

More Sites for the LWA South Circle

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ABSTRACT

In this memo we describe a visit to more potential sites for the LWA. We employ the same criteria for evaluating the sites established by Taylor et al. 2006 (LWA memo 62) including the distance to power, roads and fiber, flatness of the terrain, soil composition, available terrain shielding, and indications of locally generated Radio Frequency Interference (RFI). Coordinates and photographs are provided for each site. Finally, we summarize the sites that are most suitable for further study.

1. Introduction

On August 20-21, 2007 Pat Crane and John Dickel investigated 19 potential sites for LWA stations. These sites were selected from array configuration studies by Cohen (e.g. LWA memo No. 55; Cohen 2006), with attention to the development plan for the LWA outlined in Taylor (2006; LWA memo No. 56). We considered the array design concept for the LWA phase II, updated with more current topographic/logistic information. Figure 1 shows the locations of the sites visited marked in yellow on a map of south and west central New Mexico. The primary purpose was to locate sites providing significant north-south baselines. Three additional sites east and south of Magdalena will be investigated at a later date.

All sites described herein are on State Land. The LWA has a contract allowing right of entry onto State Land. At this point we do not exclude the possibility of using Federal lands, or even private land, but since UNM is a State University, we have found it convenient to begin investigating potential sites on State Land. We note that four of the sites were accessible only by travel through private land. DW and DU were posted so we did not reach those actual sites. AC and SJ were unposted; we got close enough to give an evaluation on AC and did enter SJ through a ranch. Finally, as noted in the description for WS, there may be a flatter area in that location accessible through a ranch.

We also tracked some fiber-optic cables: First was the Western New Mexico fiber down US180 and around SR61 that was known before. We also followed the fiber for the Magdalena Ridge Observatory, which was hung on SEC power poles down NM107 to just south of site RC. We followed buried fiber on NM52 from I-25 to about CP after which it apparently switched to being hung from power poles the rest of the way to

Winston (it looked exactly like the MRO fiber.) Finally, we followed what appeared to be fiber running on power poles from Hillsboro most of the way to Caballo.

For each site we provide GPS coordinates, photographs, and descriptions of the site including the approximate distance to roads, power, and fiber. We also discuss the local flatness, ground cover, terrain shielding, and any likely sources of RFI. We then make an assessment of the suitability of the site for further study. Additional photographs and some panoramic views are available upon request.

The coordinates are where our measurements were made; there are sometimes better spots within the given section of state land that will be mentioned in the discussion.

