GEOID HEIGHT-          -20.15  (meters)                         GEOID99
TF0977  DYNAMIC HT   -         478.608  (meters)    1570.23    (feet)   COMP
TF0977  MODELED GRAV-      980,759.7   (mgal)                           NAVD 88
TF0977
TF0977  VERT ORDER   -  SECOND     CLASS 0
TF0977
TF0977.The horizontal coordinates were scaled from a topographic map and have
TF0977.an estimated accuracy of +/- 6 seconds.
TF0977
TF0977.The orthometric height was determined by differential leveling
TF0977.and adjusted by the National Geodetic Survey in June 1991.
TF0977
TF0977.The geoid height was determined by GEOID99.
TF0977
TF0977.The dynamic height is computed by dividing the NAVD 88
TF0977.geopotential number by the normal gravity value computed on the
TF0977.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF0977.degrees latitude (g = 980.6199 gals.).
TF0977
TF0977.The modeled gravity was interpolated from observed gravity values.
TF0977
TF0977;                    North         East     Units  Estimated Accuracy
TF0977;SPC ND N      -   138,220.      536,390.      MT  (+/- 180 meters Scaled)
TF0977
TF0977                          SUPERSEDED SURVEY CONTROL
TF0977
TF0977  NGVD 29      -       478.098  (m)          1568.56   (f) ADJ UNCH    2 0
TF0977
TF0977.Superseded values are not recommended for survey control.
TF0977.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0977.See file dsdata.txt to determine how the superseded data were derived.
TF0977
TF0977_MARKER: DB = BENCH MARK DISK
TF0977_SETTING: 30 = CULVERT
TF0977_STAMPING: S-335 1935
TF0977_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
TF0977
TF0977  HISTORY      - Date     Condition        Report By
TF0977  HISTORY      - 1935     MONUMENTED       CGS
TF0977
TF0977                          STATION DESCRIPTION
TF0977
TF0977'DESCRIBED BY COAST AND GEODETIC SURVEY 1935
TF0977'3.4 MI NW FROM MINOT.
TF0977'3.4 MILES NORTHWEST OF SOO LINE PASSENGER DEPOT AT ON ROAD ALONG THE
TF0977'NORTHEAST BANK OF THE SOURIS RIVER, AT T-ROAD SOUTH, ABOUT 2.8 MILES
TF0977'NORTHWEST OF JUNCTION WITH NO. 83 HIWAY AT MINOT.  SET IN THE CENTER
TF0977'OF THE EAST HEADWALL OF CONCRETE CULVERT, 75 FT SOUTH OF CENTERLINE OF
TF0977'JUNCTION.
1        National Geodetic Survey,    Retrieval Date = OCTOBER  3, 2002
TF1797 ***********************************************************************
TF1797  DESIGNATION -  S 463
TF1797  PID         -  TF1797
TF1797  STATE/COUNTY-  ND/WARD
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TF1797  USGS QUAD    -  MINOT (1979)
TF1797
TF1797                          *CURRENT SURVEY CONTROL
TF1797
TF1797* NAD 83(1986)-  48 14 14.      (N)     101 17 45.      (W)      SCALED
TF1797* NAVD 88      -       476.548  (meters)     1563.47    (feet)   ADJUSTED
TF1797
TF1797  GEOID HEIGHT-          -20.28  (meters)                         GEOID99
TF1797  DYNAMIC HT   -         476.627  (meters)     1563.73    (feet)   COMP
TF1797  MODELED GRAV-      980,760.4   (mgal)                           NAVD 88
TF1797
TF1797  VERT ORDER   -  FIRST      CLASS II
TF1797
TF1797.The horizontal coordinates were scaled from a topographic map and have
TF1797.an estimated accuracy of +/- 6 seconds.
TF1797
TF1797.The orthometric height was determined by differential leveling
TF1797.and adjusted by the National Geodetic Survey in June 1991.
TF1797
TF1797.The geoid height was determined by GEOID99.
TF1797
TF1797.The dynamic height is computed by dividing the NAVD 88
TF1797.geopotential number by the normal gravity value computed on the
TF1797.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
TF1797.degrees latitude (g = 980.6199 gals.).
TF1797
TF1797.The modeled gravity was interpolated from observed gravity values.
TF1797
TF1797;                      North         East     Units  Estimated Accuracy
TF1797;SPC ND N      -   137,860.      540,890.       MT  (+/- 180 meters Scaled)
TF1797
TF1797                          SUPERSEDED SURVEY CONTROL
TF1797
TF1797.No superseded survey control is available for this station.
TF1797
TF1797_MARKER: DB = BENCH MARK DISK
TF1797_SETTING: 38 = PIER
TF1797_STAMPING: S 463 1981
TF1797_MARK LOGO: NGS
TF1797_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
TF1797
TF1797  HISTORY      - Date      Condition        Report By
TF1797  HISTORY      - 1981      MONUMENTED       NGS
TF1797  HISTORY      - 1982      GOOD             NGS
TF1797
TF1797                           STATION DESCRIPTION
TF1797
TF1797'DESCRIBED BY NATIONAL GEODETIC SURVEY 1981
TF1797'0.2 KM (0.1 MI) NE FROM MINOT.
TF1797'0.2 KM (0.1 MI) NORTHEASTERLY ALONG THE BURLINGTON NORTHERN RAILROAD
TF1797'FROM THE RAILROAD STATION IN MINOT, SET VERTICALLY IN THE NORTHWEST
TF1797'FACE OF THE MOST SOUTHWESTERLY 1 OF 2 PIERS OF THE SOUTH BOUND LANES
TF1797'OF THE NORTH BROADWAY OVERPASS, 18.4 METERS (60.4 FT) NORTHEAST OF THE
TF1797'NORTHWEST CORNER OF A BRICK BUILDING, 13.7 METERS (44.9 FT) SOUTH OF
TF1797'THE NEAR RAIL, 7.3 METERS (24.0 FT) SOUTH OF THE CENTER OF A PAVED
TF1797'ROAD.
TF1797'THE MARK IS 1.3 M ABOVE THE ROAD.
TF1797
TF1797                           STATION RECOVERY (1982)
TF1797
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TF1797'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1982
TF1797'RECOVERED IN GOOD CONDITION.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
TF2147 ***********************************************************************
TF2147  DESIGNATION -  SOU EAST
TF2147  PID         -  TF2147
TF2147  STATE/COUNTY-  ND/WARD
TF2147  USGS QUAD   -  SURREY (1981)
TF2147
TF2147                          *CURRENT SURVEY CONTROL
TF2147
TF2147* NAD 83(1996)-  48 11 20.37513(N)     101 13 25.52257(W)      ADJUSTED
TF2147* NAVD 88     -       512.     (meters)    1680.     (feet)   SCALED
TF2147
TF2147  LAPLACE CORR-          -6.50  (seconds)                      DEFLEC99
TF2147  GEOID HEIGHT-         -20.39  (meters)                       GEOID99
TF2147
TF2147  HORZ ORDER  -  FIRST
TF2147
TF2147.The horizontal coordinates were established by classical geodetic methods
TF2147.and adjusted by the National Geodetic Survey in January 1998.
TF2147
TF2147.The orthometric height was scaled from a topographic map.
TF2147
TF2147.The Laplace correction was computed from DEFLEC99 derived deflections.
TF2147
TF2147.The geoid height was determined by GEOID99.
TF2147
TF2147;                    North         East      Units   Scale      Converg.
