FY09 Plan for **Networks Physical Infrastructure (NPI)**
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Relevant Strategic Plan - Core Networking Strategic Plan FY2009 v8
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Networks/NPI

NPI.Strategic Goal - The strategic goal for the network physical infrastructure effort has the following components:

* Security & Services: Replacement of shared-media infrastructure and un-intelligent office switches with Management-To-The-User (**MTTU**) configurable switch ports. Desktop and associated closet wiring to be evaluated for cloud computing model.

* Capacity & Flexibility: Computer rooms (FCC, GCC, LCC, WH) implemented & upgraded with additional fiber and Cat-6 cabling via a centralized wiring scheme.

* Redundancy & Disaster Recovery: Establishment of redundant fiber paths between major computing sites. Establish fiber restoration services. Insure sufficient north-south-east-west boundary infrastructure for MAN/WAN resilience.

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* Resource Sharing and Inter-departmental Cooperation: Combine efforts with Security, FIRUS, Telco, Lab Divisions, WANs for common-pathway wiring infrastructures.

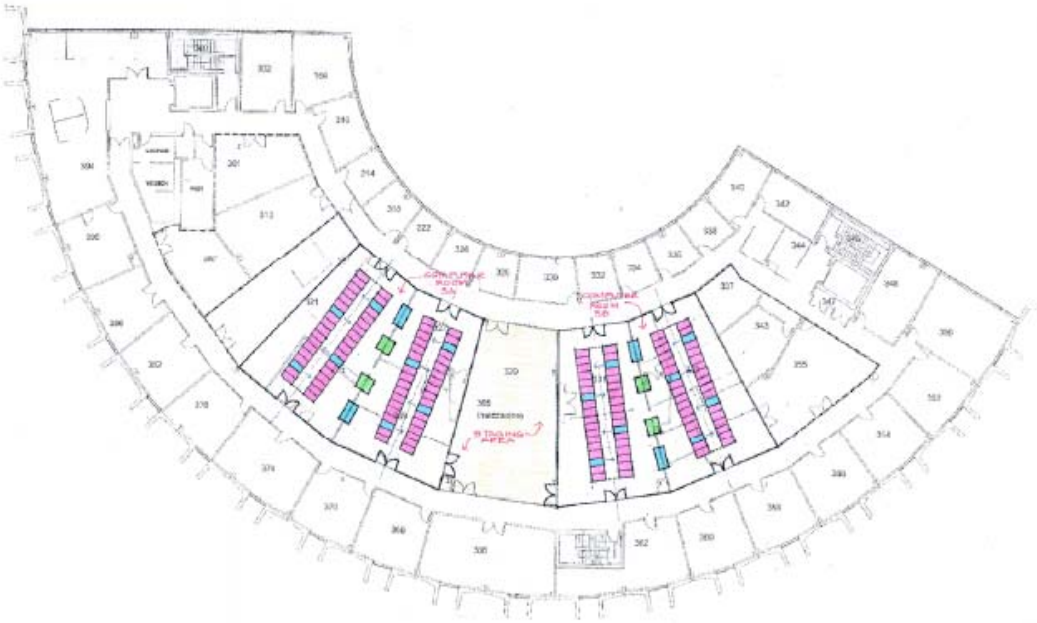
NPI. Tactical Objectives for FY09 - The tactical objectives for the network physical infrastructure effort for FY09 are:

General

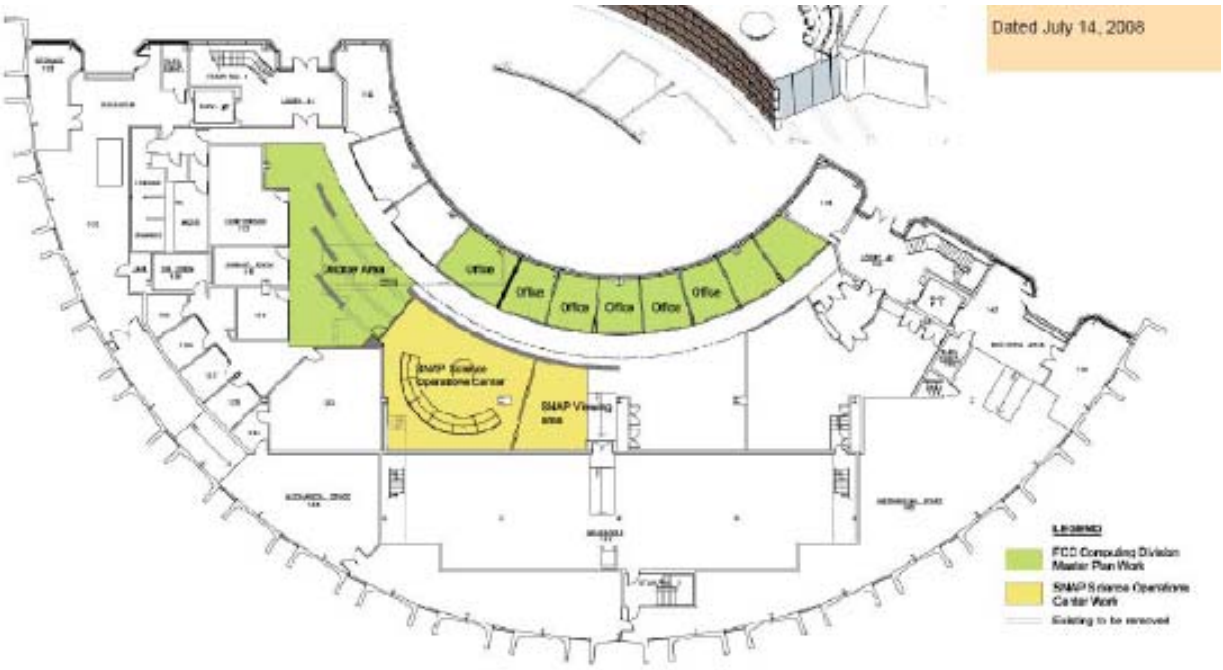
1. Maintain the general facility cable infrastructure and respond to rapidly changing infrastructure requests such as Fixed Target experiments. Scope includes normal yearly expansion of existing infrastructure, routine upgrade to keep pace with technology and troubleshooting support.
2. Remove abandoned network wiring and obsolete network edge devices.
3. Ensure network-edge-device self sparing & network wire/accessories inventory is comprehensive and adequate.
4. Create redundant fiber recovery paths, in the process cleaning up old convoluted Fixed Target fiber plant.
5. Establish GCC as the central connection point for all facilities site-wide, in the process creating high-availability redundant networking to FCC and WH.
6. Provision sufficient FCC data center infrastructure to accept non-CD computing departments seeking High Availability.
7. Provide cabling services to CD non-network (console, Fiber Channel, KVM, USB) systems in CD data centers.

Specific

1. Reconfigure FCC-building network wiring to support computer relocations from FCC1 computer room to FCC2 and new FCC3 computer rooms. Rewire FCC1 for Science Op Center and Prep Equip. (Significant effort will be required to move the D0 Cisco 6513 switch from FCC1W to FCC2). Provision rack space and rewire Brocade Fiber Channel switches on FCC2E. Provide wiring to scattered-unstructured FCC console servers. Secure infrastructure for TD computing in FCC2CR. Expand FCC-ICB fiber to support effort.



Proposed FCC3 Computer Rooms



Proposed FCC1 Science Op Center and Prep Equip.

2. Continue adding overhead cable trays throughout FCC2 and migrate old cabling from floor to overhead trays to enhance under-floor air flow, protect fiber cables, improve connection response time and reduce opened-raised-floor-tile hazards. Establish wiring Comm. Dist. Units. (CDU) “Air-Zones” over every third rack.

