



Directional Survey Certification

2948 I-70 Business Loop
Grand Junction, CO 81504
(970)-245-9447 Fax (970)-245-9454

Operator	TEP Rocky Mountain, LLC.
Well Name & No.	GM 41-10
County & State	Garfield County, CO
SDI Job No.	OP.003807
Rig	H&P 273

I, Mel Mireles Jr., having personal knowledge of all the facts, hereby certify that the attached directional survey run from a measured depth of 86 feet to a measured depth of 7,902 feet is true and correct as determined from all available records.


Signature

07-Sep-17
Date

Mel Mireles Jr.
Grand Junction Assistant Well Planner
Scientific Drilling - Colorado District

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 41-10 - Slot B14
Project:	Garfield County, CO NAD83	TVD Reference:	WELL @ 6148.00usft (Original Well Elev)
Site:	MV 5-10 Pad	MD Reference:	WELL @ 6148.00usft (Original Well Elev)
Well:	Federal GM 41-10	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Project	Garfield County, CO NAD83		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Central Zone		

Site		MV 5-10 Pad			
Site Position:		Northing:	1,600,344.70 usft	Latitude:	39.4529509
From:	Map	Easting:	2,266,881.70 usft	Longitude:	-108.0966291
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	-1.64 °

Well		Federal GM 41-10 - Slot B14				
Well Position	+N/-S	0.00 usft	Northing:	1,600,365.80 usft	Latitude:	39.4530114
	+E/-W	0.00 usft	Easting:	2,266,914.20 usft	Longitude:	-108.0965162
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	6,148.00 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/24/2017	9.53	65.75	51,772

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	47.12	

Survey Program	Date	9/7/2017			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
86.00	675.00	Survey #1 - Gyro MWD Survey (OH)	SDI Gyro MWD 104	SDI Gyro MWD Error Model Ver 1.0.4	
748.00	1,028.00	Survey #2 - Surface MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	
1,146.00	7,902.00	Survey #3 - Production MWD Survey (OH)	SDI MWD	SDI MWD - Standard ver 1.0.1	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
86.00	0.26	315.18	86.00	0.14	-0.14	-0.01	0.30	0.30	0.00	
First SDI Gyro MWD Survey										
117.00	0.70	355.43	117.00	0.38	-0.20	0.11	1.71	1.42	129.84	
213.00	2.73	14.33	212.95	3.18	0.32	2.39	2.17	2.11	19.69	
305.00	4.13	35.60	304.79	7.99	2.79	7.48	2.03	1.52	23.12	
397.00	4.84	34.45	396.51	13.89	6.91	14.52	0.78	0.77	-1.25	
489.00	7.04	40.52	488.01	21.38	12.77	23.90	2.48	2.39	6.60	
582.00	10.03	45.09	579.97	31.43	22.21	37.66	3.29	3.22	4.91	