TF2147;SPC ND N      -   132,446.705   546,191.152   MT  0.99993749 -0 32 18.9
TF2147;UTM  14       - 5,339,697.445   334,729.121   MT  0.99993562 -1 39 28.2
TF2147
TF2147:                Primary Azimuth Mark                      Grid Az
TF2147:SPC ND N      -  SOU EAST AZ MK                           127 07 51.7
TF2147:UTM  14       -  SOU EAST AZ MK                           128 15 01.0
TF2147
TF2147|-----------------------------------------------------------------------|
TF2147| PID    Reference Object                      Distance      Geod. Az  |
TF2147|                                                            dddmmss.s |
TF2147| TF2145 SURREY PUBLIC SCHOOL FLAGPOLE      APPROX. 8.7 KM 0522815.5 |
TF2147| CQ9557 SOU EAST AZ MK                                      1263532.8 |
TF2147| CQ9558 SOU EAST RM 1                       12.725 METERS 21908     |
TF2147| TF2152 MINOT MUNICIPAL TANK               APPROX. 6.3 KM 3110825.4 |
TF2147| CQ9559 SOU EAST RM 2                       16.051 METERS 32101     |
TF2147| TF2148 MINOT KLPM RADIO TRANSM TOWER      APPROX. 2.7 KM 3313328.3 |
TF2147|-----------------------------------------------------------------------|
TF2147
TF2147                          SUPERSEDED SURVEY CONTROL
TF2147
TF2147  NAD 83(1986)-  48 11 20.37530(N)     101 13 25.52070(W) AD(       ) 1
TF2147  NAD 27      -  48 11 20.33200(N)     101 13 23.93300(W) AD(       ) 1
TF2147
TF2147.Superseded values are not recommended for survey control.
TF2147.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF2147.See file dsdata.txt to determine how the superseded data were derived.
TF2147
TF2147_MARKER: DS = TRIANGULATION STATION DISK
TF2147_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF2147
TF2147  HISTORY     - Date     Condition        Report By
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TF2147  HISTORY      - 1946      MONUMENTED        CGS
TF2147  HISTORY      - 1958      GOOD              CGS
TF2147  HISTORY      - 1973      GOOD              NGS
TF2147
TF2147                            STATION DESCRIPTION
TF2147
TF2147'DESCRIBED BY COAST AND GEODETIC SURVEY 1946 (RAM)
TF2147'THE STATION IS LOCATED ON THE POINT OF A RIDGE ON A ROUND
TF2147'TOPPED KNOLL ABOUT 4 MILES SOUTHEAST OF MINOT, 4 MILES NORTHWEST
TF2147'OF LOGAN, 150 YARDS SOUTHWEST OF U.S. HIGHWAY 52 AND 6 FEET
TF2147'SOUTHWEST OF WITNESS POST.  THE MARK PROJECTS 4 INCHES AND
TF2147'THE DISK IS STAMPED SOU EAST 1946.
TF2147'
TF2147'REFERENCE MARK NO. 1 IS 41.75 FEET SOUTHWEST OF THE STATION.
TF2147'THE MARK PROJECTS 2 INCHES AND THE DISK IS STAMPED SOU EAST
TF2147'NO 1 1946.
TF2147'
TF2147'REFERENCE MARK NO. 2 IS 52.66 FEET NORTHWEST OF THE STATION.
TF2147'THE MARK PROJECTS 1 INCH AND THE DISK IS STAMPED SOU EAST NO
TF2147'2 1946.
TF2147'
TF2147'THE AZIMUTH MARK IS 0.4 MILE SOUTHEAST OF THE STATION, 33 FEET
TF2147'NORTH OF CONCRETE CULVERT, 29 FEET NORTHEAST OF THE CENTERLINE
TF2147'OF U.S. HIGHWAY 52, 3 FEET NORTHWEST OF WITNESS POST AND 2
TF2147'FEET SOUTHWEST OF FENCE.  THE MARK PROJECTS 3 INCHES AND THE
TF2147'DISK IS STAMPED SOU EAST 1946.
TF2147'
TF2147'TO REACH THE STATION FROM THE COURTHOUSE IN MINOT, GO EAST
TF2147'ON U.S. HIGHWAY 2 FOR 0.1 MILE TO THE JUNCTION OF U.S.
TF2147'HIGHWAYS 52 AND 2.  TURN RIGHT ON U.S. HIGHWAY 52 AND GO
TF2147'SOUTHEAST FOR 4.5 MILES TO A WIRE GATE ON THE RIGHT.  TURN
TF2147'RIGHT THROUGH GATE AND DRIVE WEST-NORTHWEST ACROSS PASTURE
TF2147'FOR 0.2 MILE TO THE TOP OF THE KNOLL AND THE STATION.
TF2147'
TF2147'TO REACH THE AZIMUTH MARK FROM THE STATION, GO EAST-SOUTHEAST
TF2147'ACROSS THE PASTURE FOR 0.2 MILE TO THE GATE.  PASS THROUGH
TF2147'GATE, TURN RIGHT AND GO SOUTHEAST ON U.S. HIGHWAY 52 FOR 0.25
TF2147'MILE TO THE AZIMUTH MARK ON THE LEFT.
TF2147'
TF2147'HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.
TF2147
TF2147                            STATION RECOVERY (1958)
TF2147
TF2147'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1958 (LFV)
TF2147'STATION, AZIMUTH, AND REFERENCE MARKS RECOVERED IN GOOD CONDITION.
TF2147'DESCRIPTION ADEQUATE AND CORRECT EXCEPT FOR THE FOLLOWING.
TF2147'TO REACH STATION FROM JUNCTION OF U.S. HIGHWAY 2 AND OLD STATE
TF2147'ROUTE 52 IN MINOT GO 4.2 MILES SOUTHEAST ON OLD STATE ROUTE 52
TF2147'TO WIRE GATE ON RIGHT, TURN RIGHT AND PASS THROUGH GATE, GO
TF2147'ABOUT 0.2 MILES SOUTHERLY TO HIGHEST POINT OF KNOLL NEAREST
TF2147'ROAD AND STATION.  TO REACH AZIMUTH MARK FROM WIRE GATE GO
TF2147'ABOUT 0.4 MILE SOUTHEAST ON OLD STATE ROUTE 52 TO DIRT ROAD
TF2147'ON RIGHT TO A FARMHOUSE AND AZIMUTH MARK ON LEFT ABOUT 19.2
TF2147'FEET WEST OF A POWER POLE.
TF2147
TF2147                            STATION RECOVERY (1973)
TF2147
TF2147'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1973 (ARB)
TF2147'THE MARK WAS RECOVERED, IN GOOD CONDITION, AS DESCRIBED WITH
TF2147'THE EXCEPTION THAT ACCESS IS LIMITED ONLY TO FOOT.
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1       National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF2143 ***********************************************************************
 TF2143  DESIGNATION -  SURREY
 TF2143  PID         -  TF2143
 TF2143  STATE/COUNTY-  ND/WARD
 TF2143  USGS QUAD   -  SURREY (1981)
 TF2143
 TF2143                        *CURRENT SURVEY CONTROL
 TF2143
 TF2143* NAD 83(1996)-  48 11 51.83526(N)     101 10 27.71284(W)     ADJUSTED
 TF2143* NAVD 88     -       517.     (meters)    1696.     (feet)  SCALED
 TF2143
 TF2143  LAPLACE CORR-          -5.29  (seconds)                     DEFLEC99
 TF2143  GEOID HEIGHT-         -20.48  (meters)                      GEOID99
 TF2143
 TF2143  HORZ ORDER  -  FIRST
 TF2143
 TF2143.The horizontal coordinates were established by classical geodetic methods
 TF2143.and adjusted by the National Geodetic Survey in January 1998.
 TF2143
 TF2143.The orthometric height was scaled from a topographic map.
 TF2143
 TF2143.The Laplace correction was computed from DEFLEC99 derived deflections.
 TF2143
 TF2143.The geoid height was determined by GEOID99.
 TF2143
 TF2143;                    North         East     Units   Scale      Converg.