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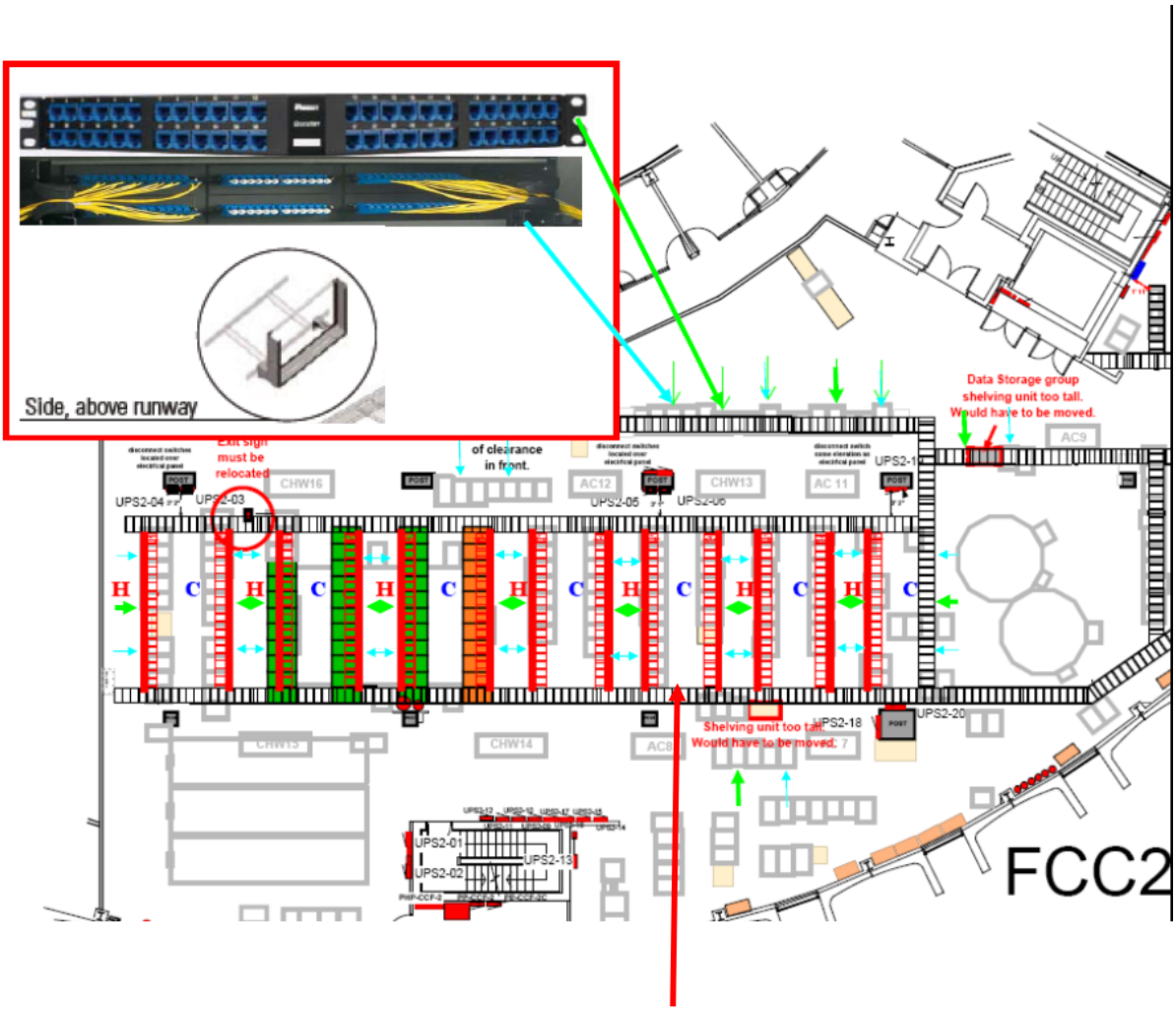
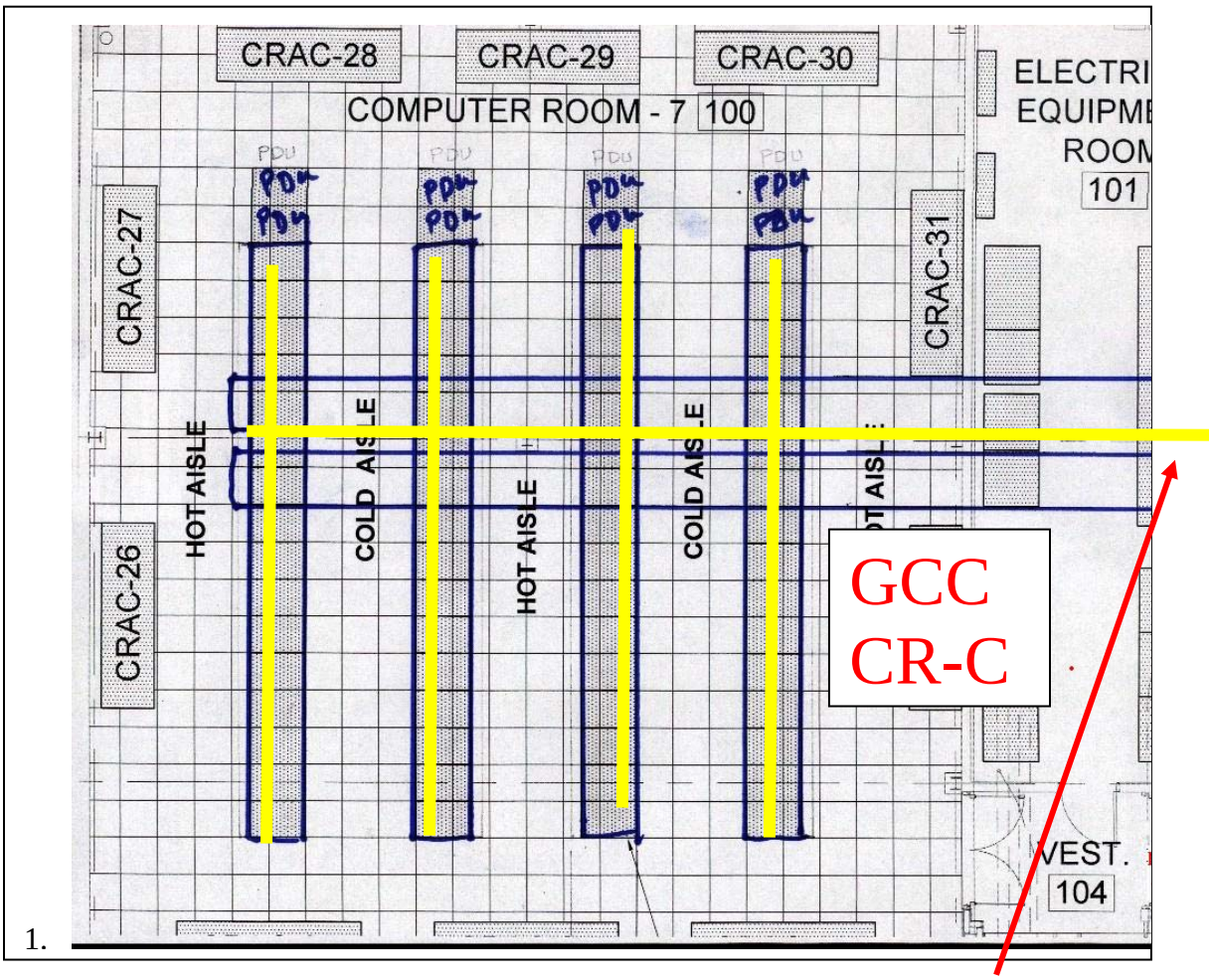