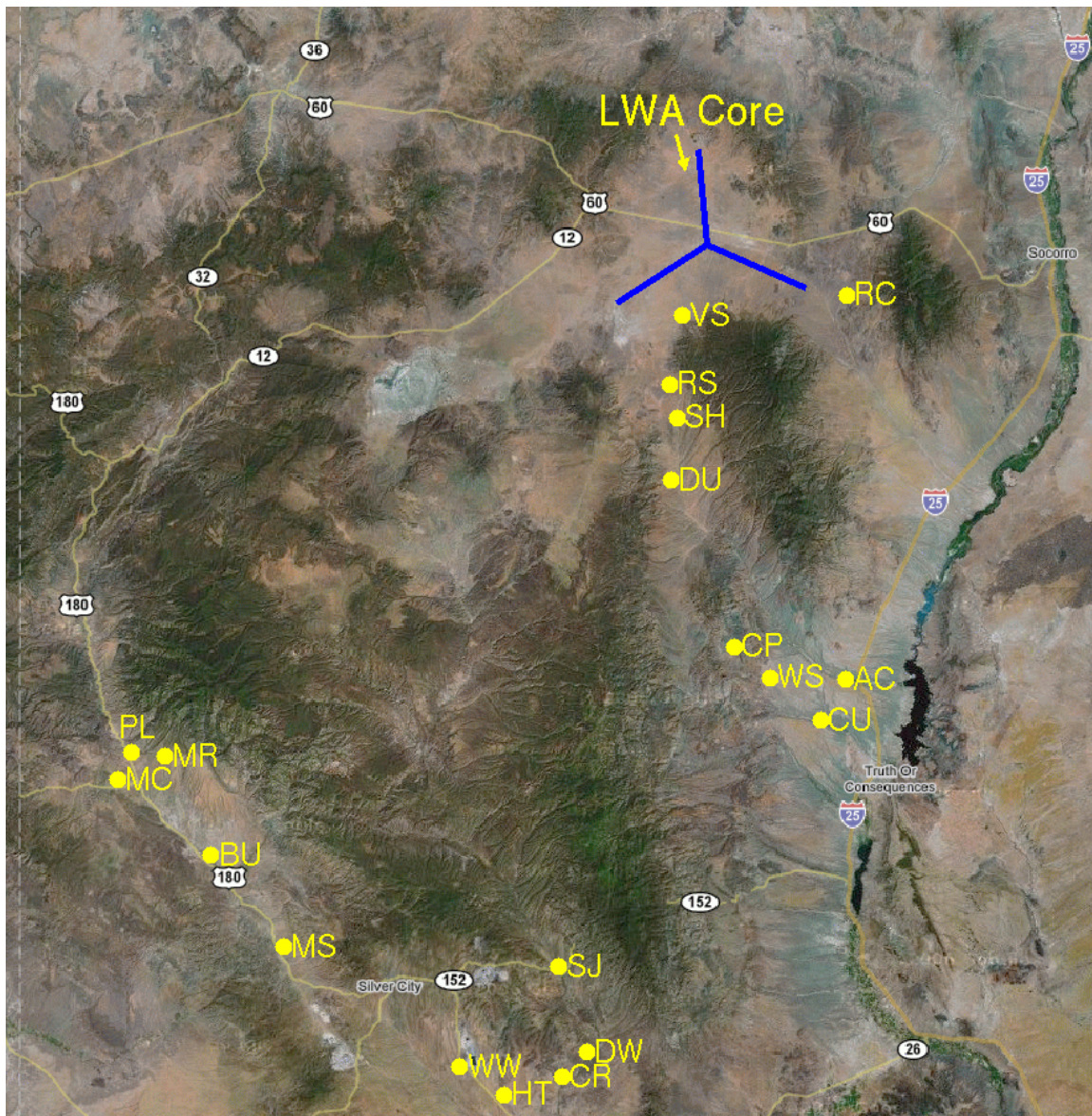


Figure 1: Locations of the 19 sites visited, or at least approached, (marked in yellow) on August 20-21, 2007. The VLA arms are marked in blue.

2. Site Descriptions One per page.

(1) PL: Pleasanton Just south of Gila national Forest on US180

Latitude: 33° 10.08'; Longitude: -108° 48.88'

Distance to power: 1+ mile from ranch house to south

Distance to road: 0.1 to 0.5 miles

Distance to fiber: < 0.25 miles, along road

Directions: US Highway 180 mile 64-65.

Terrain: rolling but several flat 100-m patches

Soil Composition: Dirt

Ground Cover: Grass

Terrain Shielding: OK – mountains to north, east and west, down valley to south. Don't know about Silver City about 45 miles to the southeast.

Obvious RFI sources: 1 house about 1 mile distant

Access: Excellent along a US highway. The state land extends 1 mile north and 1 mile east and west of chosen spot on the east side where there is a turn off to a short track

Perhaps there is a bit flatter land a bit north and west of the road.



Fig. 2. PL looking eastward from US180.

Conclusion: Good site; comparable to MC a few miles away. Need to compare RFI.

(2) MR: Moon Ranch

Latitude: 33°10.0'; Longitude: -108° 45.0'

Distance to power: 3+ miles

Distance to road: 4 miles

Distance to fiber: 4 miles

Directions: East off US180 onto Moon Ranch Road at mile 68.5, bear right at Moon Ranch gate and proceed about 3 ½ miles.

Terrain: Hilly

Soil Composition: Dirt

Ground Cover: Mainly grass.

Terrain Shielding: Mountains to north and east, hills to south and west.

Obvious RFI sources: None

Access: Passable dirt road.

No photos taken.

Conclusion: Too rolling and poorer access to everything than others in the area.

