

Technology Decision Analytics – Portland RF Engineering

CENTRAL OREGON: FOSSIL-MONUMENT-SENECA AREA

AUGUST 2018

Executive Summary

Challenge

- No coverage in central Oregon towns: Monument, Seneca, Kimberly, Spray etc.
- Partial coverage on Hwy 395 ,Hwy 19 and HWY 402
- Total Pops of 2.5K
- Total Sq. miles: 2402

Objective

- Provide IBR and IVC coverage in Central Oregon towns and Hwys. mentioned above.
- Improve customer overall network experience in Central Oregon

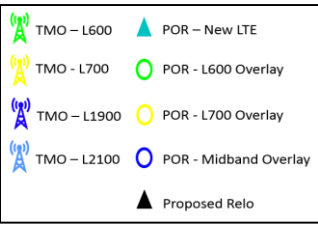
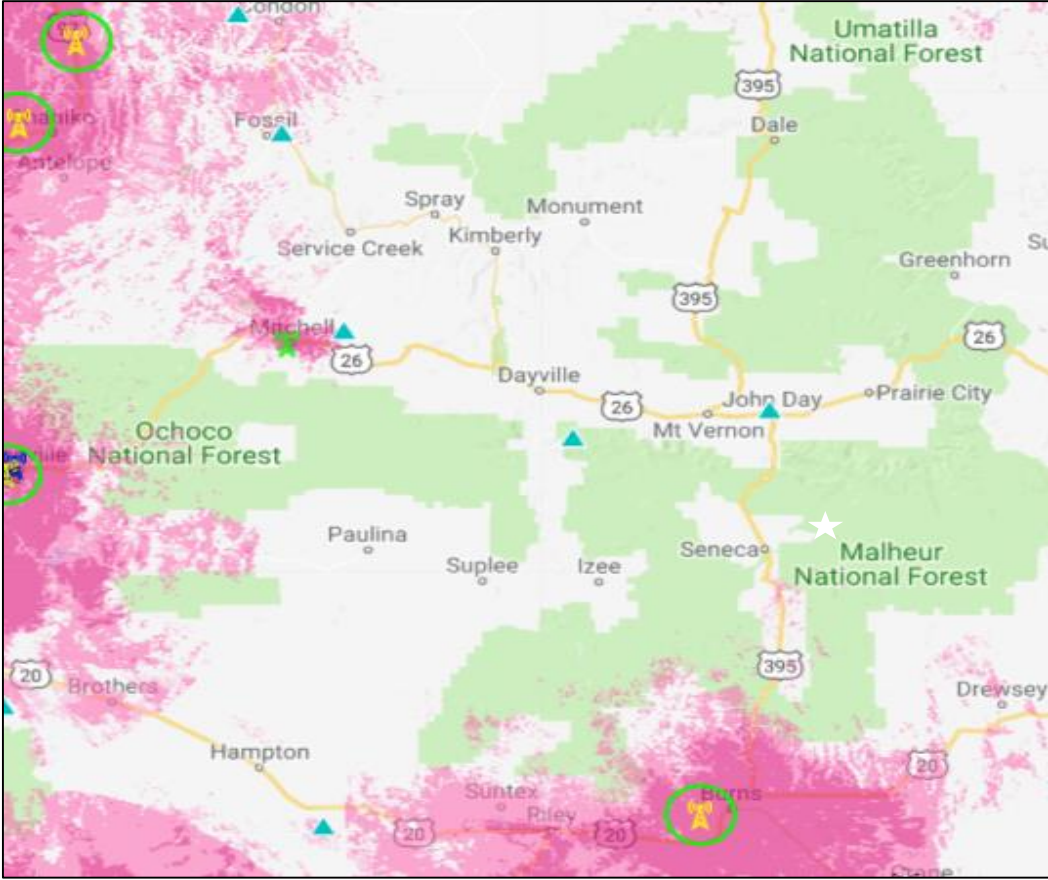
Solution

- 5 NSD with Colo Opportunity (Vz. is already on three locations)
- Total cost of \$775K CAPEX (Soft Cost: \$175K; Hard cost: \$600K)

Benefits

- Incremental IBC POP opportunity 2.5K to impact acquisition rate (will increase due to ongoing development in area).
- Will provide coverage in rural areas of Central Oregon
- Coverage parity with VZ #1 spot on 3rd party competitive metrics

