w/ telecommunications providers in YELL. @ YCC Camp Mess Hall

Wireless Communications Plan MTG 3/31/05

- Coverage areas
- Zone park for appropriate service
- Plan will be as comprehensive as possible

Cellular vs PCS - 1996
(personal communications services.)

Analog, Digital, ~~PCS~~ PCS, GSM, CDMA
~~TDMA~~ TDMA

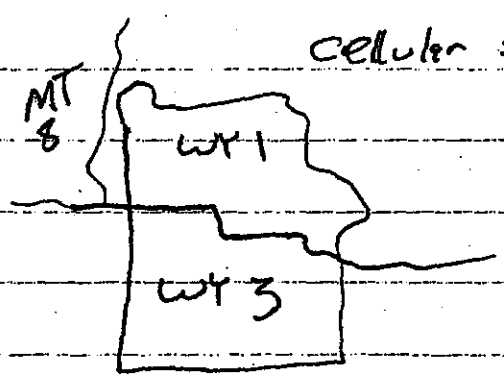
Coverage typically = line of sight

PARK DIVIDED INTO ~~AREAS~~

WY RSA 1

WY RSA 3

Cellular = up to 4 companies




up to 10 entities could provide service in the park.

8 pcs & cellular providers. + Nextel.

+ AM FM TV + 2-way radio
wireless internet, scientific monitoring, telephone,

Public Radio = fire, safety, LE?

As much population w/ as little investment as possible.

not looking @ backcountry as much, bleed over info = ok.

- need access, need power generator & Solar = hard.

Need T1 bandwidth.

fiber, copper, Microwave work.

Aesthetic Improvements = fiber ground park.

Now = Microwave.

If $ were unlimited, then → A fiber ring following GrandLoopRd. might be a very good option but would cost a lot of $.

Can lay fiber by trenching or direct burial.

- are we looking @ providing Voice-data, or other in various areas.

Some options work better for voice than data.

Companies look into capturing roaming revenues.

Primary Locations
- high sites that cover large geographic areas (can see a long ways)

Cabinet space available can limit technology that a company ~~the~~ can offer.

200 Amp Service = Standard / carrier.
could make due w/ less, but this is usually considered standard.

Sites should be built to accomodate multiple users.

FCC Publishes maps showing coverage areas for the various technologies.

WY RSA 1

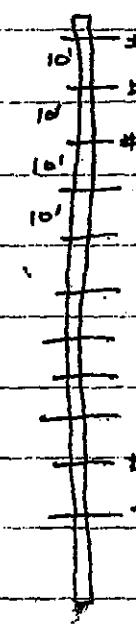
PCS
1 SPRINT
2 UNION
3 WW
4 T Mobil 10 mg
5 Edge wireless

WY RSA 1 cellular band
A - WW
B - Verizon

WY RSA 3
A - WW
B Verizon Cellular.

County line

Acceptable distance between Antennas.
10' of seperation — vertical.



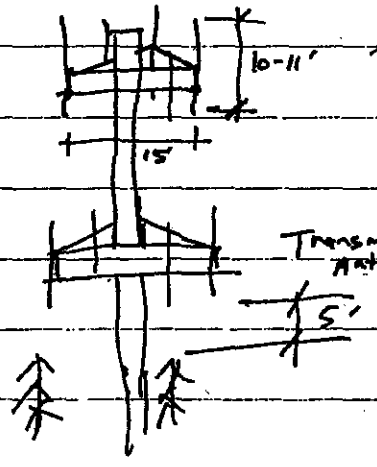

199' = as high of a tower as ~~possible~~ allowed w/o lights

Horizontal seperation ~~1/8 1/4 mile.~~
50' Seperation minimum.

Northwest Energy = Company providing power to Mt. Washburn.
9'-5' above mature trees, if trees will get no taller.

4 elevations could accomodate all users.
cellular -

10-11' antennas w/ 5' spacing of antennas.




30' - Above treeline

120' Tower - = highest w/in 2 miles of highway w/o lighting on tower.

low frequencies, can transmit from below tree line.

Need Rd Access, Power,
↳ ATV trail @ minimum.

Involve someone from FCC
SHPO
TRIBES
early in Plan development.

Back-up Power Generator = desirable.
who ever is site manager is responsible for maintenance.

Additional Microwave Capability needs to be part of Plan → improvements or Fiber Ring Upgrades.

- Need to ↑ bandwith.
- Need to add additional power.

Site plans needed to look @ Safety issues (RF) & bring back into compliance.

Adding power to Sylvan would be very expensive.

850 portable radios

150-200 mobile radios.

1500 voice/data devices.

Need Map showing Rd. Coridoors & Power coridors.

Mitigations = Site Specific.

Line of sight needed for Wireless Internet. 6"x6" to a 2'x2' Grid.

Need Power & Access.

Could do solar if needed. —

Very low power. 375 watts?

- low chance of interference w/ bend spread.

Minimum Bldg Size = ?

Verizon = Elk Plaza.
OF - WW + Union
Grant.
Lake w/o Cell coverage.

Fuel Cells = not a viable option @
this point.

MT Washburn
Bunsen Pk.
Elk Plaza
O.F.
Grant
I
Canyon - could offload stuff from Mt Washburn

Steamboat MTN would cover S. End of Park
& into GRTE.

Hwy 191 has needs.

120 Residence bldgs in Cooke City

Purple Mountain = desired by Talon Com

Sylvan Pass (Avalanche Peak)
line of sight to Cedar Peak outside of Cody.

Top Knotch does not get clear sight back to Cody like Avalanche does.

MT Washburn – needs a legitimate tower, RF is too high to allow public in these areas.

Restrict access of New tower from public.

10,000 people per year hike up to mt. washburn.

OF Cell site.

Multiple antennas in a developed area
Could provide coverage but cost ↑ & Profit ↓

Slimline design could reduce visual impact. & could also add additional carriers.

Multiple Antenna w/in the valley + infrastructure = expensive.

Floor space = an issue @ O.F.

O.F. existing site Positives = better than water treatment site.

Overall Parkwide Problem is Not enough Bandwidth (TELCO) coming into park

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Possibilities =

① Fiber ground Ground Loop Rd. = most expensive.

② Microwave routes Additional.

- Active microwave sites need power & roads.
- Redundancy Advantages of an additional microwave route.

NPS Concerns w/ getting a plan Completed.
Hire a consultant?
How do we pay for a plan?

Potential for Cell Companies to meet in ID Falls & develop a backhaul solution. that would then allow cell site designs to provide coverage.

Visitation Levels - #s to Cell Companies.

NPS needs to meet w/ Quest RE: backhaul concerns of park.