 TF2143;SPC ND N     -   133,384.985   549,871.664   MT  0.99993778 -0 30 06.5
 TF2143;UTM  14      - 5,340,563.639   338,427.225   MT  0.99992077 -1 37 16.4
 TF2143
 TF2143:                Primary Azimuth Mark                    Grid Az
 TF2143:SPC ND N     -  SURREY AZ MK RESET                      100 34 51.3
 TF2143:UTM  14      -  SURREY AZ MK RESET                      101 42 01.2
 TF2143
 TF2143|-----------------------------------------------------------------------|
 TF2143| PID    Reference Object                    Distance      Geod. Az   |
 TF2143|                                                          dddmmss.s  |
 TF2143| TF2145 SURREY PUBLIC SCHOOL FLAGPOLE      APPROX. 5.4 KM 0365211.8  |
 TF2143| CQ9641 SURREY AZ MK                                      1000442.0  |
 TF2143| CQ9642 SURREY AZ MK RESET                                1000444.8  |
 TF2143| CQ9643 SURREY RM 1                       174.956 METERS 13257       |
 TF2143| CQ9645 SURREY RM 3                       151.425 METERS 13258       |
 TF2143| CQ9644 SURREY RM 2                       122.164 METERS 19308       |
 TF2143| CQ9646 SURREY RM 4                       124.541 METERS 19308       |
 TF2143| TF2148 MINOT KLPM RADIO TRANSM TOWER      APPROX. 5.2 KM 2855534.1  |
 TF2143| TF2152 MINOT MUNICIPAL TANK               APPROX. 9.0 KM 2904559.7  |
 TF2143| TF2155 MINOT ST LEOS CATH CH SPIRE        APPROX. 9.6 KM 2943448.5  |
 TF2143| TF2153 MINOT MILLER MILLING CO TANK       APPROX. 9.4 KM 2964219.2  |
 TF2143| TF2154 MONOT FIRST LUTHERAN CHURCH SPIRE  APPROX.10.2 KM 2982243.9  |
 TF2143| TF2146 MINOT USCAA RADIO RANGE STATION    APPROX. 4.8 KM 3022107.1  |
 TF2143|-----------------------------------------------------------------------|
 TF2143
 TF2143                          SUPERSEDED SURVEY CONTROL
 TF2143
 TF2143  NAD 83(1986)-  48 11 51.83550(N)     101 10 27.71120(W) AD(       ) 1
 TF2143  NAD 27      -  48 11 51.79340(N)     101 10 26.12570(W) AD(       ) 1
 TF2143
 TF2143.Superseded values are not recommended for survey control.
 TF2143.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 TF2143.See file dsdata.txt to determine how the superseded data were derived.
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TF2143
TF2143_MARKER: DS = TRIANGULATION STATION DISK
TF2143_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF2143
TF2143  HISTORY      - Date     Condition        Report By
TF2143  HISTORY      - 1934     MONUMENTED       CGS
TF2143  HISTORY      - 1938     GOOD             CGS
TF2143  HISTORY      - 1946     GOOD             CGS
TF2143  HISTORY      - 1956     GOOD             LOCENG
TF2143  HISTORY      - 1958     MARK NOT FOUND   CGS
TF2143
TF2143                          STATION DESCRIPTION
TF2143
TF2143'DESCRIBED BY COAST AND GEODETIC SURVEY 1934 (WRP)
TF2143'STATION IS ABOUT 2-3/4 MILES S OF THE GREAT NORTHERN RAILROAD,
TF2143'3-1/2 MILES SW OF THE TOWN OF SURREY, 0.6 MILE ENE OF SORENSONS
TF2143'RANCH HOUSE AND 6 MILES ESE OF MINOT, IN SEC. 35, T 155 N,
TF2143'R 82 W, ON THE HIGHEST GROUND IN THE IMMEDIATE VICINITY,
TF2143'OVERLOOKING THE SOURIS, OR MOUSE, RIVER VALLEY.  IT PROJECTS
TF2143'8 INCHES AND IS ON LAND OWNED BY TILMAN SAUGETAD, WHO LIVES
TF2143'3-1/2 MILES W, ON THE SOURIS RIVER.
TF2143'
TF2143'SURFACE, UNDERGROUND, REFERENCE, AND AZIMUTH MARKS ARE STANDARD
TF2143'BRONZE DISKS SET IN CONCRETE.
TF2143'
TF2143'REFERENCE MARK NO. 1 IS SW OF THE STATION, 27 FEET N OF CENTER
TF2143'OF SECTION ROAD, AND PROJECTS 2 INCHES.  REFERENCE MARK
TF2143'NO. 2 IS S OF THE STATION, 27 FEET N OF CENTER OF SECTION ROAD
TF2143'AND PROJECTS 3 INCHES.
TF2143'
TF2143'AZIMUTH MARK IS ESE OF THE STATION, ON SECOND KNOLL, 21 FEET
TF2143'S OF CENTER LINE OF ROAD AND PROJECTS 4 INCHES.
TF2143'
TF2143'REACHED FROM WARD COUNTY COURTHOUSE IN MINOT, BY GOING E ON
TF2143'U.S. HIGHWAY 2 FOR 4.5 MILES, WHERE U.S. HIGHWAY 2 TURNS N.
TF2143'LEAVE PAVED HIGHWAY, TURN S, OR RIGHT, AND GO ON GRADED
TF2143'ROAD 2.1 MILES (THERE IS A WHITE SCHOOLHOUSE ON THIS ROAD
TF2143'0.3 MILE S OF PAVEMENT).  AT T-INTERSECTION, TURN E ON
TF2143'SECTION-LINE ROAD, PASS SORENSONS RANCH HOUSE, ON S SIDE OF
TF2143'ROAD, AND GO 0.6 MILE TO TOP OF GRADE.  LEAVE ROAD, TURN LEFT,
TF2143'OR N, INTO FIELD AND GO 0.1 MILE TO HIGHEST GROUND AND
TF2143'STATION.  A 4-FOOT STAND WILL SEE ALL STATIONS USED AT THIS
TF2143'TIME.
TF2143
TF2143                          STATION RECOVERY (1938)
TF2143
TF2143'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1938 (CDM)
TF2143'STATION, REFERENCE, AND AZIMUTH MARKS WERE RECOVERED AS DESCRIBED,
TF2143'AND FOUND IN GOOD CONDITION.  DISTANCES TO REFERENCE MARKS
TF2143'WERE MEASURED AND FOUND AS DESCRIBED.
TF2143'
TF2143'STATION MARK IS SET 18 INCHES BELOW THE SURFACE.
TF2143'
TF2143'AZIMUTH MARK IS LOCATED APPROXIMATELY 0.4 MILE SE OF STATION
TF2143'ON S SIDE OF E-W SECTION-LINE ROAD AND PROJECTS 8 INCHES.
TF2143
TF2143                          STATION RECOVERY (1946)
TF2143
TF2143'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1946 (RAM)
TF2143'THE STATION WAS RECOVERED AS DESCRIBED IN 1934 BY W.R.P. AND
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TF2143'ALL MARKS WERE FOUND IN GOOD CONDITION. A NEW DESCRIPTION
TF2143'FOLLOWS.
TF2143'
TF2143'THE STATION IS LOCATED ABOUT 6 MILES EAST-SOUTHEAST OF MINOT,
TF2143'3.5 MILES SOUTHWEST OF THE VILLAGE OF SURREY AND 2.75 MILES
TF2143'SOUTH OF THE GREAT NORTHERN RAILROAD TRACKS. IT IS LOCATED
TF2143'ON THE SUMMIT OF A PROMINENT HILL IN A CULTIVATED FIELD.
TF2143'THE SURFACE STATION MARK IS 15-INCHES BELOW THE SURFACE OF
TF2143'THE GROUND AND THE DISK IS STAMPED SURREY 1934.
TF2143'
TF2143'SURFACE, UNDERGROUND, REFERENCE MARKS AND AZIMUTH MARK ARE
TF2143'A STANDARD BRONZE DISK SET IN CONCRETE.