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 41-10 - Slot B14
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Site:	MV 5-10 Pad	MD Reference:	WELL @ 6148.00usft (Original Well Elev)
Well:	Federal GM 41-10	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
675.00	13.46	47.99	671.01	44.39	35.99	56.58	3.74	3.69	3.12
Last SDI Gyro MWD Survey									
748.00	15.98	50.54	741.61	56.47	50.07	75.11	3.56	3.45	3.49
First SDI Surface MWD Survey									
840.00	20.75	51.15	828.90	74.75	72.55	104.03	5.19	5.18	0.66
934.00	24.99	51.20	915.49	97.65	101.01	140.46	4.51	4.51	0.05
1,028.00	30.03	50.57	998.83	125.05	134.67	183.77	5.37	5.36	-0.67
Last SDI Surface MWD Survey									
1,146.00	31.55	51.24	1,100.20	163.13	181.55	244.04	1.32	1.29	0.57
First SDI Production MWD Survey									
1,209.00	32.66	53.73	1,153.56	183.51	208.11	277.37	2.74	1.76	3.95
1,303.00	36.84	52.23	1,230.78	215.79	250.86	330.66	4.54	4.45	-1.60
1,398.00	40.41	52.09	1,304.99	252.16	297.68	389.72	3.76	3.76	-0.15
1,461.00	41.09	51.92	1,352.72	277.48	330.09	430.69	1.09	1.08	-0.27
1,555.00	43.02	51.26	1,422.51	316.60	379.42	493.47	2.11	2.05	-0.70
1,650.00	45.01	50.46	1,490.83	358.27	430.61	559.33	2.17	2.09	-0.84
1,744.00	42.79	49.77	1,558.55	400.06	480.62	624.42	2.42	-2.36	-0.73
1,839.00	44.43	50.51	1,627.34	442.05	530.92	689.85	1.81	1.73	0.78
1,933.00	44.73	48.71	1,694.29	484.80	581.17	755.76	1.38	0.32	-1.91
2,028.00	44.62	51.50	1,761.85	527.63	632.40	822.45	2.07	-0.12	2.94
2,122.00	45.33	53.16	1,828.35	568.22	684.99	888.61	1.46	0.76	1.77
2,217.00	46.57	54.03	1,894.40	608.74	739.95	956.45	1.46	1.31	0.92
2,311.00	47.95	53.82	1,958.20	649.39	795.75	1,025.00	1.48	1.47	-0.22
2,406.00	47.90	52.28	2,021.86	691.78	852.10	1,095.13	1.20	-0.05	-1.62
2,500.00	47.98	51.68	2,084.83	734.77	907.07	1,164.67	0.48	0.09	-0.64
2,595.00	47.51	50.13	2,148.71	779.10	961.65	1,234.83	1.31	-0.49	-1.63
2,689.00	45.95	49.03	2,213.14	823.47	1,013.76	1,303.21	1.87	-1.66	-1.17
2,784.00	43.27	48.86	2,280.77	867.28	1,064.06	1,369.88	2.82	-2.82	-0.18
2,878.00	43.36	49.74	2,349.16	909.33	1,112.95	1,434.32	0.65	0.10	0.94
2,972.00	44.04	49.97	2,417.12	951.20	1,162.59	1,499.19	0.74	0.72	0.24
3,067.00	43.77	48.95	2,485.57	994.02	1,212.66	1,565.01	0.80	-0.28	-1.07
3,161.00	42.37	48.48	2,554.24	1,036.37	1,260.89	1,629.18	1.53	-1.49	-0.50
3,256.00	41.30	47.96	2,625.02	1,078.58	1,308.15	1,692.53	1.18	-1.13	-0.55
3,350.00	40.01	47.55	2,696.33	1,119.75	1,353.48	1,753.76	1.40	-1.37	-0.44
3,445.00	40.56	49.06	2,768.80	1,160.61	1,399.35	1,815.17	1.18	0.58	1.59
3,539.00	41.56	50.26	2,839.68	1,200.57	1,446.41	1,876.85	1.35	1.06	1.28
3,634.00	42.97	51.54	2,909.98	1,240.85	1,496.00	1,940.60	1.74	1.48	1.35
3,728.00	43.37	50.32	2,978.54	1,281.39	1,545.93	2,004.77	0.98	0.43	-1.30
3,823.00	41.75	49.64	3,048.51	1,322.70	1,595.13	2,068.94	1.77	-1.71	-0.72
3,917.00	42.25	51.13	3,118.37	1,362.80	1,643.59	2,131.73	1.19	0.53	1.59
4,012.00	42.55	52.78	3,188.52	1,402.27	1,694.03	2,195.56	1.21	0.32	1.74
4,106.00	42.97	50.86	3,257.54	1,441.72	1,744.19	2,259.16	1.46	0.45	-2.04
4,201.00	43.77	49.92	3,326.60	1,483.31	1,794.45	2,324.29	1.08	0.84	-0.99
4,296.00	42.03	49.89	3,396.19	1,524.96	1,843.92	2,388.87	1.83	-1.83	-0.03

