

MALLARD EXPLORATION

WELD COUNTY, COLORADO (NAD 83)

SW SW SEC. 24 T7N R63W 6th P.M.

HARVEY 7-63-23-5760BE

ORIGINAL WELLBORE

06 February, 2018

Plan: PROPOSAL #3 (2 MILE)





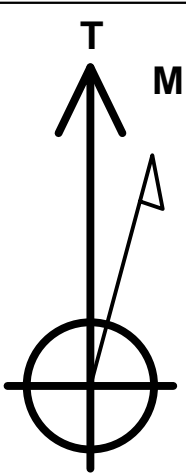
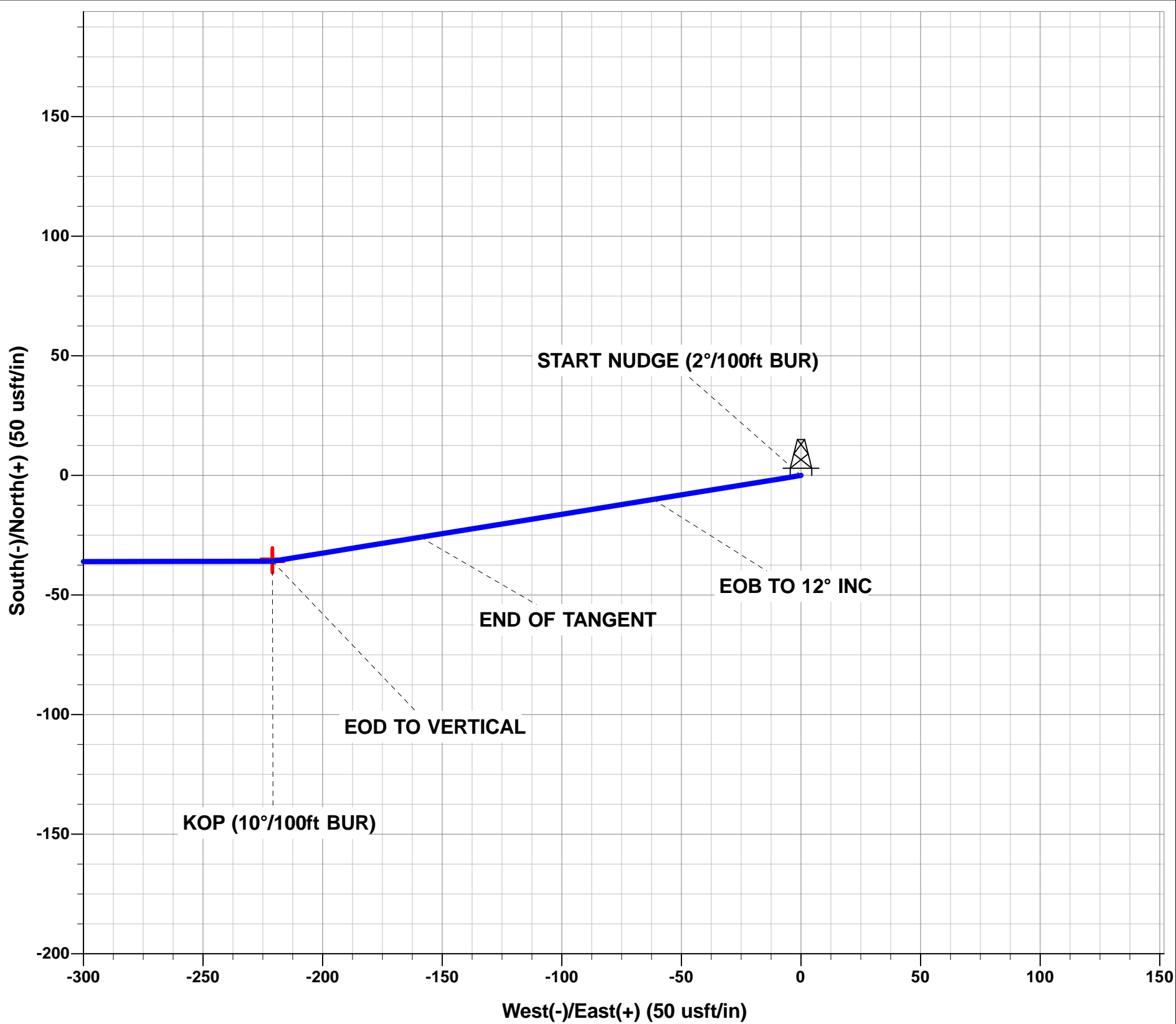
Project: WELD COUNTY, COLORADO (NAD 83)
Site: SW SW SEC. 24 T7N R63W 6th P.M.
Well: HARVEY 7-63-23-5760BE
Wellbore: ORIGINAL WELLBORE
Design: PROPOSAL #3 (2 MILE)

ANNOTATIONS

TVD	MD	Inc	Azi	+N/-S	+E/-W	VSect	Dep	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	SHL: 440ft FSL & 319ft FWL of Sec 24
300.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	START NUDGE (2°/100ft BUR)
895.82	900.20	12.00	260.78	-10.04	-61.83	61.88	62.64	EOB TO 12° INC
1359.42	1374.17	12.00	260.78	-25.84	-159.14	159.26	161.22	END OF TANGENT
1955.24	1974.37	0.00	0.00	-35.88	-220.97	221.14	223.86	EOD TO VERTICAL
6126.04	6145.17	0.00	0.00	-35.88	-220.97	221.14	223.86	KOP (10°/100ft BUR)
6699.00	7045.17	90.00	269.91	-36.78	-793.93	794.10	796.82	HZ LP: 410ft FSL & 475ft FEL of Sec 23
6699.00	16719.87	90.00	269.92	-51.33	-10468.62	10468.74	10471.52	BHL: 410ft FSL & 460ft FWL of Sec 22

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
KOP(3): HARVEY 7-63-23-5760BE	6126.04	-35.88	-220.97	40.553354	-104.393485
BHL(3): HARVEY 7-63-23-5760BE	6699.00	-51.33	-10468.62	40.553305	-104.430362
LP: HARVEY 7-63-23-5760BE (P3)	6699.00	-36.78	-793.93	40.553351	-104.395547