Current Network Overview



Central Oregon Area

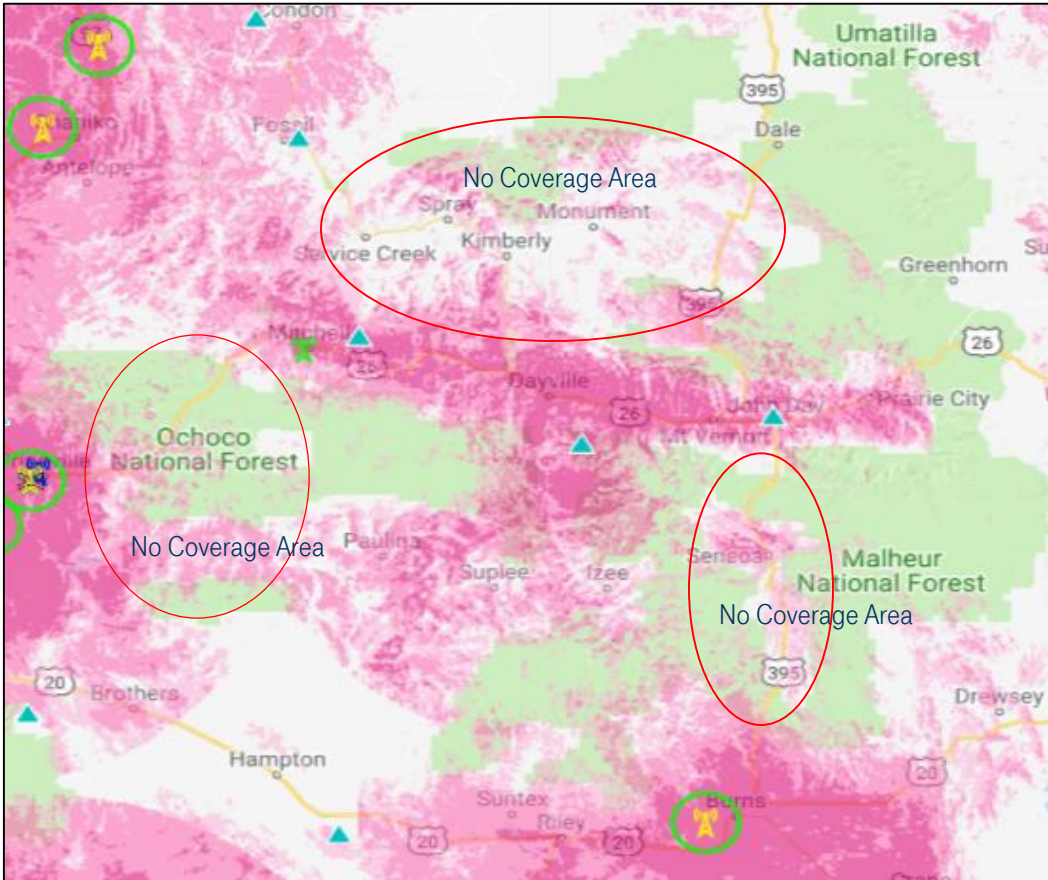
Area, State	Central Oregon, OR	
Population	12k POPS	
POP's Coverage	IBC %	0
	IBR %	2
	Outdoor %	3
Site Count	TMUS	1 (4 on POR)
	VZ	9
	AT&T	7
	Sprint	0
Store Count	TMUS	0
	VZ	0
	AT&T	0
	Sprint	0
Spectrum Holding	Mid Band	PCS & AWS
	Low Band	L600

Special Notes :

Market has identified the highlighted area requiring network investment to provide similar coverage as competitive operators.