(3) MC: Mud Creek, NM78 at corner of H-Y road

Latitude: 33° 07.320'; Longitude: -108° 51.000'

Distance to power: < 0.8 miles

Distance to road: <0.25 miles

Distance to fiber: 3 miles on US180

Directions: About 3.5 miles west of US180 on NM78

Terrain: Flat

Soil Composition: Dirt

Ground Cover: Grass with some yuccas

Terrain Shielding: Mountains to north and east, hills to south and west.

Obvious RFI sources: Houses a few miles away.

Access: Excellent along a US and state highway.



Fig. 3. MC looking westward from just south of NM78.

Conclusion: Good site. Need to compare RFI measurements with PL versus further distance to fiber for this one.

(4) BU: South of Buckhorn on US180

Latitude: 32° 59.267'; Longitude: -108° 39.221'

Distance to power: < 0.25

Distance to road: < 0.25 miles

Distance to fiber: < 0.25

Directions: US route 180 at mile 81.

Terrain: Gentle slope (~ 6 feet in 150 yards ending in a pond)

Soil Composition: Dry mud

Ground Cover: Grass and high flowers

Terrain Shielding: Mountains on N, E, W but down the valley toward Silver City

Obvious RFI sources: New subdivision going in on other side of the road.

Access: Right on US180.



Fig. 4: BU looking eastward from US180

Conclusion: Risky site from water and neighbors.

(5) MS: Mangas Springs. Just south of Mangas Springs on US180

Latitude: 32° 49.58'; Longitude: -108°30.13'

Distance to power: <0.5 mile

Distance to road: <0.1 miles

Distance to fiber: <0.1 miles

Directions: US180 at mile 96

Terrain: Crisscrossed with dried stream beds – not enough dry flat area.

Soil Composition: Dirt and dried mud.

Ground Cover: Brush and cleared pasture.

Terrain Shielding: Mountains to N, E, W and valley to south.

Obvious RFI sources: Several houses within a mile.

Access: US180 or some tracks in the river basin.



Fig. 5. MS looking westward from US180.

Conclusion: No good area to place the array.

(6) WW: White Water, near Grant county airport about 2 miles north of White Water

Latitude: 32° 36.60'; Longitude: -108° 07.92'

Distance to power: 1-1.5 miles

Distance to road: < 0.1 miles

Distance to fiber: probably about 1.5 miles on US180

Directions: Turn right off US180 below Hurley for Grant County airport, then after almost ½ mile go left onto dirt Whitewater Road and proceed ~ 1 mile south. State land is on the right

Terrain: flat

Soil Composition: Dirt

Ground Cover: Grass

Terrain Shielding: Mountains to north and east; further hills to south and west.

Obvious RFI sources: County airport about 1.5 miles NW – 2 commercial flights per day. High voltage power line about 1.5 miles E.

Access: Good dirt road for last 1.5 miles.



Fig. 6. WW looking northwest from Whitewater Road.

Conclusion: Possible RFI but otherwise a good site.

(7) HT: Hot Springs on US180 south of Hurley

Latitude: 32° 33.5'; Longitude: -108° 02.8'

Distance to power: <0.25 mile

Distance to road: <0.25 miles

Distance to fiber: <0.25 miles

Terrain: Flat

Soil Composition: Dirt

Ground Cover: Mostly creosote bushes.

Terrain Shielding: Mountains around.

Obvious RFI sources: High voltage power line right along road so < ½ mile; airport ~ 3 miles away.

Access: West side of US180 at mile 138.



Fig. 7. HT looking southwest from US180.

Conclusion: Good except for possible RFI. Probably ranked below WW only 1-2 miles away.

(8) CR: City of Rocks on NM61 near City of Rocks State Park

Latitude: 32° 34.52'; Longitude: -107° 56.21'

Distance to power: <0.5 miles

Distance to road: <0.1 miles

Distance to fiber: <0.5 miles

Terrain: Hilly

Soil Composition: Dirt

Ground Cover: Very prolific creosote bushes

Terrain Shielding: Hills to west and further mountains all around

Obvious RFI sources: nearest houses a few miles

Access: On NM61.



Fig. 8. CR looking eastward from NM61

Conclusion: Not enough flat land.