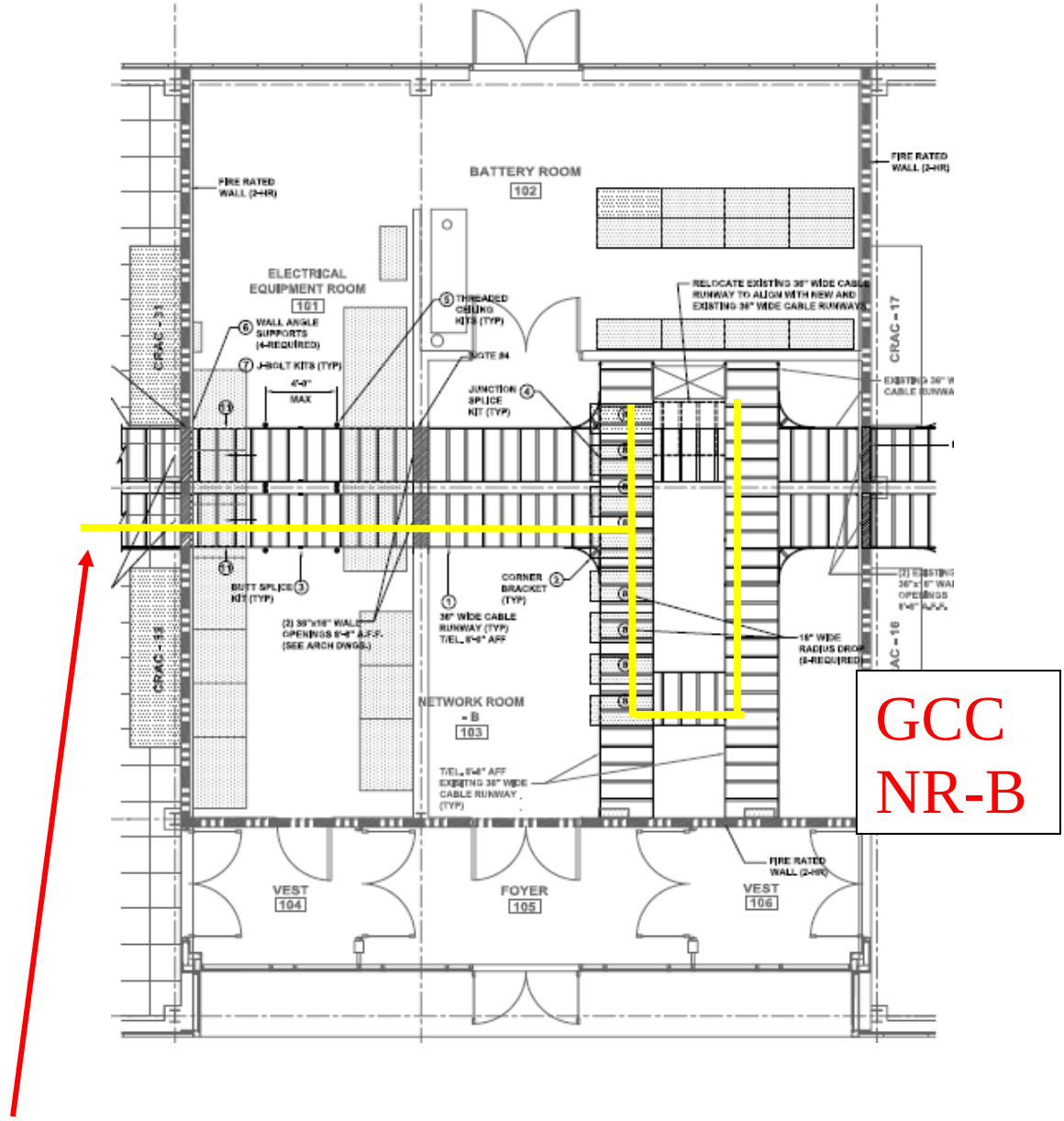