- No coverage in central Oregon towns: Monument, Seneca, Kimberly, Spray etc.
- Partial coverage on Hwy 395 ,Hwy 19, Hwy 26 and HWY 402
- Total Pops of 12K
- Total Sq. miles: 2402
- Competitive and Engineering Insights – Verizon has better coverage and is building a new site in the east

EOY 2018 Network Overview



	TMO - L600		POR - New LTE
	TMO - L700		POR - L600 Overlay
	TMO - L1900		POR - L700 Overlay
	TMO - L2100		POR - Midband Overlay
			Proposed Relo

Central Oregon Area

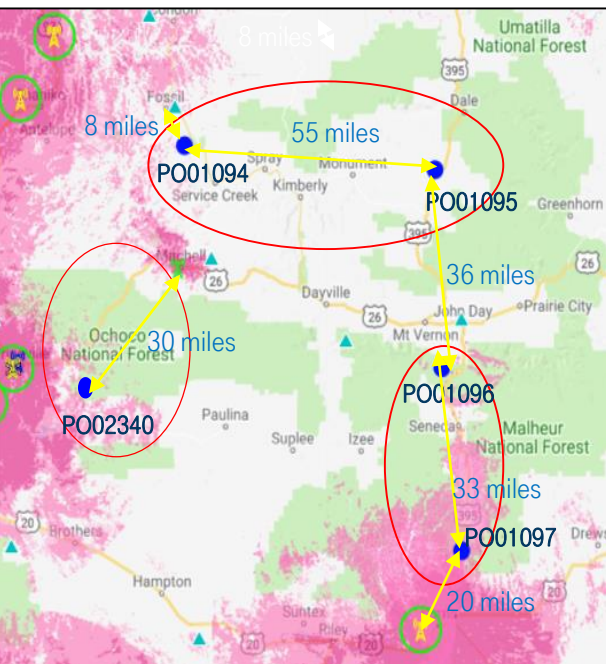
Area, State	Central Oregon, OR	
Population	12k POPS	
POP's Coverage	IBC %	NA
	IBR %	37
	Outdoor %	63
Site Count	TMUS	5
	VZ	9
	AT&T	7
	Sprint	0
Store Count	TMUS	0
	VZ	0
	AT&T	0
	Sprint	0
Spectrum Holding	Mid Band	PCS & AWS
	Low Band	L600

Location Benefits :

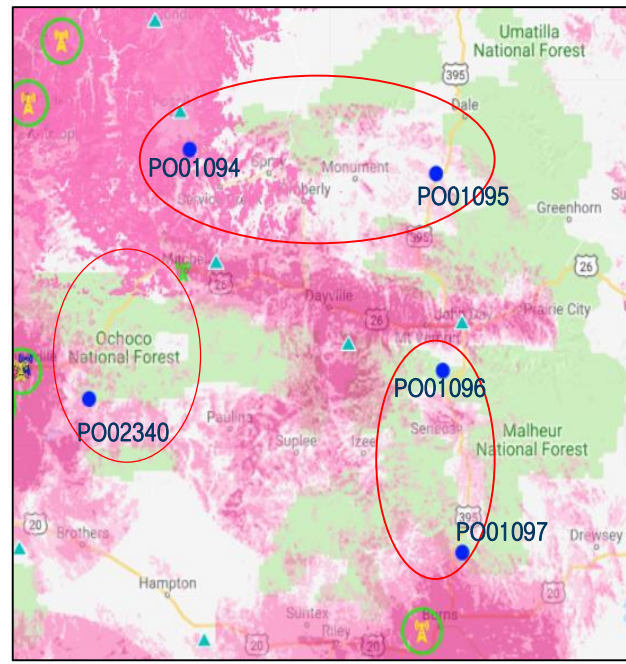
- Partial coverage on Hwy 395, Hwy 19 and HWY 402
- Total Pops of 2.5K
- Total Sq. miles: 2402
- Timeline: 4Q2019