TF2143'
TF2143'REFERENCE MARK NO. 1 IS 574.0 FEET SOUTHEAST OF THE STATION,
TF2143'27 FEET NORTH OF THE APPROXIMATE CENTERLINE OF A SECTION LINE
TF2143'ROAD AND 2 FEET NORTHWEST OF A WITNESS POST. THE MARK IS
TF2143'FLUSH WITH THE GROUND AND THE DISK IS STAMPED SURREY NO 1 1934.
TF2143'
TF2143'REFERENCE MARK NO. 2 IS 400.8 FEET SOUTH OF THE STATION AND
TF2143'27 FEET NORTH OF THE APPROXIMATE CENTERLINE OF A SECTION LINE
TF2143'ROAD. THE MARK PROJECTS 3 INCHES AND THE DISK IS STAMPED SURREY
TF2143'NO 2 1934.
TF2143'
TF2143'THE AZIMUTH MARK IS 0.4 MILE EAST-SOUTHEAST OF THE STATION
TF2143'AND 21 FEET SOUTH OF THE APPROXIMATE CENTERLINE OF A SECTION
TF2143'LINE ROAD. THE MARK PROJECTS 4 INCHES AND THE DISK IS STAMPED
TF2143'SURREY AZIMUTH 1934.
TF2143'
TF2143'TO REACH THE STATION FROM THE WARD COUNTY COURTHOUSE IN MINOT,
TF2143'GO EAST ON U.S. HIGHWAY 2 FOR 4.5 MILES TO A GRADED DIRT ROAD
TF2143'RIGHT, TURN RIGHT AND GO SOUTH FOR 2.1 MILES TO A T ROAD LEFT,
TF2143'TURN LEFT AND GO 1.0 MILE ON SECTION LINE ROAD AND STATION
TF2143'ON THE LEFT AS DESCRIBED.
TF2143'
TF2143'TO REACH THE AZIMUTH MARK FROM THE STATION, GO EAST ON SECTION
TF2143'LINE ROAD FOR 0.4 MILE AND THE MARK ON THE RIGHT AS DESCRIBED.
TF2143'
TF2143'NOTE - THE 1934 MEASUREMENT OF REFERENCE MARKS WERE NOT CHECKED
TF2143'FOR DISTANCE BECAUSE OF WHEAT CROP AND BEING OF SUCH A DISTANCE.
TF2143'
TF2143'OBSERVATIONS TAKEN FROM A 10-FOOT WOOD STAND.
TF2143
TF2143 STATION RECOVERY (1956)
TF2143
TF2143'RECOVERY NOTE BY LOCAL ENGINEER (INDIVIDUAL OR FIRM) 1956
TF2143'STATION RECOVERED BY TRUEX AND BRUNNER
TF2143'
TF2143'THE AZIMUTH MARK AND REFERENCE MARKS 1 AND 2 WERE RESET IN
TF2143'THE FALL OF 1956 BY TRUAX AND BRUNNER, ENGINEERS AND SURVEYORS,
TF2143'BOX 133, MINOT, NORTH DAKOTA.
TF2143'
TF2143'REFERENCE MARK NO. 3 WAS ESTABLISHED ON LINE WITH REFERENCE
TF2143'MARK NO. 1 AND IS NOW SET IN THE TOE OF THE INSLOPE OF THE
TF2143'NEW ROAD. IT IS 582.8 FEET FROM THE STATION.
TF2143'
TF2143'REFERENCE MARK NO. 4 WAS ESTABLISHED ON LINE WITH REFERENCE
TF2143'MARK NO. 2 AND IS NOW SET IN THE TOE OF THE INSLOPE OF THE
TF2143'NEW ROAD. IT IS 408.6 FEET FROM THE STATION.
TF2143'
TF2143'THE AZIMUTH MARK WAS RESET ON THE SAME BEARING AS THE ORIGINAL

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 TF2143'IN APPROXIMATELY THE SAME LOCATION.  THE NEW MARK IS LOCATED
 TF2143'AT THE TOE OF INSLOPE OF THE NEW ROAD ABOUT 18 FEET FROM
 TF2143'THE CENTERLINE.
 TF2143'
 TF2143'REFERENCE MARKS 1 AND 2 AND THE ORIGINAL AZIMUTH MARK WERE
 TF2143'DESTROYED.
 TF2143'
 TF2143'AZIMUTH MARK AND 1 REFERENCE MARK DISK WERE RECOVERED AND
 TF2143'RECEIVED AT THIS OFFICE 1/10/57.
 TF2143
 TF2143                          STATION RECOVERY (1958)
 TF2143
 TF2143'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1958 (LFV)
 TF2143'STATION AND REFERENCE MARKS SEARCHED FOR BUT NOT RECOVERED.
 TF2143'A REFERENCE MARK STAMPED NO. 3, 1955 WAS FOUND ALONG NORTH
 TF2143'EDGE OF SECTION LINE ROAD, BUT NO INFORMATION WAS FURNISHED
 TF2143'IN DATA REGARDING THIS MARK.  AZIMUTH MARK NOT SEARCHED FOR.
 TF2143'STATION MARK IS PROBABLY IN PLACE BUT AREA IS IN CULTIVATION.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF1844 ***********************************************************************
 TF1844  DESIGNATION -  T 463
 TF1844  PID         -  TF1844
 TF1844  STATE/COUNTY-  ND/WARD
 TF1844  USGS QUAD   -  MINOT (1979)
 TF1844
 TF1844                         *CURRENT SURVEY CONTROL
 TF1844 ______________________________________________________________________
 TF1844* NAD 83(1986)-  48 13 41.     (N)     101 18 55.     (W)      SCALED
 TF1844* NAVD 88     -       471.610  (meters)    1547.27    (feet)   ADJUSTED
 TF1844 ______________________________________________________________________
 TF1844  GEOID HEIGHT-         -20.23  (meters)                        GEOID99
 TF1844  DYNAMIC HT  -         471.687 (meters)    1547.53    (feet)   COMP
 TF1844  MODELED GRAV-     980,758.5   (mgal)                          NAVD 88
 TF1844
 TF1844  VERT ORDER  -  FIRST     CLASS II
 TF1844
 TF1844.The horizontal coordinates were scaled from a topographic map and have
 TF1844.an estimated accuracy of +/- 6 seconds.
 TF1844
 TF1844.The orthometric height was determined by differential leveling
 TF1844.and adjusted by the National Geodetic Survey in June 1991.
 TF1844
 TF1844.The geoid height was determined by GEOID99.
 TF1844
 TF1844.The dynamic height is computed by dividing the NAVD 88
 TF1844.geopotential number by the normal gravity value computed on the
 TF1844.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TF1844.degrees latitude (g = 980.6199 gals.).
 TF1844
 TF1844.The modeled gravity was interpolated from observed gravity values.
 TF1844
 TF1844;                   North         East     Units  Estimated Accuracy
 TF1844;SPC ND N     -   136,860.      539,430.      MT  (+/- 180 meters Scaled)
 TF1844
 TF1844                          SUPERSEDED SURVEY CONTROL
 TF1844
 TF1844.No superseded survey control is available for this station.
 TF1844
 TF1844_MARKER: DB = BENCH MARK DISK
 TF1844_SETTING: 36 = DAM
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 TF1844_STAMPING: T 463 1981
 TF1844_MARK LOGO: NGS
 TF1844_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 TF1844
 TF1844  HISTORY      - Date      Condition         Report By
 TF1844  HISTORY      - 1981      MONUMENTED        NGS
 TF1844
 TF1844                           STATION DESCRIPTION
 TF1844
 TF1844'DESCRIBED BY NATIONAL GEODETIC SURVEY 1981
 TF1844'IN MINOT.
 TF1844'IN MINOT, AT THE JUNCTION OF SIXTEENTH STREET SOUTHWEST AND BURDICK
 TF1844'EXPRESSWAY, AT THE MINOT WATER TREATMENT PLANT, IN THE SOUTH END OF A
 TF1844'DIVERSION DAM, 35.8 METERS (117.5 FT) SOUTHWEST OF THE CENTERLINE OF
 TF1844'SIXTEENTH STREET, 1.2 METERS (3.9 FT) NORTHWEST OF THE SOUTHEAST END
 TF1844'OF THE DAM, 0.4 METERS (1.3 FT) SOUTHWEST OF THE NORTHEAST EDGE OF THE
 TF1844'DAM.