Azimuths to True North
Magnetic North: 7.97°

Magnetic Field
Strength: 52449.7snT
Dip Angle: 67.02°
Date: 28/12/2017
Model: IGRF2015

FORMATION TOP DETAILS

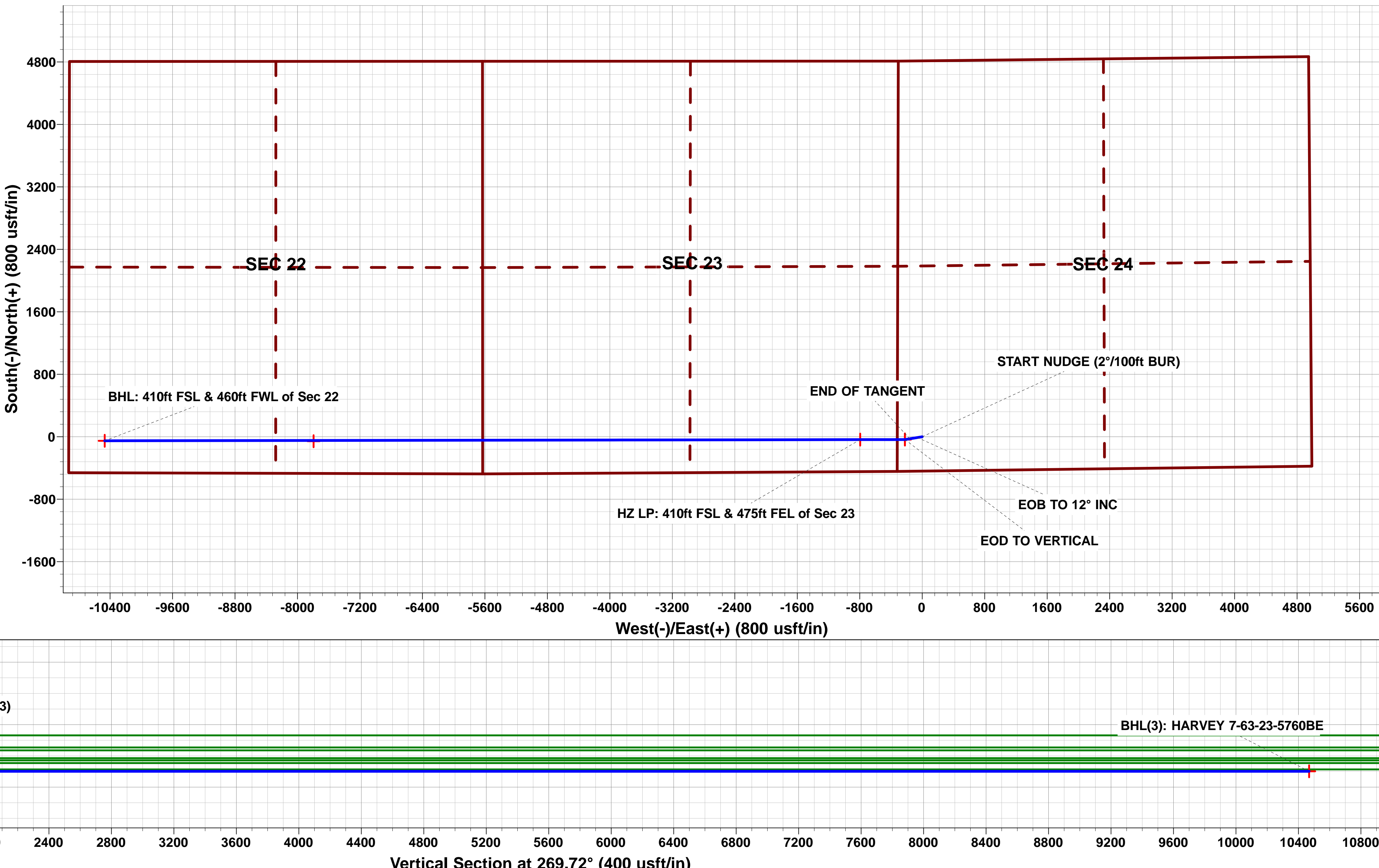
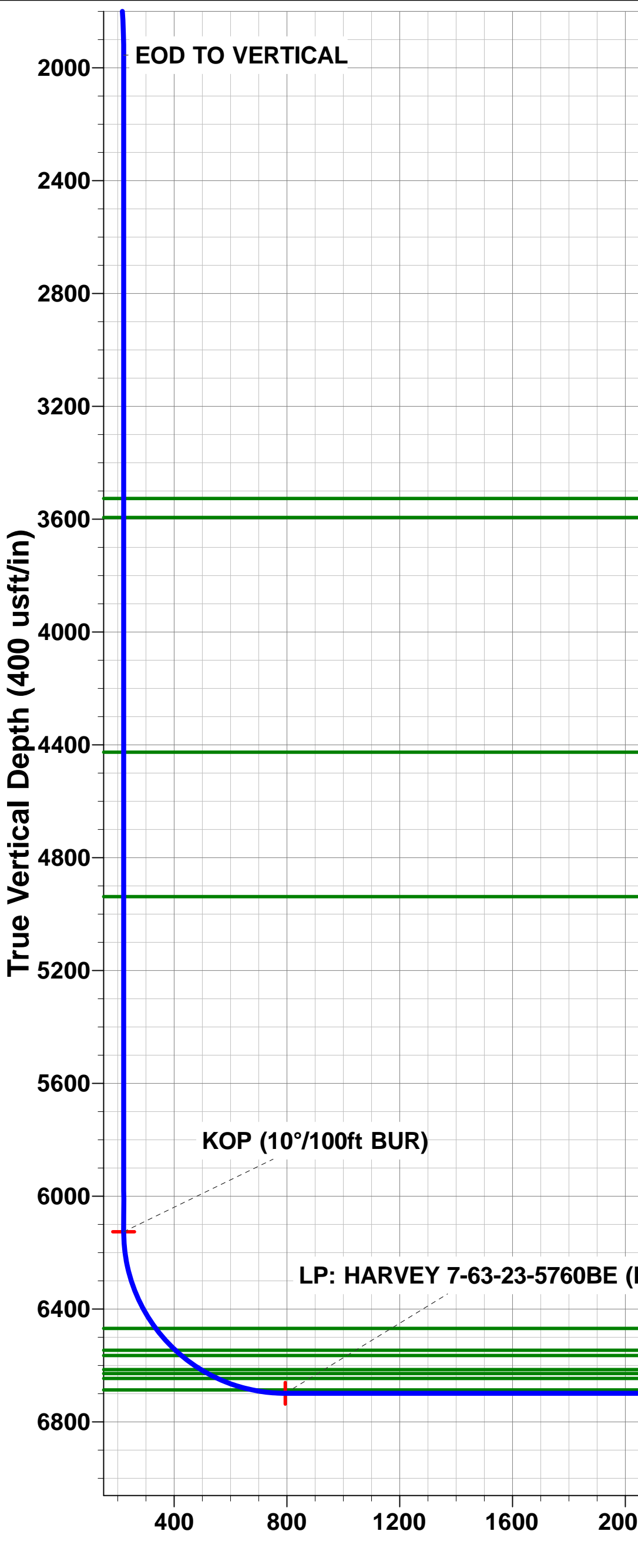
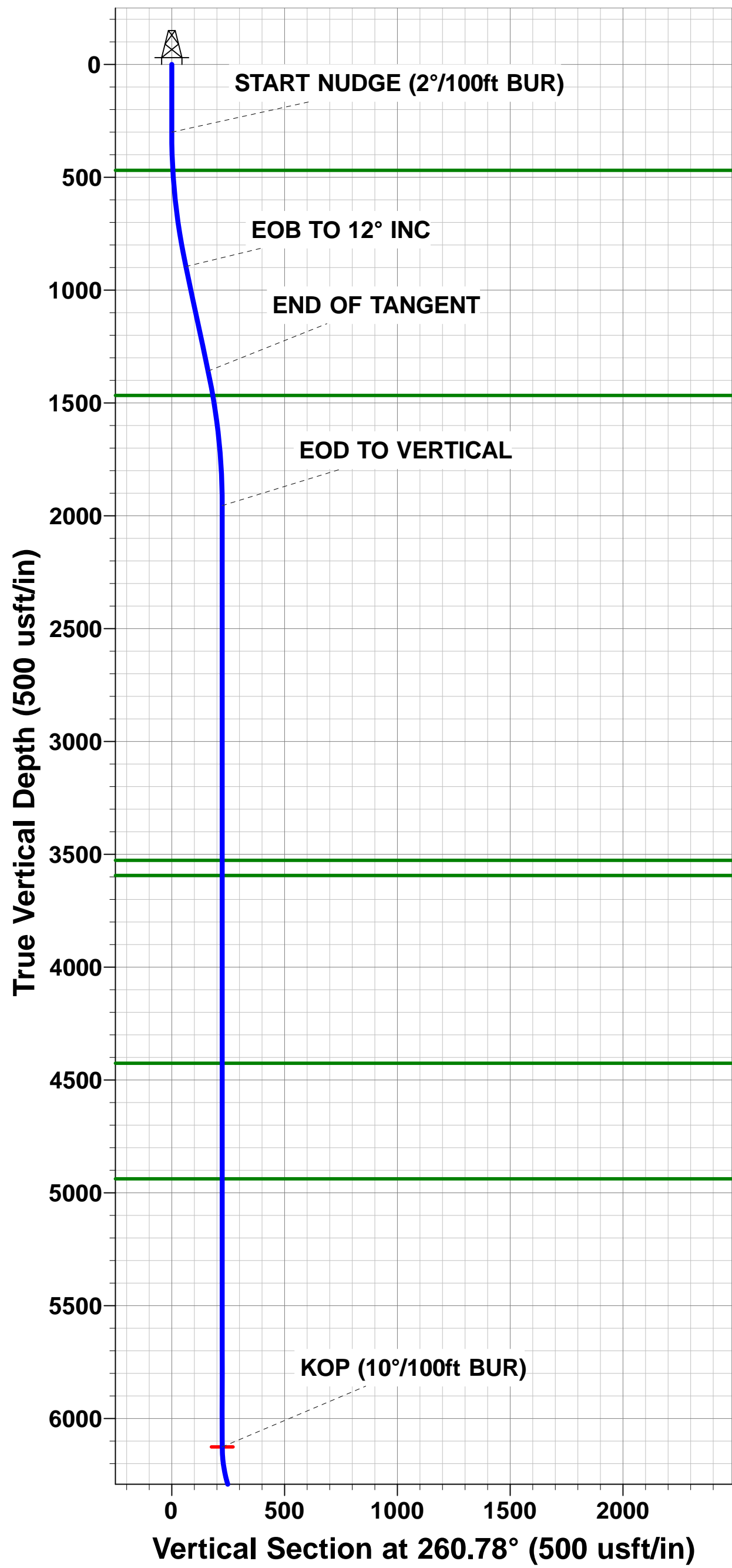
TVDPath	MDPath	Formation
470.00	470.10	FOX HILLS BASE
1467.00	1483.73	PIERRE SHALE TOP
3527.00	3546.13	RICHARD SNADSTONE
3594.00	3613.13	PARKMAN SANDSTONE
4426.00	4445.13	SUSSEX SANDSTONE
4938.00	4957.13	SHANNON SANDSTONE
6469.00	6512.85	SHARON SPRINGS
6546.00	6616.52	NIOBRARA A CHALK
6565.00	6645.24	NIOBRARA A CHALK BASE
6615.00	6731.00	NIOBRARA B1 CHALK TOP
6629.00	6758.98	NIOBRARA B1 CHALK BASE
6646.00	6796.79	NIOBRARA B2 CHALK TOP
6687.00	6927.70	NIOBRARA B2 CHALK BASE

PROPOSED LOCAL COORDINATES:

SHL: 440ft FSL & 319ft FWL of Sec 24

HZ LP: 410ft FSL & 475ft FEL of Sec 23

BHL: 410ft FSL & 460ft FWL of Sec 22



Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well HARVEY 7-63-23-5760BE
Company:	MALLARD EXPLORATION	TVD Reference:	WELL @ 4808.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	WELL @ 4808.00usft (Original Well Elev)
Site:	SW SW SEC. 24 T7N R63W 6th P.M.	North Reference:	True
Well:	HARVEY 7-63-23-5760BE	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3 (2 MILE)		

Project	WELD COUNTY, COLORADO (NAD 83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	SW SW SEC. 24 T7N R63W 6th P.M.		
Site Position:		Northing:	1,446,384.63 usft
From:	Lat/Long	Easting:	3,307,691.23 usft
Position Uncertainty:	0.00 usft	Slot Radius:	1.10000 ft
		Latitude:	40.553452
		Longitude:	-104.392690
		Grid Convergence:	0.72 °

Well	HARVEY 7-63-23-5760BE		
Well Position	+N-S	0.00 usft	Northing: 1,446,384.63 usft
	+E-W	0.00 usft	Easting: 3,307,691.23 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	40.553452
		Longitude:	-104.392690
		Ground Level:	4,788.00 usft

Wellbore	ORIGINAL WELLBORE				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	28/12/2017	7.97	67.02	52,450

Design	PROPOSAL #3 (2 MILE)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	6,699.00	0.00	0.00	269.72

Plan Sections											
MD (usft)	Inc (°)	Azi (°)	Vertical Depth	SS (usft)	+N-S (usft)	+E-W (usft)	Dogleg Rate (°/100usf)	Build Rate (°/100usf)	Turn Rate (°/100usf)	TFO (°)	Target
0.00	0.00	0.00	0.00	-4,808.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	-4,508.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.20	12.00	260.78	895.82	-3,912.18	-10.04	-61.83	2.00	2.00	0.00	260.78	
1,374.17	12.00	260.78	1,359.42	-3,448.58	-25.84	-159.14	0.00	0.00	0.00	0.00	
1,974.37	0.00	0.00	1,955.24	-2,852.76	-35.88	-220.97	2.00	-2.00	0.00	180.00	
6,145.17	0.00	0.00	6,126.04	1,318.04	-35.88	-220.97	0.00	0.00	0.00	0.00	KOP(3): HARVEY 7
7,045.17	90.00	269.91	6,699.00	1,891.00	-36.78	-793.93	10.00	10.00	-10.01	269.91	LP: HARVEY 7-63-
16,719.87	90.00	269.92	6,699.00	1,891.00	-51.33	-10,468.62	0.00	0.00	0.00	87.36	BHL(3): HARVEY 7

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Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	WELL @ 4808.00usft (Original Well Elev)
Site:	SW SW SEC. 24 T7N R63W 6th P.M.	North Reference:	True
Well:	HARVEY 7-63-23-5760BE	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3 (2 MILE)		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
SHL: 440ft FSL & 319ft FWL of Sec 24										
0.00	0.00	0.00	0.00	4,808.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	4,708.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	4,608.00	0.00	0.00	0.00	0.00	0.00	0.00
START NUDGE (2°/100ft BUR)										
300.00	0.00	0.00	300.00	4,508.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	2.00	260.78	399.98	4,408.02	-0.28	-1.72	1.72	2.00	2.00	0.00
FOX HILLS BASE										
470.10	3.40	260.78	470.00	4,338.00	-0.81	-4.98	4.99	2.00	2.00	0.00
500.00	4.00	260.78	499.84	4,308.16	-1.12	-6.89	6.89	2.00	2.00	0.00
600.00	6.00	260.78	599.45	4,208.55	-2.52	-15.49	15.50	2.00	2.00	0.00
700.00	8.00	260.78	698.70	4,109.30	-4.47	-27.52	27.54	2.00	2.00	0.00
800.00	10.00	260.78	797.47	4,010.53	-6.98	-42.96	42.99	2.00	2.00	0.00
900.00	12.00	260.78	895.62	3,912.38	-10.03	-61.79	61.84	2.00	2.00	0.00
EOB TO 12° INC										
900.20	12.00	260.78	895.82	3,912.18	-10.04	-61.83	61.88	2.00	2.00	0.00
1,000.00	12.00	260.78	993.44	3,814.56	-13.37	-82.32	82.39	0.00	0.00	0.00
1,100.00	12.00	260.78	1,091.25	3,716.75	-16.70	-102.85	102.93	0.00	0.00	0.00
1,200.00	12.00	260.78	1,189.06	3,618.94	-20.03	-123.38	123.48	0.00	0.00	0.00
1,300.00	12.00	260.78	1,286.88	3,521.12	-23.37	-143.91	144.02	0.00	0.00	0.00
END OF TANGENT										
1,374.17	12.00	260.78	1,359.42	3,448.58	-25.84	-159.14	159.26	0.00	0.00	0.00
1,400.00	11.49	260.78	1,384.71	3,423.29	-26.68	-164.33	164.46	2.00	-2.00	0.00
PIERRE SHALE TOP										
1,483.73	9.81	260.78	1,467.00	3,341.00	-29.16	-179.60	179.74	2.00	-2.00	0.00
1,500.00	9.49	260.78	1,483.04	3,324.96	-29.60	-182.29	182.44	2.00	-2.00	0.00
1,600.00	7.49	260.78	1,581.94	3,226.06	-31.97	-196.86	197.01	2.00	-2.00	0.00
1,700.00	5.49	260.78	1,681.29	3,126.71	-33.78	-208.01	208.17	2.00	-2.00	0.00
1,800.00	3.49	260.78	1,780.98	3,027.02	-35.03	-215.73	215.90	2.00	-2.00	0.00
1,900.00	1.49	260.78	1,880.88	2,927.12	-35.73	-220.02	220.19	2.00	-2.00	0.00
EOD TO VERTICAL										
1,974.37	0.00	0.00	1,955.24	2,852.76	-35.88	-220.97	221.14	2.00	-2.00	0.00
2,000.00	0.00	0.00	1,980.87	2,827.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,100.00	0.00	0.00	2,080.87	2,727.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,200.00	0.00	0.00	2,180.87	2,627.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,300.00	0.00	0.00	2,280.87	2,527.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,400.00	0.00	0.00	2,380.87	2,427.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,500.00	0.00	0.00	2,480.87	2,327.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,600.00	0.00	0.00	2,580.87	2,227.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,700.00	0.00	0.00	2,680.87	2,127.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,800.00	0.00	0.00	2,780.87	2,027.13	-35.88	-220.97	221.14	0.00	0.00	0.00
2,900.00	0.00	0.00	2,880.87	1,927.13	-35.88	-220.97	221.14	0.00	0.00	0.00
3,000.00	0.00	0.00	2,980.87	1,827.13	-35.88	-220.97	221.14	0.00	0.00	0.00
3,100.00	0.00	0.00	3,080.87	1,727.13	-35.88	-220.97	221.14	0.00	0.00	0.00
3,200.00	0.00	0.00	3,180.87	1,627.13	-35.88	-220.97	221.14	0.00	0.00	0.00
3,300.00	0.00	0.00	3,280.87	1,527.13	-35.88	-220.97	221.14	0.00	0.00	0.00
3,400.00	0.00	0.00	3,380.87	1,427.13	-35.88	-220.97	221.14	0.00	0.00	0.00
3,500.00	0.00	0.00	3,480.87	1,327.13	-35.88	-220.97	221.14	0.00	0.00	0.00
RICHARD SNADSTONE										
3,546.13	0.00	0.00	3,527.00	1,281.00	-35.88	-220.97	221.14	0.00	0.00	0.00
3,600.00	0.00	0.00	3,580.87	1,227.13	-35.88	-220.97	221.14	0.00	0.00	0.00
PARKMAN SANDSTONE										
3,613.13	0.00	0.00	3,594.00	1,214.00	-35.88	-220.97	221.14	0.00	0.00	0.00