Coverage Enhancement Plan

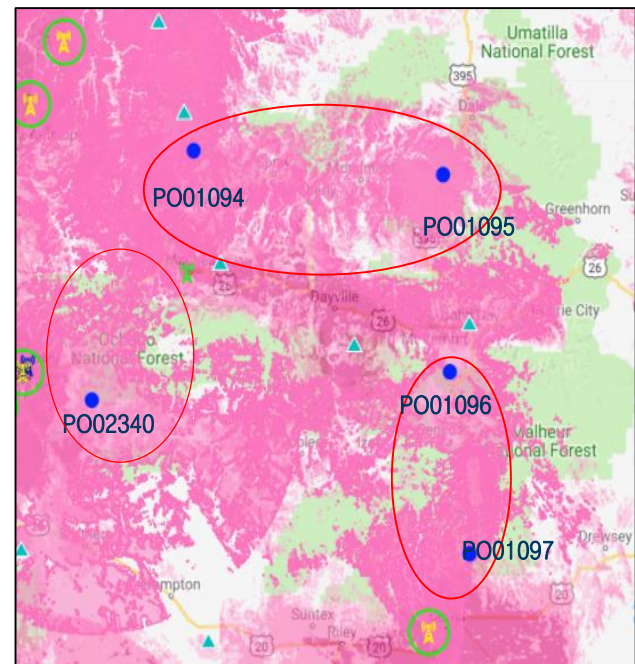
Present Coverage



Coverage with sites on POR



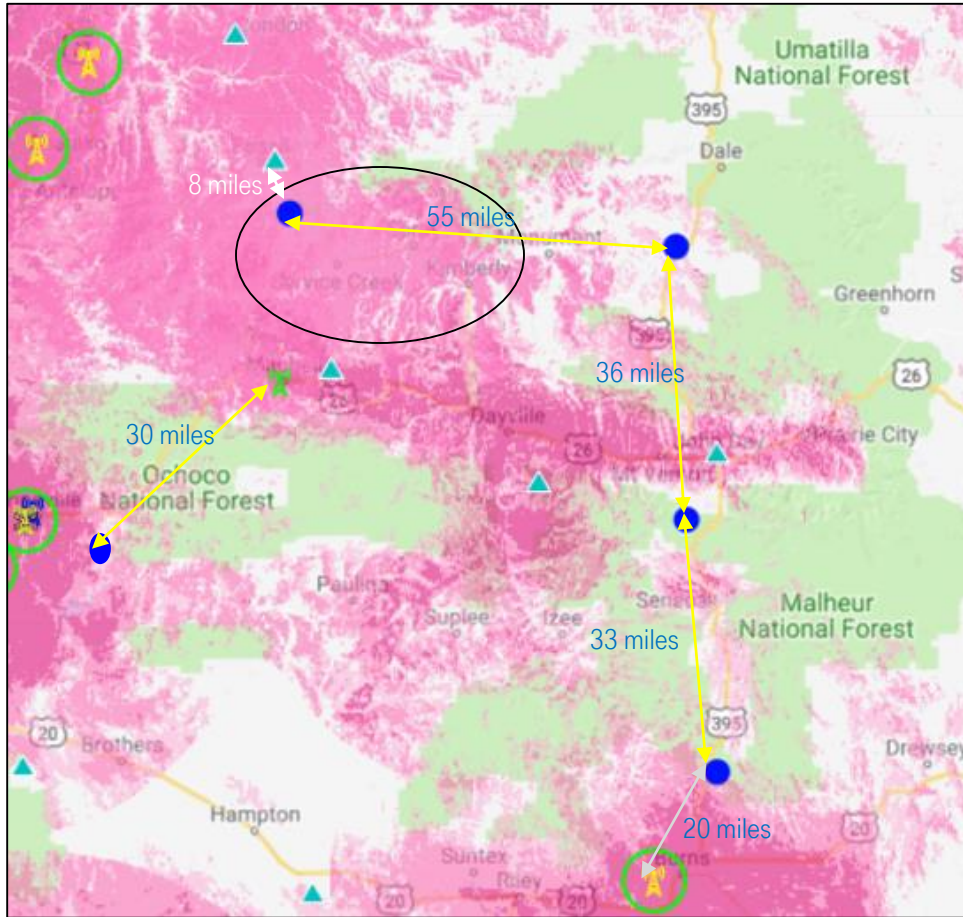
Coverage with new proposed NSDs



Proposed New Rings

Ring Id	Ring Name	Lat	Long	Square mile	Structure type
PO01094	Rancheria	44.89821	-120.1375	546	Tower
PO01095	Long Creek	44.83314	-119.07144	324	Tower
PO01096	Fall mountain	44.29377	-119.04234	269	Tower
PO01097	Divine Ridge	43.79155	-118.95793	330	Tower
PO02340	Ochoco	44.21583	-120.57300	933	Tower

Site Justification : Service Creek PO01094



Service Creek		
Category	Travel	
NSD	1	
Configuration	L600	
POP's	IBC %	NA
Coverage	IBR %	NA
	Outdoor %	100%
Post-Build	TMUS	1
Site Count	VZ	1
	AT&T	0
	Sprint	0