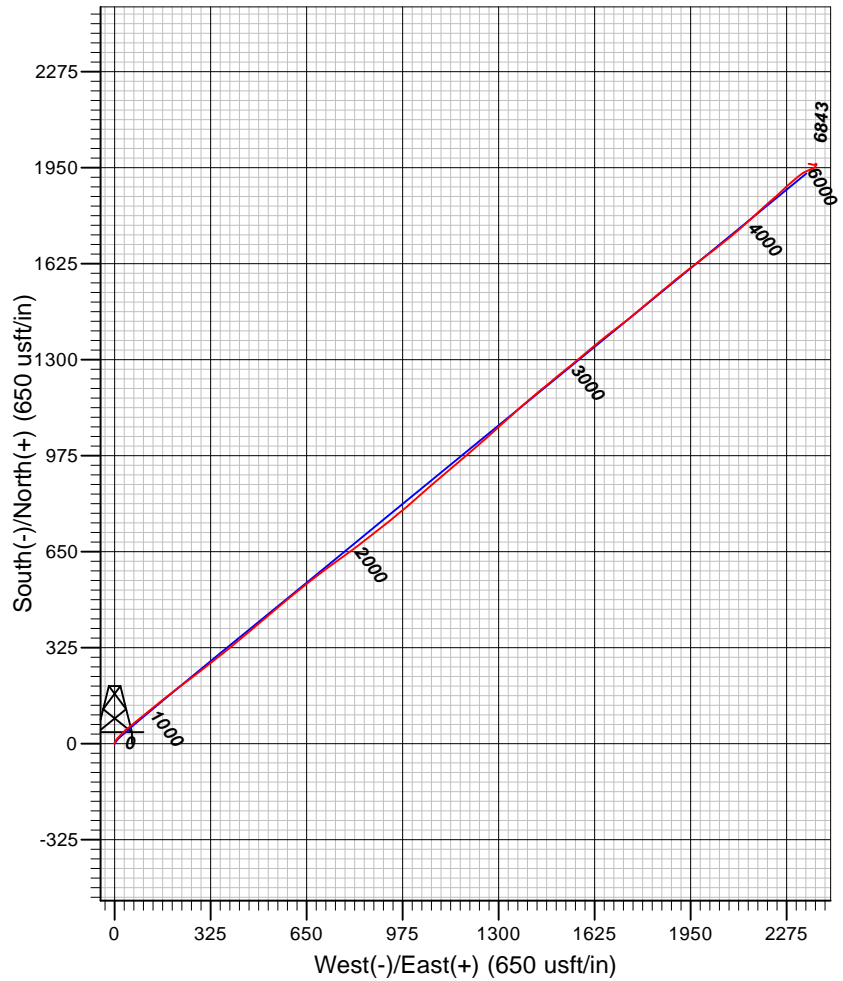
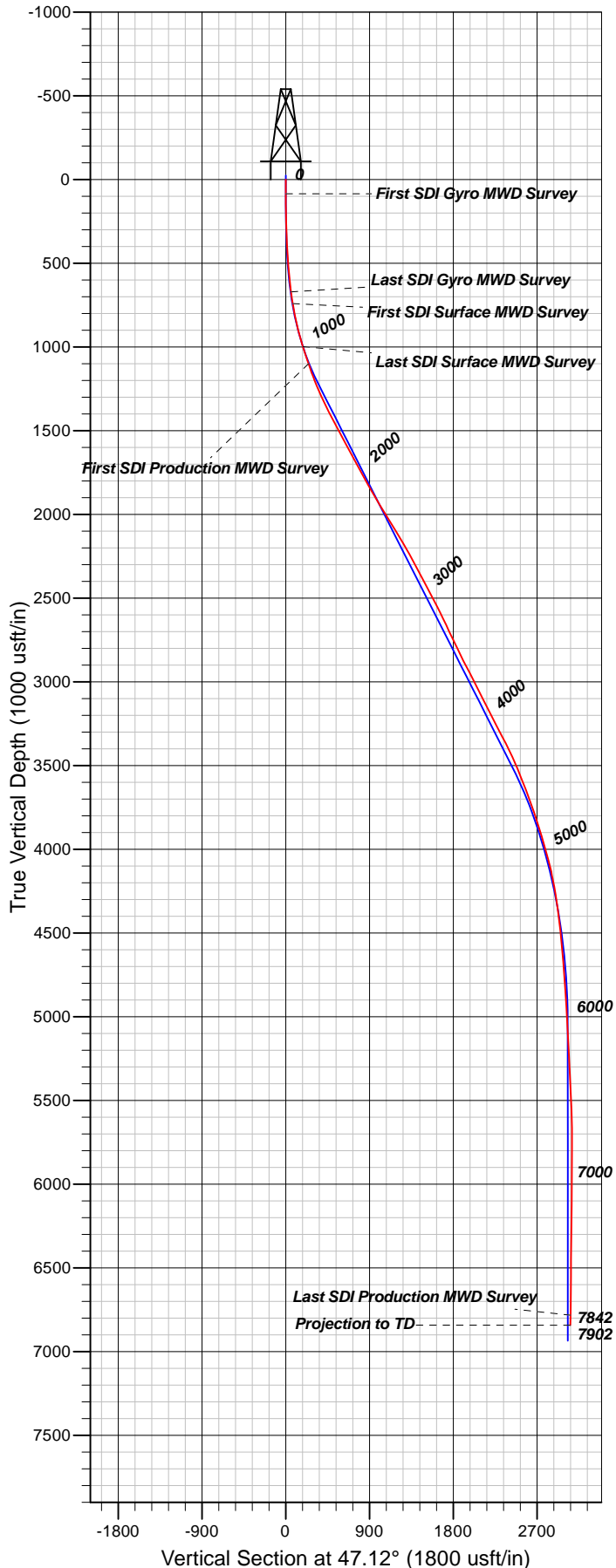
Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 41-10 - Slot B14
Project:	Garfield County, CO NAD83	TVD Reference:	WELL @ 6148.00usft (Original Well Elev)
Site:	MV 5-10 Pad	MD Reference:	WELL @ 6148.00usft (Original Well Elev)
Well:	Federal GM 41-10	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,391.00	38.77	51.22	3,468.53	1,564.09	1,891.44	2,450.33	3.55	-3.43	1.40	
4,485.00	36.05	51.56	3,543.19	1,599.73	1,936.06	2,507.27	2.90	-2.89	0.36	
4,580.00	35.05	52.71	3,620.48	1,633.64	1,979.65	2,562.29	1.27	-1.05	1.21	
4,674.00	33.91	52.73	3,697.96	1,665.87	2,022.00	2,615.25	1.21	-1.21	0.02	
4,769.00	31.57	50.43	3,777.87	1,697.76	2,062.26	2,666.46	2.79	-2.46	-2.42	
4,863.00	28.98	50.32	3,859.04	1,727.98	2,098.76	2,713.77	2.76	-2.76	-0.12	
4,958.00	27.82	48.70	3,942.61	1,757.31	2,133.13	2,758.91	1.47	-1.22	-1.71	
5,053.00	27.11	47.05	4,026.90	1,786.69	2,165.63	2,802.72	1.10	-0.75	-1.74	
5,148.00	22.95	47.88	4,112.96	1,813.87	2,195.22	2,842.90	4.39	-4.38	0.87	
5,242.00	19.23	48.72	4,200.65	1,836.38	2,220.46	2,876.71	3.97	-3.96	0.89	
5,337.00	15.79	48.63	4,291.23	1,855.25	2,241.92	2,905.28	3.62	-3.62	-0.09	
5,431.00	12.56	46.02	4,382.36	1,870.81	2,258.88	2,928.29	3.50	-3.44	-2.78	
5,526.00	10.81	47.36	4,475.39	1,884.02	2,272.87	2,947.53	1.86	-1.84	1.41	
5,621.00	8.89	50.63	4,568.99	1,894.71	2,285.09	2,963.76	2.10	-2.02	3.44	
5,715.00	9.39	48.22	4,661.79	1,904.43	2,296.43	2,978.68	0.67	0.53	-2.56	
5,810.00	8.17	50.16	4,755.68	1,913.91	2,307.39	2,993.17	1.32	-1.28	2.04	
5,904.00	6.83	51.20	4,848.87	1,921.70	2,316.88	3,005.41	1.43	-1.43	1.11	
5,998.00	5.44	51.38	4,942.33	1,927.98	2,324.71	3,015.43	1.48	-1.48	0.19	