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Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3 (2 MILE)		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,700.00	0.00	0.00	3,680.87	1,127.13	-35.88	-220.97	221.14	0.00	0.00	0.00
3,800.00	0.00	0.00	3,780.87	1,027.13	-35.88	-220.97	221.14	0.00	0.00	0.00
3,900.00	0.00	0.00	3,880.87	927.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,000.00	0.00	0.00	3,980.87	827.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,100.00	0.00	0.00	4,080.87	727.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,200.00	0.00	0.00	4,180.87	627.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,300.00	0.00	0.00	4,280.87	527.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,400.00	0.00	0.00	4,380.87	427.13	-35.88	-220.97	221.14	0.00	0.00	0.00
SUSSEX SANDSTONE										
4,445.13	0.00	0.00	4,426.00	382.00	-35.88	-220.97	221.14	0.00	0.00	0.00
4,500.00	0.00	0.00	4,480.87	327.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,600.00	0.00	0.00	4,580.87	227.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,700.00	0.00	0.00	4,680.87	127.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,800.00	0.00	0.00	4,780.87	27.13	-35.88	-220.97	221.14	0.00	0.00	0.00
4,900.00	0.00	0.00	4,880.87	-72.87	-35.88	-220.97	221.14	0.00	0.00	0.00
SHANNON SANDSTONE										
4,957.13	0.00	0.00	4,938.00	-130.00	-35.88	-220.97	221.14	0.00	0.00	0.00
5,000.00	0.00	0.00	4,980.87	-172.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,100.00	0.00	0.00	5,080.87	-272.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,200.00	0.00	0.00	5,180.87	-372.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,300.00	0.00	0.00	5,280.87	-472.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,400.00	0.00	0.00	5,380.87	-572.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,500.00	0.00	0.00	5,480.87	-672.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,600.00	0.00	0.00	5,580.87	-772.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,700.00	0.00	0.00	5,680.87	-872.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,800.00	0.00	0.00	5,780.87	-972.87	-35.88	-220.97	221.14	0.00	0.00	0.00
5,900.00	0.00	0.00	5,880.87	-1,072.87	-35.88	-220.97	221.14	0.00	0.00	0.00
6,000.00	0.00	0.00	5,980.87	-1,172.87	-35.88	-220.97	221.14	0.00	0.00	0.00
6,100.00	0.00	0.00	6,080.87	-1,272.87	-35.88	-220.97	221.14	0.00	0.00	0.00
KOP (10°/100ft BUR)										
6,145.17	0.00	0.00	6,126.04	-1,318.04	-35.88	-220.97	221.14	0.00	0.00	0.00
6,200.00	5.48	269.91	6,180.79	-1,372.79	-35.88	-223.59	223.77	10.00	10.00	0.00
6,300.00	15.48	269.91	6,279.00	-1,471.00	-35.91	-241.76	241.94	10.00	10.00	0.00
6,400.00	25.48	269.91	6,372.55	-1,564.55	-35.97	-276.71	276.89	10.00	10.00	0.00
6,500.00	35.48	269.91	6,458.62	-1,650.62	-36.05	-327.38	327.55	10.00	10.00	0.00
SHARON SPRINGS										
6,512.85	36.77	269.91	6,469.00	-1,661.00	-36.06	-334.95	335.12	10.00	10.00	0.00
6,600.00	45.48	269.91	6,534.59	-1,726.59	-36.15	-392.22	392.39	10.00	10.00	0.00
NIOBRARA A CHALK										
6,616.52	47.14	269.91	6,546.00	-1,738.00	-36.17	-404.16	404.34	10.00	10.00	0.00
NIOBRARA A CHALK BASE										
6,645.24	50.01	269.91	6,565.00	-1,757.00	-36.20	-425.69	425.87	10.00	10.00	0.00
6,700.00	55.48	269.91	6,598.14	-1,790.14	-36.27	-469.26	469.43	10.00	10.00	0.00
NIOBRARA B1 CHALK TOP										
6,731.00	58.58	269.91	6,615.00	-1,807.00	-36.31	-495.26	495.44	10.00	10.00	0.00
NIOBRARA B1 CHALK BASE										
6,758.98	61.38	269.91	6,629.00	-1,821.00	-36.35	-519.49	519.67	10.00	10.00	0.00
NIOBRARA B2 CHALK TOP										
6,796.79	65.16	269.91	6,646.00	-1,838.00	-36.40	-553.25	553.43	10.00	10.00	0.00
6,800.00	65.48	269.91	6,647.34	-1,839.34	-36.41	-556.17	556.34	10.00	10.00	0.00
6,900.00	75.48	269.91	6,680.71	-1,872.71	-36.56	-650.31	650.48	10.00	10.00	0.00
NIOBRARA B2 CHALK BASE										