Development Feasibility

Site Configuration

L600

Candidate List:

- Frontier Telnet (44.89821, -120.1375)

Telco:

- Possible Microwave

Power:

Candidates have commercial power

Cost:

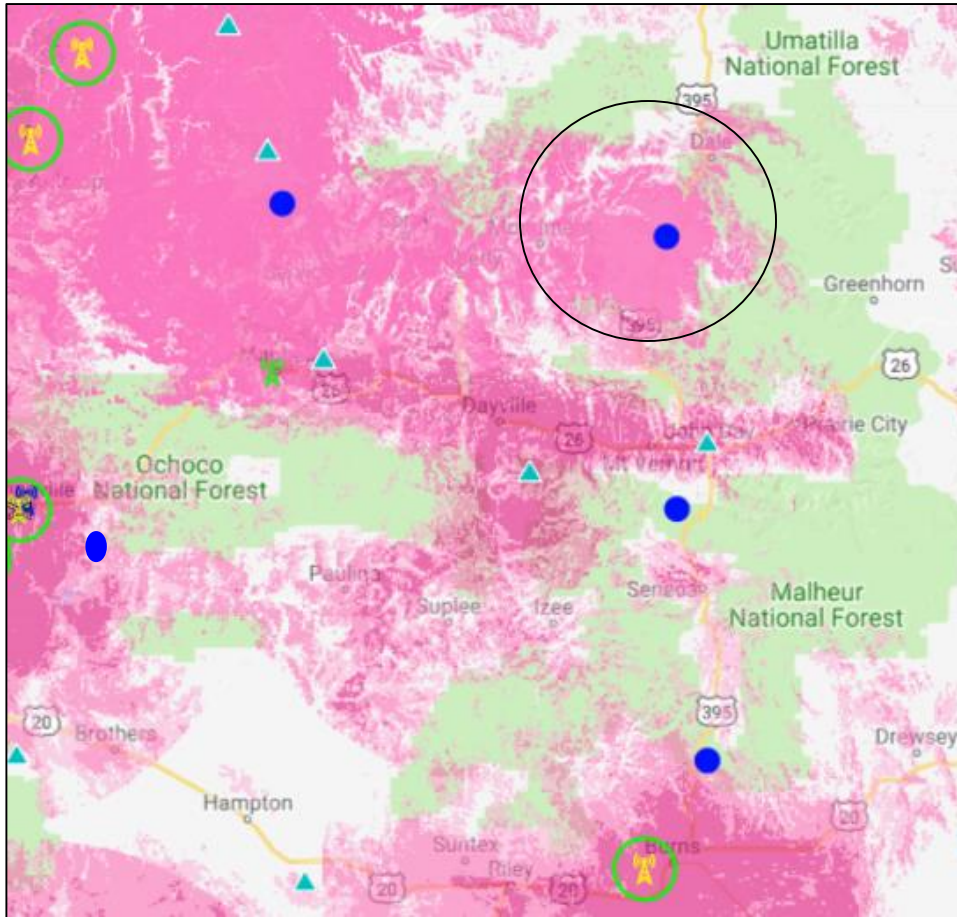
- Soft cost Estimates: \$35k
- Hard cost Estimate: \$120K

On Air Estimate: 4Q2019

RF Objective:

- Currently no TMO coverage in this area.
- This site will extend coverage on Hwy 19 in central Oregon and will connect Fossil town with Mitchell
- Sq. Miles covered: 546
- VZ has coverage in this area.

Site Justification : Battle Mountain PO0xxx2



Bull Mountain		
Category	Work, Live & Travel	
NSD	1	
Configuration	L600	
POP's	IBC %	NA
	IBR %	NA
Coverage	Outdoor %	100%
	Post-Build	TMUS
Site Count	VZ	1
	AT&T	0
	Sprint	0

Development Feasibility

Candidate List:

- ATC tower (44.83314 , -119.07144)

Telco:

- Possible Microwave, Fiber: unknow

Power:

Candidates have commercial power

Cost:

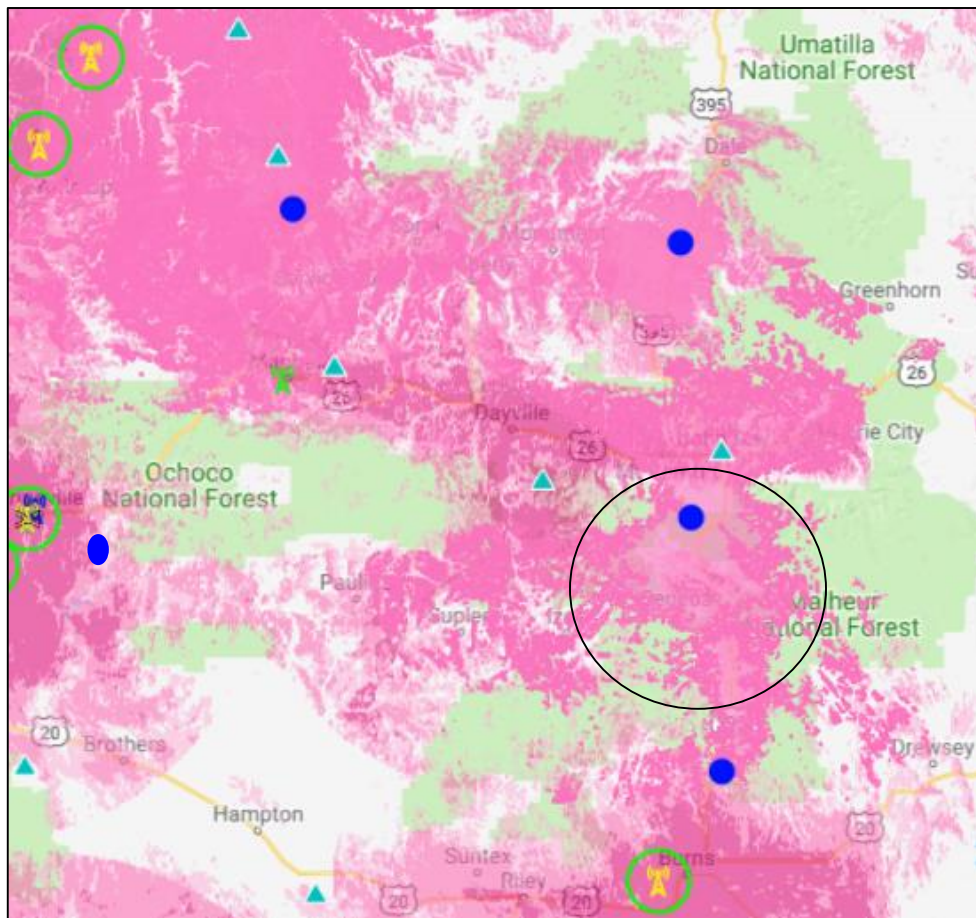
- Soft cost Estimates: \$35k
- Hard cost Estimate: \$120K

On Air Estimate: 4Q2019

RF Objective:

- Currently no TMO coverage in this area.
- This site will extend coverage on Hwy 395 in central Oregon and will connect to John Day.
- Sq. Miles covered: 324
- VZ has coverage in this area.

Site Justification : Fall Mountain PO01096



Fall Mountain		
Category	Travel	
NSD	1	
Configuration	L600	
POP's	IBC %	NA
Coverage	IBR %	NA
	Outdoor %	100%
Post-Build Site Count	TMUS	1
	VZ	1
	AT&T	0
	Sprint	0

RF Objective:

- Currently no TMO coverage in this area.
- This site will extend coverage on Hwy 395/19 in central Oregon and will connect John Day and Seneca town.
- Sq. Miles covered: 269
- VZ has coverage in this area.

Development Feasibility

Candidate List:

- Multiple towers
(44.29377, -119.04234)

Telco:

- Fiber at candidate A
- Also has LOS to existing

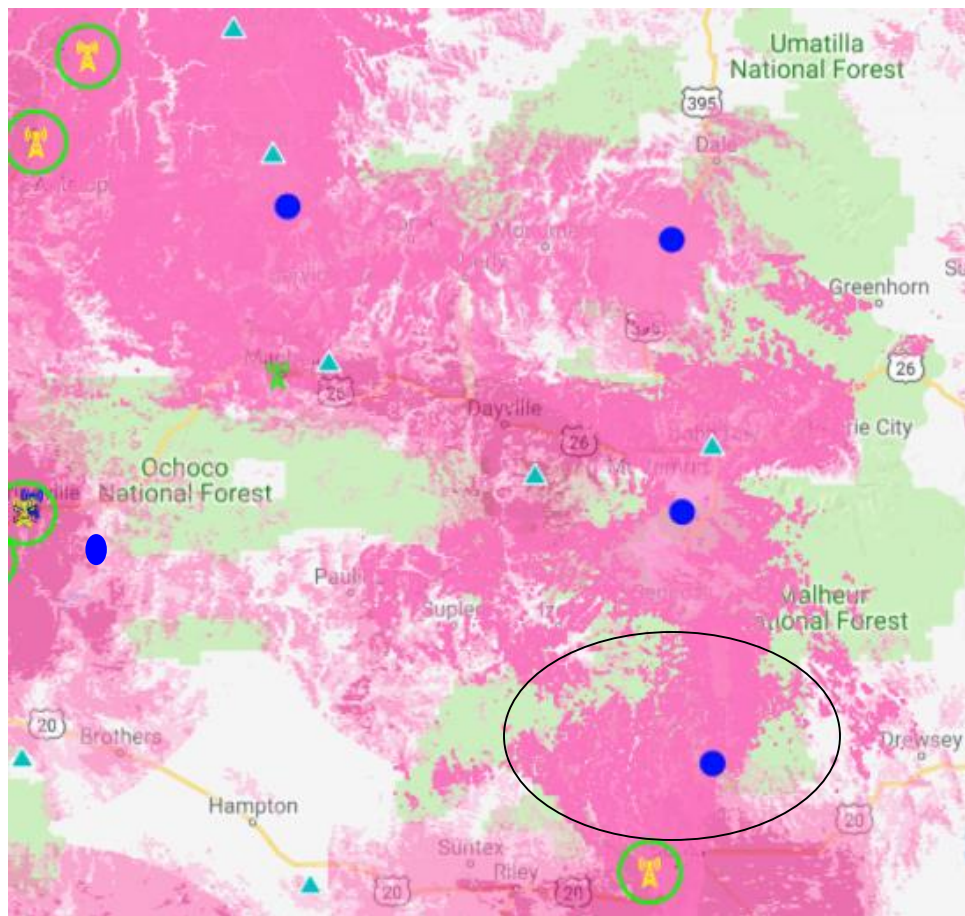
Power:

Candidates have commercial power

- Soft cost Estimates: \$35k
- Hard cost Estimate: \$120K

On Air Estimate: 4Q2019

Site Justification : Divine Ridge PO01097



Divine Ridge		
Category	Travel	
NSD	1	
Configuration	L700 +L600	
POP's	IBC %	NA
Coverage	IBR %	NA
	Outdoor %	100%
Post-Build	TMUS	1
Site Count	VZ	1
	AT&T	0
	Sprint	0

RF Objective:

- Currently no TMO coverage in this area.
- This site will extend coverage on Hwy 395 in central Oregon and will connect Seneca town with Burns town.
- Sq. Miles covered: 330
- VZ has coverage in this area.

Development Feasibility

Candidate List:

- Oregon Public Broadcasting
(43.79155, -118.95793)

Telco:

- Microwave, Fiber: Unknown

Power:

candidates have commercial power

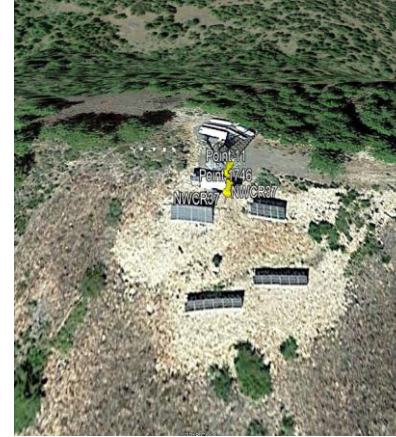
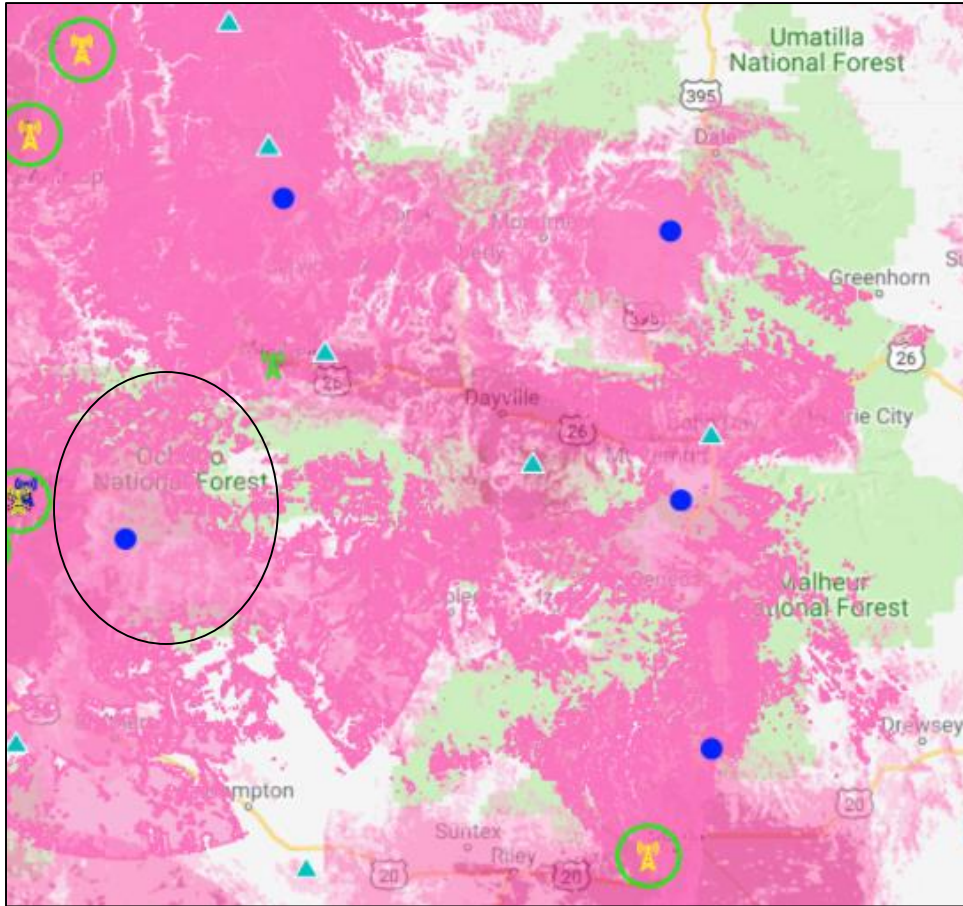
Cost:

Soft cost Estimates: \$35k

Hard cost Estimate: \$120K

On Air Estimate: 4Q2019

Site Justification : Ochoco PO02340



Ochoco		
Category	Travel	
NSD	1	
Configuration	L700 +L600	
POP's	IBC %	NA
Coverage	IBR %	NA
	Outdoor %	100%
Post-Build Site Count	TMUS	1
	VZ	1
	AT&T	0
	Sprint	0

Development Feasibility

Candidate List:

- ATC (44.21583, -120.57300)

Telco:

- Microwave, Fiber: Unknown

Power:

candidates have commercial power

Cost:

Soft cost Estimates: \$35k

Hard cost Estimate: \$120K

On Air Estimate: 4Q2019

RF Objective:

- Currently no TMO coverage in this area.
- This site will extend coverage on Hwy 26 and will connect Prineville and Mitchell town.
- Popular destination in Central Oregon.
- Sq. Miles covered: 933
- VZ has coverage in this area.

LEGEND





Coverage

-  IBC
-  IBR
-  Outdoor





Sites

- | | | | |
|--|---|---|--|
|  AT&T |  TMO - L700 |  POR - New LTE |  Proposed NSD |
|  VZ (approx.) |  TMO - L1900 |  POR - L600 Overlay |  Proposed Overlay |
|  S (approx.) |  TMO - L2100 |  POR - L700 Overlay |  Proposed MOD |
|  MLA Colo | |  POR - Midband Overlay | |

Stores

-  TMO Existing
-  MetroPCS Existing
-  TMO Pipeline
-  MetroPCS Pipeline

Misc.

-  Targeted Area
-  Cluster
-  Live POP
-  Work POP