6,093.00	5.13	62.82	5,036.93	1,932.73	2,332.01	3,024.01	1.15	-0.33	12.04	
6,108.76	5.19	62.83	5,052.62	1,933.38	2,333.27	3,025.38	0.38	0.38	0.09	
GM 41-10 KMV										
6,188.00	5.49	62.90	5,131.52	1,936.74	2,339.83	3,032.48	0.38	0.38	0.08	
6,283.00	5.80	66.67	5,226.06	1,940.71	2,348.29	3,041.37	0.51	0.33	3.97	
6,377.00	5.33	65.00	5,319.62	1,944.44	2,356.61	3,050.00	0.53	-0.50	-1.78	
6,472.00	5.42	67.16	5,414.20	1,948.04	2,364.74	3,058.42	0.23	0.09	2.27	
6,566.00	4.57	40.64	5,507.85	1,952.61	2,371.27	3,066.31	2.59	-0.90	-28.21	
6,661.00	3.34	27.37	5,602.63	1,957.94	2,375.01	3,072.68	1.61	-1.29	-13.97	
6,755.00	0.69	354.96	5,696.56	1,960.94	2,376.22	3,075.60	2.96	-2.82	-34.48	
6,850.00	0.84	312.92	5,791.56	1,961.98	2,375.66	3,075.90	0.60	0.16	-44.25	
6,944.00	0.76	280.40	5,885.55	1,962.56	2,374.54	3,075.48	0.48	-0.09	-34.60	
7,039.00	1.09	239.22	5,980.54	1,962.21	2,373.14	3,074.22	0.76	0.35	-43.35	
7,134.00	1.19	242.14	6,075.52	1,961.29	2,371.49	3,072.38	0.12	0.11	3.07	
7,228.00	1.09	254.33	6,169.50	1,960.59	2,369.77	3,070.64	0.28	-0.11	12.97	
7,322.00	1.14	260.48	6,263.48	1,960.20	2,367.99	3,069.07	0.14	0.05	6.54	
7,417.00	1.36	253.27	6,358.46	1,959.71	2,365.98	3,067.27	0.28	0.23	-7.59	
7,511.00	1.23	269.42	6,452.43	1,959.38	2,363.90	3,065.52	0.41	-0.14	17.18	
7,606.00	1.75	302.18	6,547.40	1,960.15	2,361.65	3,064.39	1.03	0.55	34.48	
7,701.00	2.04	289.40	6,642.35	1,961.48	2,358.83	3,063.23	0.54	0.31	-13.45	
7,795.00	2.78	275.77	6,736.27	1,962.26	2,354.98	3,060.94	0.99	0.79	-14.50	
7,842.00	3.05	272.03	6,783.21	1,962.42	2,352.60	3,059.31	0.70	0.57	-7.96	
Last SDI Production MWD Survey										
7,902.00	3.05	272.03	6,843.12	1,962.54	2,349.41	3,057.04	0.00	0.00	0.00	
Projection to TD - GM 41-10 PBHL										