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well HARVEY 7-63-23-5760BE
Company:	MALLARD EXPLORATION	TVD Reference:	WELL @ 4808.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	WELL @ 4808.00usft (Original Well Elev)
Site:	SW SW SEC. 24 T7N R63W 6th P.M.	North Reference:	True
Well:	HARVEY 7-63-23-5760BE	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3 (2 MILE)		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,927.70	78.25	269.91	6,687.00	-1,879.00	-36.60	-677.28	677.45	10.00	10.00	0.00
7,000.00	85.48	269.91	6,697.22	-1,889.22	-36.71	-748.81	748.98	10.00	10.00	0.00
HZ LP: 410ft FSL & 475ft FEL of Sec 23										
7,045.17	90.00	269.91	6,699.00	-1,891.00	-36.78	-793.93	794.10	10.00	10.00	0.00
7,100.00	90.00	269.91	6,699.00	-1,891.00	-36.87	-848.76	848.93	0.00	0.00	0.00
7,200.00	90.00	269.91	6,699.00	-1,891.00	-37.03	-948.76	948.93	0.00	0.00	0.00
7,300.00	90.00	269.91	6,699.00	-1,891.00	-37.19	-1,048.76	1,048.93	0.00	0.00	0.00
7,400.00	90.00	269.91	6,699.00	-1,891.00	-37.34	-1,148.76	1,148.93	0.00	0.00	0.00
7,500.00	90.00	269.91	6,699.00	-1,891.00	-37.50	-1,248.76	1,248.93	0.00	0.00	0.00
7,600.00	90.00	269.91	6,699.00	-1,891.00	-37.66	-1,348.76	1,348.93	0.00	0.00	0.00
7,700.00	90.00	269.91	6,699.00	-1,891.00	-37.81	-1,448.76	1,448.93	0.00	0.00	0.00
7,800.00	90.00	269.91	6,699.00	-1,891.00	-37.97	-1,548.76	1,548.93	0.00	0.00	0.00
7,900.00	90.00	269.91	6,699.00	-1,891.00	-38.13	-1,648.76	1,648.93	0.00	0.00	0.00
8,000.00	90.00	269.91	6,699.00	-1,891.00	-38.28	-1,748.76	1,748.92	0.00	0.00	0.00
8,100.00	90.00	269.91	6,699.00	-1,891.00	-38.44	-1,848.76	1,848.92	0.00	0.00	0.00
8,200.00	90.00	269.91	6,699.00	-1,891.00	-38.59	-1,948.76	1,948.92	0.00	0.00	0.00
8,300.00	90.00	269.91	6,699.00	-1,891.00	-38.75	-2,048.76	2,048.92	0.00	0.00	0.00
8,400.00	90.00	269.91	6,699.00	-1,891.00	-38.91	-2,148.76	2,148.92	0.00	0.00	0.00
8,500.00	90.00	269.91	6,699.00	-1,891.00	-39.06	-2,248.76	2,248.92	0.00	0.00	0.00
8,600.00	90.00	269.91	6,699.00	-1,891.00	-39.22	-2,348.76	2,348.92	0.00	0.00	0.00
8,700.00	90.00	269.91	6,699.00	-1,891.00	-39.37	-2,448.76	2,448.92	0.00	0.00	0.00
8,800.00	90.00	269.91	6,699.00	-1,891.00	-39.53	-2,548.76	2,548.92	0.00	0.00	0.00
8,900.00	90.00	269.91	6,699.01	-1,891.01	-39.68	-2,648.76	2,648.92	0.00	0.00	0.00
9,000.00	90.00	269.91	6,699.01	-1,891.01	-39.84	-2,748.76	2,748.92	0.00	0.00	0.00
9,100.00	90.00	269.91	6,699.01	-1,891.01	-39.99	-2,848.76	2,848.92	0.00	0.00	0.00
9,200.00	90.00	269.91	6,699.01	-1,891.01	-40.15	-2,948.76	2,948.92	0.00	0.00	0.00
9,300.00	90.00	269.91	6,699.01	-1,891.01	-40.30	-3,048.76	3,048.92	0.00	0.00	0.00
9,400.00	90.00	269.91	6,699.01	-1,891.01	-40.46	-3,148.76	3,148.92	0.00	0.00	0.00
9,500.00	90.00	269.91	6,699.01	-1,891.01	-40.61	-3,248.76	3,248.92	0.00	0.00	0.00
9,600.00	90.00	269.91	6,699.01	-1,891.01	-40.76	-3,348.76	3,348.92	0.00	0.00	0.00
9,700.00	90.00	269.91	6,699.01	-1,891.01	-40.92	-3,448.76	3,448.92	0.00	0.00	0.00
9,800.00	90.00	269.91	6,699.01	-1,891.01	-41.07	-3,548.76	3,548.91	0.00	0.00	0.00
9,900.00	90.00	269.91	6,699.01	-1,891.01	-41.22	-3,648.76	3,648.91	0.00	0.00	0.00
10,000.00	90.00	269.91	6,699.01	-1,891.01	-41.38	-3,748.76	3,748.91	0.00	0.00	0.00
10,100.00	90.00	269.91	6,699.01	-1,891.01	-41.53	-3,848.76	3,848.91	0.00	0.00	0.00
10,200.00	90.00	269.91	6,699.01	-1,891.01	-41.68	-3,948.76	3,948.91	0.00	0.00	0.00
10,300.00	90.00	269.91	6,699.01	-1,891.01	-41.84	-4,048.76	4,048.91	0.00	0.00	0.00
10,400.00	90.00	269.91	6,699.01	-1,891.01	-41.99	-4,148.76	4,148.91	0.00	0.00	0.00
10,500.00	90.00	269.91	6,699.01	-1,891.01	-42.14	-4,248.75	4,248.91	0.00	0.00	0.00
10,600.00	90.00	269.91	6,699.01	-1,891.01	-42.29	-4,348.75	4,348.91	0.00	0.00	0.00
10,700.00	90.00	269.91	6,699.01	-1,891.01	-42.45	-4,448.75	4,448.91	0.00	0.00	0.00
10,800.00	90.00	269.91	6,699.01	-1,891.01	-42.60	-4,548.75	4,548.91	0.00	0.00	0.00
10,900.00	90.00	269.91	6,699.01	-1,891.01	-42.75	-4,648.75	4,648.91	0.00	0.00	0.00
11,000.00	90.00	269.91	6,699.01	-1,891.01	-42.90	-4,748.75	4,748.91	0.00	0.00	0.00
11,100.00	90.00	269.91	6,699.01	-1,891.01	-43.05	-4,848.75	4,848.91	0.00	0.00	0.00
11,200.00	90.00	269.91	6,699.01	-1,891.01	-43.21	-4,948.75	4,948.91	0.00	0.00	0.00
11,300.00	90.00	269.91	6,699.01	-1,891.01	-43.36	-5,048.75	5,048.91	0.00	0.00	0.00
11,400.00	90.00	269.91	6,699.01	-1,891.01	-43.51	-5,148.75	5,148.91	0.00	0.00	0.00
11,500.00	90.00	269.91	6,699.01	-1,891.01	-43.66	-5,248.75	5,248.90	0.00	0.00	0.00
11,600.00	90.00	269.91	6,699.01	-1,891.01	-43.81	-5,348.75	5,348.90	0.00	0.00	0.00
11,700.00	90.00	269.91	6,699.01	-1,891.01	-43.96	-5,448.75	5,448.90	0.00	0.00	0.00
11,800.00	90.00	269.91	6,699.01	-1,891.01	-44.11	-5,548.75	5,548.90	0.00	0.00	0.00
11,900.00	90.00	269.91	6,699.01	-1,891.01	-44.26	-5,648.75	5,648.90	0.00	0.00	0.00
12,000.00	90.00	269.91	6,699.01	-1,891.01	-44.41	-5,748.75	5,748.90	0.00	0.00	0.00