 TF1844'THE MARK IS 5.0 M BELOW THE STREET.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF0933 ***********************************************************************
 TF0933  DESIGNATION -  TRANSPORT
 TF0933  PID         -  TF0933
 TF0933  STATE/COUNTY-  ND/WARD
 TF0933  USGS QUAD   -  BURLINGTON SE (1979)
 TF0933
 TF0933                          *CURRENT SURVEY CONTROL
 TF0933 ______________________________________________________________________
 TF0933* NAD 83(1996)-  48 15 16.26968(N)     101 17 06.68307(W)      ADJUSTED
 TF0933* NAVD 88      -       522.541  (meters)     1714.37   (feet)  ADJUSTED
 TF0933 ______________________________________________________________________
 TF0933  LAPLACE CORR-          -6.46  (seconds)                      DEFLEC99
 TF0933  GEOID HEIGHT-         -20.32  (meters)                       GEOID99
 TF0933  DYNAMIC HT  -         522.629 (meters)     1714.66   (feet)  COMP
 TF0933  MODELED GRAV-     980,763.3   (mgal)                         NAVD 88
 TF0933
 TF0933  HORZ ORDER  -  SECOND
 TF0933  VERT ORDER  -  FIRST     CLASS II
 TF0933
 TF0933.This mark is at Minot Airport (MOT)
 TF0933
 TF0933.The horizontal coordinates were established by classical geodetic methods
 TF0933.and adjusted by the National Geodetic Survey in January 1998.
 TF0933
 TF0933.The orthometric height was determined by differential leveling
 TF0933.and adjusted by the National Geodetic Survey in June 1991.
 TF0933
 TF0933.The Laplace correction was computed from DEFLEC99 derived deflections.
 TF0933
 TF0933.The geoid height was determined by GEOID99.
 TF0933
 TF0933.The dynamic height is computed by dividing the NAVD 88
 TF0933.geopotential number by the normal gravity value computed on the
 TF0933.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TF0933.degrees latitude (g = 980.6199 gals.).
 TF0933
 TF0933.The modeled gravity was interpolated from observed gravity values.
 TF0933
 TF0933;                   North         East      Units   Scale      Converg.
 TF0933;SPC ND N     -   139,776.804   541,698.228   MT  0.99994022 -0 35 03.4
 TF0933;UTM  14      - 5,347,114.021   330,380.333   MT  0.99995351 -1 42 19.5
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TF0933
TF0933:                Primary Azimuth Mark                    Grid Az
TF0933:SPC ND N     -  TRANSPORT AZ MK                         348 52 33.5
TF0933:UTM  14      -  TRANSPORT AZ MK                         349 59 49.6
TF0933
TF0933|-------------------------------------------------------------------|
TF0933| PID    Reference Object                      Distance      Geod. Az  |
TF0933|                                                            dddmmss.s |
TF0933| TF0934 TRANSPORT RM 1                        29.925 METERS 09126     |
TF0933| TF2146 MINOT USCAA RADIO RANGE STATION     APPROX. 5.6 KM 1315305.4 |
TF0933| TF2152 MINOT MUNICIPAL TANK                APPROX. 3.1 KM 1834749.8 |
TF0933| TF2153 MINOT MILLER MILLING CO TANK        APPROX. 2.1 KM 1844734.1 |
TF0933| TF2155 MINOT ST LEOS CATH CH SPIRE         APPROX. 2.4 KM 1914651.4 |
TF0933| TF0932 TRANSPORT RM 2                        19.815 METERS 21205     |
TF0933| TF0939 TRANSPORT AZ MK                     APPROX. 1.8 KM 3481730.1 |
TF0933|-------------------------------------------------------------------|
TF0933
TF0933                          SUPERSEDED SURVEY CONTROL
TF0933
TF0933  NAD 83(1986)-  48 15 16.26948(N)     101 17 06.68122(W) AD(        ) 2
TF0933  NAD 27      -  48 15 16.23700(N)     101 17 05.09700(W) AD(        ) 2
TF0933  NGVD 29     -       522.174  (m)           1713.17    (f) ADJ UNCH    1 2
TF0933
TF0933.Superseded values are not recommended for survey control.
TF0933.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
TF0933.See file dsdata.txt to determine how the superseded data were derived.
TF0933
TF0933_MARKER: DS = TRIANGULATION STATION DISK
TF0933_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
TF0933_STAMPING: TRANSPORT 1946
TF0933_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
TF0933+STABILITY: SURFACE MOTION
TF0933
TF0933  HISTORY     - Date     Condition        Report By
TF0933  HISTORY     - 1946     MONUMENTED       CGS
TF0933  HISTORY     - 1954     GOOD             CGS
TF0933  HISTORY     - 1962     GOOD             CGS
TF0933  HISTORY     - 1962     GOOD             NGS
TF0933  HISTORY     - 1963     GOOD             CGS
TF0933  HISTORY     - 1963     GOOD             NGS
TF0933  HISTORY     - 1968     GOOD             CGS
TF0933  HISTORY     - 1973     GOOD             NGS
TF0933  HISTORY     - 1983     GOOD             NGS
TF0933  HISTORY     - 1983     GOOD             USGS
TF0933
TF0933                          STATION DESCRIPTION
TF0933
TF0933'DESCRIBED BY COAST AND GEODETIC SURVEY 1946 (RAM)
TF0933'THE STATION IS LOCATED ON THE MINOT COMMERCIAL AIRPORT, ABOUT
TF0933'1.5 MILES NORTH OF MINOT, 100 YARDS SOUTHWEST OF THE CONTROL
TF0933'HOUSE, 30 FEET EAST-NORTHEAST OF THE WIND DIRECTION INDICATOR
TF0933'AND 7 FEET NORTH-NORTHWEST OF A WHITE WITNESS POST.  THE MARK
TF0933'PROJECTS ABOUT 2 INCHES AND THE DISK IS STAMPED TRANSPORT 1946.
TF0933'
TF0933'REFERENCE MARK NO. 1 IS 98.18 FEET EAST OF THE STATION AND
TF0933'2 FEET NORTH OF AN EAST-WEST FENCE LINE.  THE MARK PROJECTS
TF0933'ABOUT 2 INCHES AND THE DISK IS STAMPED TRANSPORT NO 1 1946.
TF0933'
TF0933'REFERENCE MARK NO. 2 IS 65.01 FEET SOUTHWEST OF THE STATION
TF0933'AND 42 FEET SOUTH OF THE WIND INDICATOR.  THE MARK PROJECTS
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TF0933'ABOUT 2 INCHES AND THE DISK IS STAMPED TRANSPORT NO 2 1946.
TF0933'
TF0933'THE AZIMUTH MARK IS APPROXIMATELY 1.2 MILES NORTH OF THE
TF0933'STATION ALONG THE NORTH SIDE OF THE AIRFIELD. IT IS 100 FEET
TF0933'SOUTHEAST OF A RIGHT ANGLE CURVE IN A ROAD AND 1 FOOT SOUTH
TF0933'OF A NORTH-SOUTH FENCE LINE. THE MARK PROJECTS ABOUT 4 INCHES
TF0933'AND THE DISK IS STAMPED TRANSPORT 1946.