(9) DW: Dwyer west of Dwyer on NM61

Latitude: 32° 38.16'; Longitude: -107° 52.08'

Distance to power: 1+ miles

Distance to road: 1+ miles

Distance to fiber: 1+ miles

Directions: One mile west of Dwyer on a private road.

Terrain: Probably hilly as viewed from a distance

Soil Composition: Dirt

Ground Cover: ?

Terrain Shielding: hills on the north and west.

Obvious RFI sources: probably no houses within a mile or more.

Access: No public access as the road at Dwyer is posted with NO Trespassing signs. We would apparently have to get permission in advance.

No picture available

Conclusion: Not actually accessed but terrain does not look promising and access would apparently have to be negotiated.

(10) SJ: San Juan near intersection of NM61 and NM152

Latitude: 32° 47.3'; Longitude: -107° 55.56'

Distance to power: <1/4 miles

Distance to road: 1/4 mile

Distance to fiber: 0.5 mile?

Terrain: sloped (perhaps 5-10° with SW higher)

Soil Composition: Dirt

Ground Cover: Grass with a few yuccas and junipers

Terrain Shielding: Ringed with mountains

Obvious RFI sources: nearest ranch ~ 1/4 mile.

Access: Go through the gate of Harrington Ranch about 100 yards west of intersection of NM152 and NM61 (near mile 15 on NM152). Went through ranch but no signs indicating private access.



Fig. 9. SJ looking southwestward from dirt access road.

Conclusion: May be the best one in the area SE of Silver City if the RFI is bad at WW.

(11) AC Alamosa Creek

Latitude: 33° 18.12'; Longitude: 107° 19.74'

Distance to power: probably a few miles

Distance to road: 1+ mile

Distance to fiber: 3-4 miles

Directions: We did not access specific site because the road in from the northeast did not exist and the one from the south off NM142 about 2.3 miles west of NM52 appeared to be an abandoned track that was gated but not locked.

Terrain: Flat

Soil Composition: dirt

Ground Cover: brushy

Terrain Shielding: None toward Rio Grande valley. Mountains on west.

Obvious RFI sources: About 10 miles to T or C down in the valley.

Access: See directions above



Fig. 10. Gate to AC looking NNE from NM142.

Conclusion: Probably better sites in area.

(12) CU: Cuchillo on mesa southwest of town

Latitude: 33° 13.78'; Longitude: 107° 22.82'

Distance to power: 0.8 miles

Distance to road: 1+ mile

Distance to fiber: 1.3 miles

Directions: Just west of town on NM52 turn left across the (currently dry) river bed and proceed about 1 mile up onto the mesa

Terrain: Quite flat

Soil Composition: slightly rocky dirt

Ground Cover: creosote bushes

Terrain Shielding: None toward Rio Grande valley. Mountains on western side.

Obvious RFI sources: About 10 miles from T or C down in the valley.

Access: the dirt road through the wash and up to the mesa top would definitely need 4WD in many seasons and may be impassable in wet weather.



Fig. 11. Looking southeast from CU site.

Conclusion: Significant problems with access and ground cover. RFI uncertain.

(13) WS: Willow Spring

Latitude: 33° 18.38'; Longitude: 107° 29.1'

Distance to power: < ¼ mile

Distance to road: < ¼ mile

Distance to fiber: < ¼ mile

Directions: About mile 14.5 on NM52.

Terrain: Rolling on edge of an arroyo but maybe large enough sites.

Soil Composition: Dirt

Ground Cover: Grass

Terrain Shielding: None toward Rio Grande valley. Mountains on west and north.

Obvious RFI sources: Ranch about ¾ mile away.

Access: On paved NM52. There might be a larger flatter area on the mesa in the background about ½ mile north and west accessible through a ranch road running north just to the east of the pictured area. There were no posted signs but we did not go to the ranch.



Fig. 12. WS looking north from NM52.

Conclusion: Marginal site.

(14) CP: Carrizo Peak

Latitude: 33° 21.22'; Longitude: 107° 33.56'

Distance to power: < ¼ mile

Distance to road: < ¼ mile

Distance to fiber: Uncertain unless it is on the power poles.

Directions: Both sides of NM52 at mile 21.