Planning Report



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Company:	MALLARD EXPLORATION	TVD Reference:	WELL @ 4808.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	WELL @ 4808.00usft (Original Well Elev)
Site:	SW SW SEC. 24 T7N R63W 6th P.M.	North Reference:	True
Well:	HARVEY 7-63-23-5760BE	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3 (2 MILE)		

Planned Survey										
MD (usft)	Inc (°)	Azi (°)	TVD (usft)	SS (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,100.00	90.00	269.91	6,699.01	-1,891.01	-44.56	-5,848.75	5,848.90	0.00	0.00	0.00
12,200.00	90.00	269.91	6,699.01	-1,891.01	-44.71	-5,948.75	5,948.90	0.00	0.00	0.00
12,300.00	90.00	269.91	6,699.01	-1,891.01	-44.86	-6,048.75	6,048.90	0.00	0.00	0.00
12,400.00	90.00	269.91	6,699.01	-1,891.01	-45.01	-6,148.75	6,148.90	0.00	0.00	0.00
12,500.00	90.00	269.91	6,699.01	-1,891.01	-45.16	-6,248.75	6,248.90	0.00	0.00	0.00
12,600.00	90.00	269.91	6,699.01	-1,891.01	-45.31	-6,348.75	6,348.90	0.00	0.00	0.00
12,700.00	90.00	269.91	6,699.01	-1,891.01	-45.46	-6,448.75	6,448.90	0.00	0.00	0.00
12,800.00	90.00	269.91	6,699.01	-1,891.01	-45.61	-6,548.75	6,548.90	0.00	0.00	0.00
12,900.00	90.00	269.91	6,699.01	-1,891.01	-45.76	-6,648.75	6,648.90	0.00	0.00	0.00
13,000.00	90.00	269.91	6,699.01	-1,891.01	-45.91	-6,748.75	6,748.90	0.00	0.00	0.00
13,100.00	90.00	269.91	6,699.01	-1,891.01	-46.05	-6,848.75	6,848.90	0.00	0.00	0.00
13,200.00	90.00	269.91	6,699.01	-1,891.01	-46.20	-6,948.75	6,948.89	0.00	0.00	0.00
13,300.00	90.00	269.92	6,699.01	-1,891.01	-46.35	-7,048.75	7,048.89	0.00	0.00	0.00
13,400.00	90.00	269.92	6,699.01	-1,891.01	-46.50	-7,148.75	7,148.89	0.00	0.00	0.00
13,500.00	90.00	269.92	6,699.01	-1,891.01	-46.65	-7,248.75	7,248.89	0.00	0.00	0.00
13,600.00	90.00	269.92	6,699.01	-1,891.01	-46.80	-7,348.75	7,348.89	0.00	0.00	0.00
13,700.00	90.00	269.92	6,699.01	-1,891.01	-46.94	-7,448.75	7,448.89	0.00	0.00	0.00
13,800.00	90.00	269.92	6,699.01	-1,891.01	-47.09	-7,548.75	7,548.89	0.00	0.00	0.00
13,900.00	90.00	269.92	6,699.01	-1,891.01	-47.24	-7,648.75	7,648.89	0.00	0.00	0.00
14,000.00	90.00	269.92	6,699.01	-1,891.01	-47.39	-7,748.75	7,748.89	0.00	0.00	0.00
14,100.00	90.00	269.92	6,699.01	-1,891.01	-47.53	-7,848.75	7,848.89	0.00	0.00	0.00
14,200.00	90.00	269.92	6,699.01	-1,891.01	-47.68	-7,948.75	7,948.89	0.00	0.00	0.00
14,300.00	90.00	269.92	6,699.01	-1,891.01	-47.83	-8,048.75	8,048.89	0.00	0.00	0.00
14,400.00	90.00	269.92	6,699.01	-1,891.01	-47.97	-8,148.75	8,148.89	0.00	0.00	0.00
14,500.00	90.00	269.92	6,699.01	-1,891.01	-48.12	-8,248.75	8,248.89	0.00	0.00	0.00
14,600.00	90.00	269.92	6,699.01	-1,891.01	-48.27	-8,348.75	8,348.89	0.00	0.00	0.00
14,700.00	90.00	269.92	6,699.01	-1,891.01	-48.41	-8,448.75	8,448.89	0.00	0.00	0.00
14,800.00	90.00	269.92	6,699.01	-1,891.01	-48.56	-8,548.75	8,548.89	0.00	0.00	0.00
14,900.00	90.00	269.92	6,699.01	-1,891.01	-48.70	-8,648.75	8,648.88	0.00	0.00	0.00
15,000.00	90.00	269.92	6,699.00	-1,891.00	-48.85	-8,748.75	8,748.88	0.00	0.00	0.00
15,100.00	90.00	269.92	6,699.00	-1,891.00	-48.99	-8,848.75	8,848.88	0.00	0.00	0.00