TF0933'
TF0933'TO REACH THE STATION FROM THE WARD COUNTY COURTHOUSE IN MINOT,
TF0933'GO NORTH ON EAST THIRD STREET FOR 1.6 MILES TO THE NORTH EDGE
TF0933'OF TOWN. CONTINUE NORTH UPHILL ON GRAVEL ROAD FOR 0.5 MILE
TF0933'TO AIRFIELD. TURN SHARP RIGHT AND GO AROUND THE SOUTH END
TF0933'OF THE HANGARS, THEN 0.3 MILE NORTHEAST TO WIND DIRECTION
TF0933'INDICATOR AND THE STATION AS DESCRIBED. TO REACH THE AZIMUTH
TF0933'FROM THE MAIN GATE OF THE AIRFIELD, GO IN A WESTERLY DIRECTION
TF0933'ALONG THE SOUTH FENCE OF THE AIRFIELD FOR 0.6 MILE TO U.S.
TF0933'HIGHWAY NO. 83. GO NORTH ALONG THE WEST SIDE OF THE AIRFIELD
TF0933'ON THIS ROAD FOR 1.1 MILES TO CROSSROADS. TURN RIGHT AND GO
TF0933'EAST FOR 0.4 MILE TO A RIGHT ANGLE TURN IN THE ROAD AND THE
TF0933'AZIMUTH ON THE RIGHT.
TF0933'
TF0933'HEIGHT OF LIGHT ABOVE STATION MARK 4 METERS.
TF0933
TF0933 STATION RECOVERY (1954)
TF0933
TF0933'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1954 (LWQ)
TF0933'THE STATION, REF. MK. NO. 1 AND THE AZIMUTH MARK WERE RECOVERED
TF0933'IN GOOD CONDITION. A SEARCH OF ABOUT 1/2 HOUR WAS MADE FOR
TF0933'REF. MK. NO. 2 BUT IT WAS NOT FOUND. THE ANGLE WAS MEASURED
TF0933'WITH AN INSTRUMENT AND THE DISTANCE TAPED. A GRADED ROAD
TF0933'HAS BEEN CONSTRUCTED AT THE SITE AND IT IS BELIEVED THAT
TF0933'THE MARK HAS BEEN DESTROYED.
TF0933'
TF0933'A NEW DESCRIPTION FOLLOWS--THE STATION IS LOCATED AT THE
TF0933'SOUTH EDGE OF THE PORT OMINOT AIRPORT, 12 FEET NORTH OF THE
TF0933'AIRPORT BEACON AND 7 FEET NORTH-NORTHWEST OF A WHITE WITNESS
TF0933'POST. THE MARK PROJECTS ABOUT 2 INCHES AND THE DISK IS
TF0933'STAMPED TRANSPORT 1946.
TF0933'
TF0933'REFERENCE MARK NO. 1 IS 98.18 FEET EAST OF THE STATION AND
TF0933'2 FEET NORTH OF EAST-WEST FENCE LINE. THE MARK IS STAMPED
TF0933'TRANSPORT NO 1 1946 AND PROJECTS ABOUT 2 INCHES.
TF0933'
TF0933'REFERENCE MARK NO. 2 IS DESTROYED.
TF0933'
TF0933'THE AZIMUTH MARK IS APPROXIMATELY 1.2 MILES NORTH OF THE
TF0933'STATION ALONG THE NORTH SIDE OF THE AIRFIELD. IT IS 100 FEET
TF0933'SOUTHEAST OF A RIGHT ANGLE CURVE IN A ROAD AND 1 FOOT SOUTH
TF0933'OF A CORNER FENCE POST. THE MARK PROJECTS ABOUT 4 INCHES AND
TF0933'THE DISK IS STAMPED TRANSPORT 1946.
TF0933'
TF0933'DESCRIPTION IS ADEQUATE.
TF0933
TF0933 STATION RECOVERY (1962)
TF0933
TF0933'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1962 (LBO)
TF0933'STATION RECOVERED AND ALL MARKS WERE FOUND IN GOOD CONDITION.
TF0933'THE STATION MARK IS 12 FEET NORTH OF THE MINOT INTERNATIONAL
TF0933'AIRPORT BEACON AND WIND-SOCK TOWER. A 4-FOOT 2 X 6 INCH POST
TF0933'WAS SET 2.5 FEET EAST OF THE STATION MARK. THE MARK PROJECTS

TF0933'2 INCHES AND THE DISK IS STAMPED TRANSPORT 1946.
TF0933'
TF0933'REFERENCE MARK NO. 1 IS 98.18 FEET EAST OF THE STATION MARK
TF0933'AND 2 FEET NORTH OF AN EAST-WEST FENCE LINE.
TF0933'
TF0933'REFERENCE MARK NO. 2 IS 65.01 FEET SOUTHWEST OF THE STATION
TF0933'MARK. IT IS NEAR THE SOUTH EDGE OF THE ROAD BED AND 2 INCHES
TF0933'BELOW THE SURFACE OF THE ROAD-BED.
TF0933'
TF0933'TO REACH THE STATION FROM THE COURTHOUSE IN MINOT, GO NORTH
TF0933'OF 3RD STREET FOR 1.5 MILES TO TOP OF HILL, THENCE TURN
TF0933'RIGHT AND GO SOUTHEAST, PASSING TO THE LEFT, (NORTH) SIDE
TF0933'OF A LARGE STORAGE TANK, THENCE GO NORTHEAST ON TRACK ROAD TO
TF0933'THE BEACON FOR 0.25 MILE AND THE STATION AS DESCRIBED.
TF0933'
TF0933'TO REACH THE AZIMUTH MARK FROM THE STATION, GO WESTERLY FOR
TF0933'0.9 MILE TO U.S. HIGHWAY 83 JUST EAST OF THE BOWL AND CAFE
TF0933'BUILDING, THENCE GO NORTH ON U.S. HIGHWAY 83 FOR 0.55 MILE TO
TF0933'MINOT INTERNATIONAL AIRPORT ENTRANCE ON THE RIGHT, CONTINUE
TF0933'NORTH ON HIGHWAY FOR 0.6 MILE TO A SIDE ROAD RIGHT, TURN
TF0933'RIGHT AND GO EAST FOR 0.25 MILE TO A LEFT TURN IN THE ROAD AND
TF0933'THE AZIMUTH MARK ABOUT 100 FEET SOUTHEAST OF THE TURN IN
TF0933'THE ROAD AND 1 FOOT SOUTH OF THE SOUTHEAST CORNER FENCE POST.
TF0933
TF0933 STATION RECOVERY (1962)
TF0933
TF0933'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1962
TF0933'1.6 MI NE FROM MINOT.
TF0933'0.9 MILE NORTH ALONG U.S. HIGHWAY 83 FROM THE FIRST LUTHERAN CHURCH AT
TF0933'MINOT, THENCE 0.7 MILE EAST ALONG GRAVELED ROADS AROUND THE SOUTH END
TF0933'OF THE PORT O MINOT AIRPORT, ABOUT MIDWAY BETWEEN THE TWO MAIN RUNWAYS
TF0933'OF THE AIRPORT, 319.0 FEET WEST OF THE SOUTHWEST CORNER OF THE
TF0933'NATIONAL GUARD BUILDING, 45.0 FEET NORTH OF THE CENTERLINE OF THE ROAD
TF0933'LEADING EAST, 34.0 FEET WEST OF A POWER POLE, 12.4 FEET NORTH OF THE
TF0933'NORTHEAST LEG OF A BEACON TOWER, 67.0 FEET SOUTHEAST OF THE CENTERLINE
TF0933'OF A ROAD LEADING NORTHEAST, 2.6 FEET WEST OF A METAL WITNESS POST,
TF0933'ABOUT 2 FEET BELOW THE LEVEL OF THE ROAD, AND SET IN THE TOP OF A
TF0933'CONCRETE POST PROJECTING 2 INCHES.
TF0933
TF0933 STATION RECOVERY (1963)
TF0933
TF0933'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1963 (JVT)
TF0933'THE STATION MARK, REFERENCE MARKS 1 AND 2, AND THE AZIMUTH
TF0933'MARK WERE RECOVERED AND FOUND TO BE IN GOOD CONDITION. THE
TF0933'DISTANCES AND DIRECTIONS TO THE REFERENCE MARKS WAS VERIFIED.