Terrain: Flat

Soil Composition: rocky dirt

Ground Cover: Cholla plus asters. Looks like it has been a horse pasture.

Terrain Shielding: Ringed by hills.

Obvious RFI sources: Nothing in sight.

Access: On paved NM52.



Fig. 13. Looking south at CP from NM52.

Conclusion: Looks ok except for fiber question.

(15) DU: Dusty

Latitude: 33° 39.48'; Longitude: 107° 41.58'

Distance to power: ?

Distance to road: 1+ mile

Distance to fiber: ?

Directions: One mile west off mile 53+ at Henderson Ranch on NM52.

Terrain: Unknown

Soil Composition: Dirt

Ground Cover: Unknown

Terrain Shielding: Hills all around.

Obvious RFI sources: Nearest ranch is 1 mile away.

Access: This site was not visited because the access road from Henderson Ranch on NM52 was marked No Trespassing. NM52 is dirt there.

Other Note: There is state land 1 mile further north straddling NM52 but it was too rough. The specified site on the mesa to the west might be flatter.

No photo available

Conclusion: Must check access if that location is really needed.

(16) SH: Sullivan's Hole

Latitude: 33° 46.94'; Longitude: 107° 40.70'

Distance to power: 0.2 mile

Distance to road: 0.2 mile

Distance to fiber: nowhere

Directions: Mile 63+ on NM52 fence at northeast corner of state land.

Terrain: A little bumpy but ok.

Soil Composition: Dirt

Ground Cover: Mainly grass

Terrain Shielding: Open but mountains all around

Obvious RFI sources: none

Access: Dirt NM52 is ok.

Additional note: The original site suggested was about a mile further south but the documented one looked better.



Fig. 14. View southwestward from NM52 at northeast corner of SH. Note the water trough in the left center of the picture.

Conclusion: Reasonable site

(17) RS: Rock Springs

Latitude: 33° 49.63'; Longitude: 107° 41.97'

Distance to power: 0.2 mile

Distance to road: 0.2 mile

Distance to fiber: nowhere

Directions: East side of NM52 at mile 66.7, a few hundred yards north of intersection with NM163.

Terrain: Flat.

Soil Composition: Dirt

Ground Cover: Grass and low sagebrush

Terrain Shielding: Open but mountains all around in distance.

Obvious RFI sources: none

Access: Dirt NM52 is ok.



Fig. 15. Looking eastward from NM52 at RS.

Conclusion: Reasonable site

(18) VS: VLA South

Latitude: 33° 57.34'; Longitude: 107° 39.58'

Distance to power: 5 miles north

Distance to road: 0.2 mile

Distance to fiber: 7-8 miles on VLA west arm

Directions: Mile 76.9 on NM52.

Terrain: Gradual slope to north.

Soil Composition: Dirt

Ground Cover: Grass

Terrain Shielding: In Plains of St. Augustine.

Obvious RFI sources: none

Access: Dirt NM52 is ok.



Fig. 16. Looking northwest from VS on NM52.

Conclusion: Reasonable site

(19) RC: Rock Springs Canyon

Latitude: 34° 02.00'; Longitude: 107° 19.26'

Distance to power: 0.2 mile

Distance to road: 0.2 mile

Distance to fiber: < ¼ mile (line to Magdalena Ridge Obs.).

Directions: About mile 32.8 on NM107, south of Magdalena.

Terrain: Flat.

Soil Composition: Dirt

Ground Cover: Mainly grass

Terrain Shielding: On edge of Plains of St. Augustine

Obvious RFI sources: None

Access: NM107.



Fig. 17. Looking westward from RC

Conclusion: Good site. Another spot 2 miles to the south is not quite as good and has a further fiber run.

3. Summary

There appear to be acceptable sites in each of the main clumps in the southern circle pending RFI testing.

Either PL or MC should work for the southwestern area.

For the furthest south region, WW or SJ look most promising but RFI testing is clearly needed because of the proximity to Silver City.

CP is probably the best choice in the east-south.

In the short-south area, RS might be a bit better than either SH or VS but there is little difference.

RC is clearly good but may be too close to EA to be of value. It is also likely to have less RFI than MA.