15,200.00	90.00	269.92	6,699.00	-1,891.00	-49.14	-8,948.75	8,948.88	0.00	0.00	0.00
15,300.00	90.00	269.92	6,699.00	-1,891.00	-49.29	-9,048.75	9,048.88	0.00	0.00	0.00
15,400.00	90.00	269.92	6,699.00	-1,891.00	-49.43	-9,148.75	9,148.88	0.00	0.00	0.00
15,500.00	90.00	269.92	6,699.00	-1,891.00	-49.58	-9,248.75	9,248.88	0.00	0.00	0.00
15,600.00	90.00	269.92	6,699.00	-1,891.00	-49.72	-9,348.75	9,348.88	0.00	0.00	0.00
15,700.00	90.00	269.92	6,699.00	-1,891.00	-49.86	-9,448.75	9,448.88	0.00	0.00	0.00
15,800.00	90.00	269.92	6,699.00	-1,891.00	-50.01	-9,548.75	9,548.88	0.00	0.00	0.00
15,900.00	90.00	269.92	6,699.00	-1,891.00	-50.15	-9,648.75	9,648.88	0.00	0.00	0.00
16,000.00	90.00	269.92	6,699.00	-1,891.00	-50.30	-9,748.75	9,748.88	0.00	0.00	0.00
16,100.00	90.00	269.92	6,699.00	-1,891.00	-50.44	-9,848.75	9,848.88	0.00	0.00	0.00
16,200.00	90.00	269.92	6,699.00	-1,891.00	-50.59	-9,948.75	9,948.88	0.00	0.00	0.00
16,300.00	90.00	269.92	6,699.00	-1,891.00	-50.73	-10,048.75	10,048.88	0.00	0.00	0.00
16,400.00	90.00	269.92	6,699.00	-1,891.00	-50.87	-10,148.75	10,148.88	0.00	0.00	0.00
16,500.00	90.00	269.92	6,699.00	-1,891.00	-51.02	-10,248.75	10,248.88	0.00	0.00	0.00
16,600.00	90.00	269.92	6,699.00	-1,891.00	-51.16	-10,348.75	10,348.87	0.00	0.00	0.00
16,700.00	90.00	269.92	6,699.00	-1,891.00	-51.30	-10,448.75	10,448.87	0.00	0.00	0.00
BHL: 410ft FSL & 460ft FWL of Sec 22										
16,719.87	90.00	269.92	6,699.00	-1,891.00	-51.33	-10,468.62	10,468.74	0.00	0.00	0.00

Planning Report



Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well HARVEY 7-63-23-5760BE
Company:	MALLARD EXPLORATION	TVD Reference:	WELL @ 4808.00usft (Original Well Elev)
Project:	WELD COUNTY, COLORADO (NAD 83)	MD Reference:	WELL @ 4808.00usft (Original Well Elev)
Site:	SW SW SEC. 24 T7N R63W 6th P.M.	North Reference:	True
Well:	HARVEY 7-63-23-5760BE	Survey Calculation Method:	Minimum Curvature
Wellbore:	ORIGINAL WELLBORE		
Design:	PROPOSAL #3 (2 MILE)		

Formations						
MD (usft)	TVD (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
470.10	470.00	FOX HILLS BASE				
1,483.73	1,467.00	PIERRE SHALE TOP				
3,546.13	3,527.00	RICHARD SNADSTONE				
3,613.13	3,594.00	PARKMAN SANDSTONE				
4,445.13	4,426.00	SUSSEX SANDSTONE				
4,957.13	4,938.00	SHANNON SANDSTONE				
6,512.85	6,469.00	SHARON SPRINGS				
6,616.52	6,546.00	NIOBRARA A CHALK				
6,645.24	6,565.00	NIOBRARA A CHALK BASE				
6,731.00	6,615.00	NIOBRARA B1 CHALK TOP				
6,758.98	6,629.00	NIOBRARA B1 CHALK BASE				
6,796.79	6,646.00	NIOBRARA B2 CHALK TOP				
6,927.70	6,687.00	NIOBRARA B2 CHALK BASE				

Plan Annotations				
MD (usft)	TVD (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
0.00	0.00	0.00	0.00	SHL: 440ft FSL & 319ft FWL of Sec 24
300.00	300.00	0.00	0.00	START NUDGE (2°/100ft BUR)
900.20	895.82	-10.04	-61.83	EOB TO 12° INC
1,374.17	1,359.42	-25.84	-159.14	END OF TANGENT
1,974.37	1,955.24	-35.88	-220.97	EOD TO VERTICAL
6,145.17	6,126.04	-35.88	-220.97	KOP (10°/100ft BUR)
7,045.17	6,699.00	-36.78	-793.93	HZ LP: 410ft FSL & 475ft FEL of Sec 23
16,719.87	6,699.00	-51.33	-10,468.62	BHL: 410ft FSL & 460ft FWL of Sec 22