TF0933'THE ORIGINAL DESCRIPTION IS OBSOLETE AND A NEW DESCRIPTION
TF0933'FOLLOWS.
TF0933'
TF0933'THE STATION IS LOCATED ABOUT 2.1 MILES NORTH OF MINOT, ALONG
TF0933'THE SOUTH SIDE OF THE MINOT INTERNATIONAL AIRPORT, 319 FEET
TF0933'WEST OF THE SOUTHWEST CORNER OF THE NATIONAL GUARD BUILDING,
TF0933'12.4 FEET NORTH OF THE NORTHEAST LEG OF THE AIRPORT BEACON,
TF0933'AND 2.6 FEET WEST OF A METAL WITNESS POST.
TF0933'
TF0933'THE STATION MARK, A STANDARD DISK STAMPED TRANSPORT 1946, IS
TF0933'SET IN THE TOP OF A SQUARE CONCRETE MONUMENT THAT PROJECTS
TF0933'ABOUT 2 INCHES ABOVE THE GROUND.
TF0933'
TF0933'REFERENCE MARK 1, A STANDARD DISK STAMPED TRANSPORT NO 1 1946,
TF0933'IS SET IN THE TOP OF A SQUARE CONCRETE MONUMENT THAT PROJECTS

TF0933'ABOUT 2 INCHES ABOVE THE GROUND. IT IS ABOUT 40 FEET NORTH OF
TF0933'THE APPROXIMATE CENTERLINE OF A DIRT ROAD AND 2.5 FEET NORTH
TF0933'OF AN EAST-WEST FENCE LINE.
TF0933'
TF0933'REFERENCE MARK 2, A STANDARD DISK STAMPED TRANSPORT NO 2 1946,
TF0933'IS SET IN THE TOP OF A SQUARE CONCRETE MONUMENT THAT IS ABOUT
TF0933'2 INCHES BELOW THE ROAD SURFACE. IT IS ABOUT 11 FEET SOUTH
TF0933'OF THE APPROXIMATE CENTERLINE OF A DIRT ROAD AND AT THE VERY
TF0933'EDGE OF VEGITATION ALONG THE SHOULDER OF THE ROAD.
TF0933'
TF0933'THE AZIMUTH MARK, A STANDARD DISK STAMPED TRANSPORT 1946,
TF0933'IS SET IN THE TOP OF A SQUARE CONCRETE MONUMENT THAT IS
TF0933'PROJECTING ABOUT 2 INCHES. IT IS ABOUT 490 FEET WEST OF THE
TF0933'APPROXIMATE CENTERLINE OF THE NORTH END OF THE NORTH-SOUTH
TF0933'RUNWAY, 120 FEET SOUTHEAST OF THE APPROXIMATE CENTERLINE OF A
TF0933'LEFT TURN IN THE ROAD, 2.9 FEET EAST OF A METAL WITNESS POST,
TF0933'AND 2.0 FEET SOUTH OF A FENCE CORNER.
TF0933'
TF0933'TO REACH THE STATION FROM THE ENTRANCE DRIVE TO THE MINOT
TF0933'INTERNATIONAL AIRPORT GO SOUTH ON U.S. HIGHWAY 83 FOR 0.5
TF0933'MILE TO A GRAVELED ROAD LEADING EAST. TURN LEFT AND FOLLOW
TF0933'THE ROADS EAST ALONG THE FENCE LINE AT THE SOUTH EDGE OF THE
TF0933'AIRPORT AND GO ABOUT 0.7 MILE TO THE STATION SITE AS DESCRIBED.
TF0933'
TF0933'TO REACH THE AZIMUTH MARK FROM THE AIRPORT ENTRANCE GO NORTH
TF0933'ON U.S. HIGHWAY 83 FOR 0.6 MILE TO A GRAVELED ROAD LEADING
TF0933'EAST. TURN RIGHT AND GO 0.25 MILE TO A LEFT TURN IN THE ROAD
TF0933'AND THE MARK AS DESCRIBED.
TF0933
TF0933 STATION RECOVERY (1963)
TF0933
TF0933'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1963
TF0933'RECOVERED IN GOOD CONDITION.
TF0933
TF0933 STATION RECOVERY (1968)
TF0933
TF0933'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1968 (DLW)
TF0933'STATION WAS RECOVERED AS DESCRIBED IN HORIZONTAL CONTROL DATA
TF0933'SUPPLIMENT DATED JULY 1961. DESCRIPTION IS ADEQUATE.
TF0933'
TF0933'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--0.9 MILE NORTH
TF0933
TF0933 STATION RECOVERY (1973)
TF0933
TF0933'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1973 (ARB)
TF0933'THE STATION WAS RECOVERED, IN GOOD CONDITION, AS DESCRIBED.
TF0933
TF0933 STATION RECOVERY (1983)
TF0933
TF0933'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1983 (GFS)
TF0933'THE STATION MARK WAS RECOVERED AS DESCRIBED IN GOOD CONDITION.
TF0933'THE R.M.S AND AZIMUTH MARK WERE NOT SEARCHED FOR.
TF0933'
TF0933'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN--1-1/2 MILES NORTH
TF0933'OF MINOT.
TF0933
TF0933 STATION RECOVERY (1983)
TF0933
TF0933'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1983
TF0933'RECOVERED IN GOOD CONDITION.

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1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF1801 ***********************************************************************
 TF1801  DESIGNATION -  U 467
 TF1801  PID         -  TF1801
 TF1801  STATE/COUNTY-  ND/WARD
 TF1801  USGS QUAD   -  MINOT (1979)
 TF1801
 TF1801                          *CURRENT SURVEY CONTROL
 TF1801
 TF1801* NAD 83(1986)-  48 12 26.      (N)     101 17 44.      (W)      SCALED
 TF1801* NAVD 88     -       527.843   (meters)     1731.76    (feet)   ADJUSTED
 TF1801
 TF1801  GEOID HEIGHT-          -20,25  (meters)                          GEOID99
 TF1801  DYNAMIC HT  -          527.928 (meters)     1732.04    (feet)   COMP
 TF1801  MODELED GRAV-      980,756.1   (mgal)                            NAVD 88
 TF1801
 TF1801  VERT ORDER  -  FIRST     CLASS II
 TF1801
 TF1801.The horizontal coordinates were scaled from a topographic map and have
 TF1801.an estimated accuracy of +/- 6 seconds.
 TF1801
 TF1801.The orthometric height was determined by differential leveling
 TF1801.and adjusted by the National Geodetic Survey in June 1991.
 TF1801
 TF1801.The geoid height was determined by GEOID99.
 TF1801
 TF1801.The dynamic height is computed by dividing the NAVD 88
 TF1801.geopotential number by the normal gravity value computed on the
 TF1801.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TF1801.degrees latitude (g = 980.6199 gals.).
 TF1801
 TF1801.The modeled gravity was interpolated from observed gravity values.
 TF1801
 TF1801;                    North         East     Units  Estimated Accuracy
 TF1801;SPC ND N     -   134,530.      540,870.       MT  (+/- 180 meters Scaled)
 TF1801
 TF1801                          SUPERSEDED SURVEY CONTROL
 TF1801
 TF1801.No superseded survey control is available for this station.
 TF1801
 TF1801_MARKER: DB = BENCH MARK DISK
 TF1801_SETTING: 38 = ABUTMENT
 TF1801_STAMPING: U 467 1982
 TF1801_MARK LOGO: NGS
 TF1801_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
 TF1801+STABILITY: POSITION/ELEVATION WELL
 TF1801
 TF1801  HISTORY     - Date     Condition        Report By
 TF1801  HISTORY     - 1982     MONUMENTED       NGS
 TF1801
 TF1801                          STATION DESCRIPTION
 TF1801
 TF1801'DESCRIBED BY NATIONAL GEODETIC SURVEY 1982
 TF1801'IN MINOT.