Company:	TEP Rocky Mountain LLC	Local Co-ordinate Reference:	Well Federal GM 41-10 - Slot B14
Project:	Garfield County, CO NAD83	TVD Reference:	WELL @ 6148.00usft (Original Well Elev)
Site:	MV 5-10 Pad	MD Reference:	WELL @ 6148.00usft (Original Well Elev)
Well:	Federal GM 41-10	North Reference:	True
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	Grand Junction District

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
86.00	86.00	0.14	-0.14	First SDI Gyro MWD Survey
675.00	671.01	44.39	35.99	Last SDI Gyro MWD Survey
748.00	741.61	56.47	50.07	First SDI Surface MWD Survey
1,028.00	998.83	125.05	134.67	Last SDI Surface MWD Survey
1,146.00	1,100.20	163.13	181.55	First SDI Production MWD Survey
7,842.00	6,783.21	1,962.42	2,352.60	Last SDI Production MWD Survey
7,902.00	6,843.12	1,962.54	2,349.41	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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Well Details: Federal GM 41-10

TVD Reference: WELL @ 6148.00usft (Original Well Elev)						Level: 6148.00
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	1600365.80	2266914.20	39.4530113	-108.0965162	B14

REFERENCE INFORMATION

Co-ordinate (N/E) Reference: Well Federal GM 41-10 - Slot B14, True North
 Vertical (TVD) Reference: WELL @ 6148.00usft (Original Well Elev)
 Section (VS) Reference: Slot - B14(0.00N, 0.00E)
 Measured Depth Reference: WELL @ 6148.00usft (Original Well Elev)
 Calculation Method: Minimum Curvature

PROJECT DETAILS: Garfield County, CO NAD83

Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: Colorado Central Zone

System Datum: Mean Sea Level

Plan: OH

11:33, September 07 2017
 Created By: Mel Mireles Jr.