 TF1801'IN MINOT, AT THE INTERSECTION OF U. S. HIGHWAY 83, 2 AND 85, IN TOP OF
 TF1801'AND 0.8 METER (2.6 FT) WEST OF THE EAST END OF THE SOUTH CONCRETE
 TF1801'ABUTMENT OF THE U. S. HIGHWAY 83 OVERPASS, 8.3 METERS (27.2 FT) EAST
 TF1801'OF THE CENTERLINE OF THE NORTH BOUND LANES OF THE HIGHWAY AND 0.1
 TF1801'METER (0.3 FT) WEST OF THE WEST EDGE OF THE BRIDGE CURB.
 TF1801'THE MARK IS ABOVE LEVEL WITH THE HIGHWAY.
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1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF1842 ***********************************************************************
 TF1842  DESIGNATION -  V 463
 TF1842  PID         -  TF1842
 TF1842  STATE/COUNTY-  ND/WARD
 TF1842  USGS QUAD   -  MINOT (1979)
 TF1842
 TF1842                        *CURRENT SURVEY CONTROL
 TF1842
 TF1842* NAD 83(1986)-  48 13 44.      (N)     101 21 58.      (W)      SCALED
 TF1842* NAVD 88     -       479.017   (meters)     1571.57    (feet)   ADJUSTED
 TF1842
 TF1842  GEOID HEIGHT-          -20.11  (meters)                         GEOID99
 TF1842  DYNAMIC HT  -          479.094 (meters)     1571.83   (feet)   COMP
 TF1842  MODELED GRAV-      980,758.7   (mgal)                           NAVD 88
 TF1842
 TF1842  VERT ORDER  -  FIRST     CLASS II
 TF1842
 TF1842.The horizontal coordinates were scaled from a topographic map and have
 TF1842.an estimated accuracy of +/- 6 seconds.
 TF1842
 TF1842.The orthometric height was determined by differential leveling
 TF1842.and adjusted by the National Geodetic Survey in June 1991.
 TF1842
 TF1842.The geoid height was determined by GEOID99.
 TF1842
 TF1842.The dynamic height is computed by dividing the NAVD 88
 TF1842.geopotential number by the normal gravity value computed on the
 TF1842.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TF1842.degrees latitude (g = 980.6199 gals.).
 TF1842
 TF1842.The modeled gravity was interpolated from observed gravity values.
 TF1842
 TF1842;                    North         East     Units  Estimated Accuracy
 TF1842;SPC ND N     -   136,990.      535,660.      MT  (+/- 180 meters Scaled)
 TF1842
 TF1842                           SUPERSEDED SURVEY CONTROL
 TF1842
 TF1842.No superseded survey control is available for this station.
 TF1842
 TF1842_MARKER: I = METAL ROD
 TF1842_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
 TF1842_STAMPING: V 463 1981
 TF1842_MARK LOGO: NGS
 TF1842_PROJECTION: FLUSH
 TF1842_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 TF1842_ROD/PIPE-DEPTH: 20.1 meters
 TF1842
 TF1842  HISTORY     - Date     Condition        Report By
 TF1842  HISTORY     - 1981     MONUMENTED       NGS
 TF1842
 TF1842                           STATION DESCRIPTION
 TF1842
 TF1842'DESCRIBED BY NATIONAL GEODETIC SURVEY 1981
 TF1842'6.2 KM (3.85 MI) WEST FROM MINOT.
 TF1842'3.7 KM (2.3 MI) SOUTHWESTERLY ALONG THE BURLINGTON NORTHERN RAILROAD
 TF1842'FROM THE RAILROAD STATION IN MINOT, THENCE 2.5 KM (1.55 MI) WESTERLY
 TF1842'ALONG U.S. HIGHWAY 2, 46.0 METERS (150.9 FT) SOUTHEAST OF THE CENTER
 TF1842'OF A DRIVEWAY LEADING INTO THE CENTEX PIPELINE TERMINAL, 34.7 METERS
 TF1842'(113.8 FT) SOUTHWEST OF THE CENTERLINE OF THE EAST BOUND LANES OF THE
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 TF1842'HIGHWAY AND 1.9 METERS (6.2 FT) WEST OF A UTILITY POLE.  NOTE=ACCESS
 TF1842'TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP.
 TF1842'THE MARK IS 0.5 METERS  NE FROM  A FENCE AND WITNESS POST
 TF1842'THE MARK IS 1.0 M BELOW THE HIGHWAY.
1        National Geodetic Survey,   Retrieval Date = OCTOBER  3, 2002
 TF1798 ***********************************************************************
 TF1798  DESIGNATION -  V 467
 TF1798  PID         -  TF1798
 TF1798  STATE/COUNTY-  ND/WARD
 TF1798  USGS QUAD   -  MINOT (1979)
 TF1798
 TF1798                         *CURRENT SURVEY CONTROL
 TF1798  ______________________________________________________________________
 TF1798* NAD 83(1986)-  48 13 39.      (N)     101 17 45.      (W)      SCALED
 TF1798* NAVD 88      -       511.007  (meters)    1676.53    (feet)   ADJUSTED
 TF1798  ______________________________________________________________________
 TF1798  GEOID HEIGHT-          -20.27  (meters)                        GEOID99
 TF1798  DYNAMIC HT  -          511.091 (meters)    1676.80    (feet)   COMP
 TF1798  MODELED GRAV-      980,759.1   (mgal)                          NAVD 88
 TF1798
 TF1798  VERT ORDER  -  FIRST     CLASS II
 TF1798
 TF1798.The horizontal coordinates were scaled from a topographic map and have
 TF1798.an estimated accuracy of +/- 6 seconds.
 TF1798
 TF1798.The orthometric height was determined by differential leveling
 TF1798.and adjusted by the National Geodetic Survey in June 1991.
 TF1798
 TF1798.The geoid height was determined by GEOID99.
 TF1798
 TF1798.The dynamic height is computed by dividing the NAVD 88
 TF1798.geopotential number by the normal gravity value computed on the
 TF1798.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 TF1798.degrees latitude (g = 980.6199 gals.).
 TF1798
 TF1798.The modeled gravity was interpolated from observed gravity values.
 TF1798
 TF1798;                    North         East     Units  Estimated Accuracy
 TF1798;SPC ND N      -   136,780.      540,880.      MT  (+/- 180 meters Scaled)
 TF1798
 TF1798                           SUPERSEDED SURVEY CONTROL
 TF1798
 TF1798.No superseded survey control is available for this station.
 TF1798
 TF1798_MARKER: I = METAL ROD
 TF1798_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
 TF1798_STAMPING: V 467 1982
 TF1798_MARK LOGO: NGS
 TF1798_PROJECTION: FLUSH
 TF1798_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 TF1798_ROD/PIPE-DEPTH: 9.8  meters
 TF1798
 TF1798  HISTORY      - Date      Condition         Report By
 TF1798  HISTORY      - 1982      MONUMENTED        NGS
 TF1798
 TF1798                           STATION DESCRIPTION
 TF1798
 TF1798'DESCRIBED BY NATIONAL GEODETIC SURVEY 1982
 TF1798'IN MINOT.
 TF1798'IN MINOT, AT THE NORTHWEST CORNER OF THE INTERSECTION OF 9TH AVENUE
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TF1798'SOUTHWEST AND SOUTH BROADWAY (U. S. HIGHWAY 83), 11.7 METERS (38.4 FT)
TF1798'WEST OF THE CENTERLINE OF THE SOUTH BOUND LANES OF SOUTH BROADWAY AND
TF1798'9.0 METERS (29.5 FT) NORTH OF THE CENTER OF THE AVENUE. NOTE=ACCESS
TF1798'TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP.
TF1798'THE MARK IS 0.3 METERS E FROM A WITNESS POST.
TF1798'THE MARK IS 0.5 M ABOVE SOUTH BROADWAY.

*** retrieval complete.
Elapsed Time = 00:01:13

Appendix -C-

Monument Details

TYPICAL CONTROL MONUMENT