FCC2 Overhead Cable Tray CDU “Air-Zone” Locations

3. Add/remove/change cabling in (and between) GCC CR-C and LCC as requested by LQCD to support arrival of new Farms to CR-C.

1. 

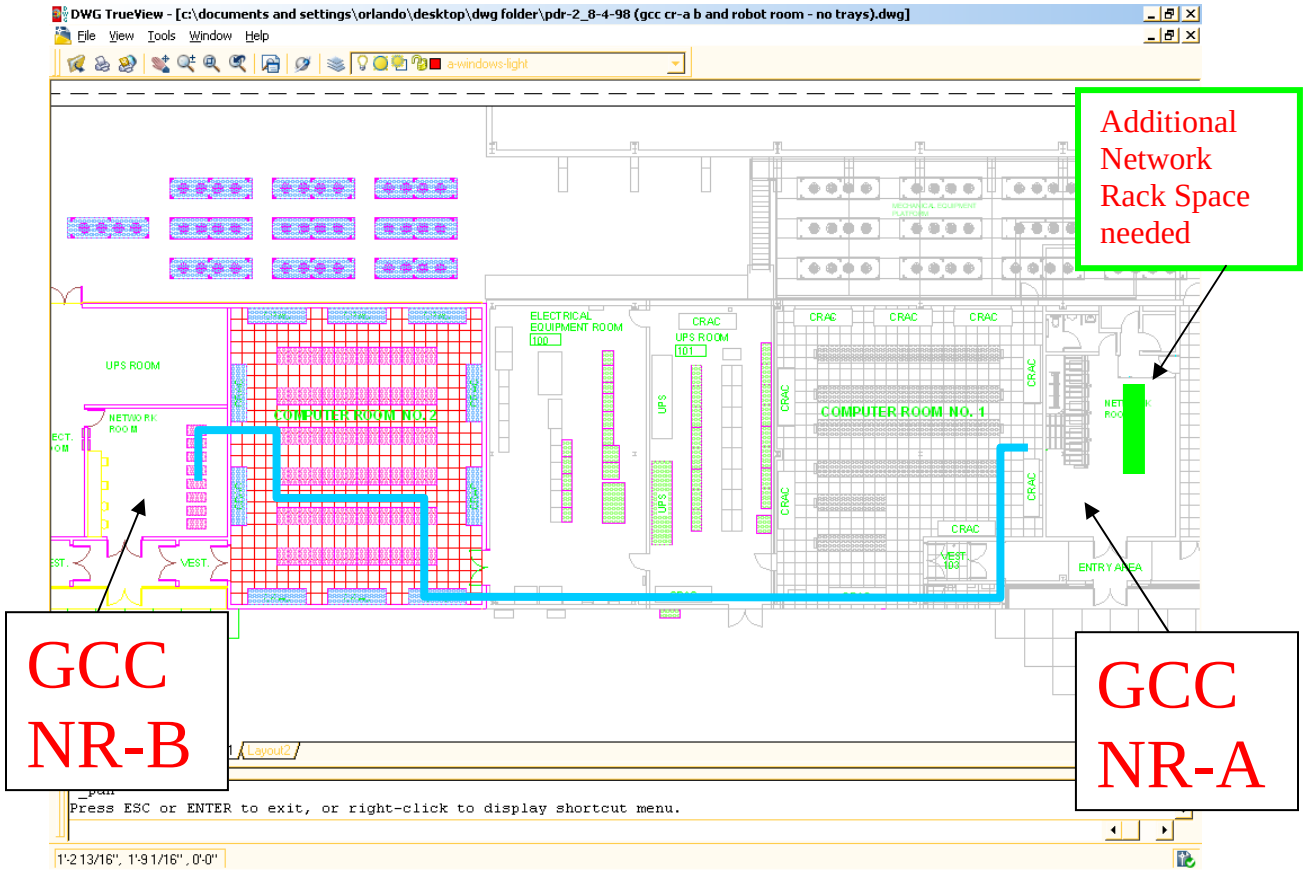
Proposed Fiber duct from CR-C to NR-B.



Proposed fiber duct from CR-C to NR-B

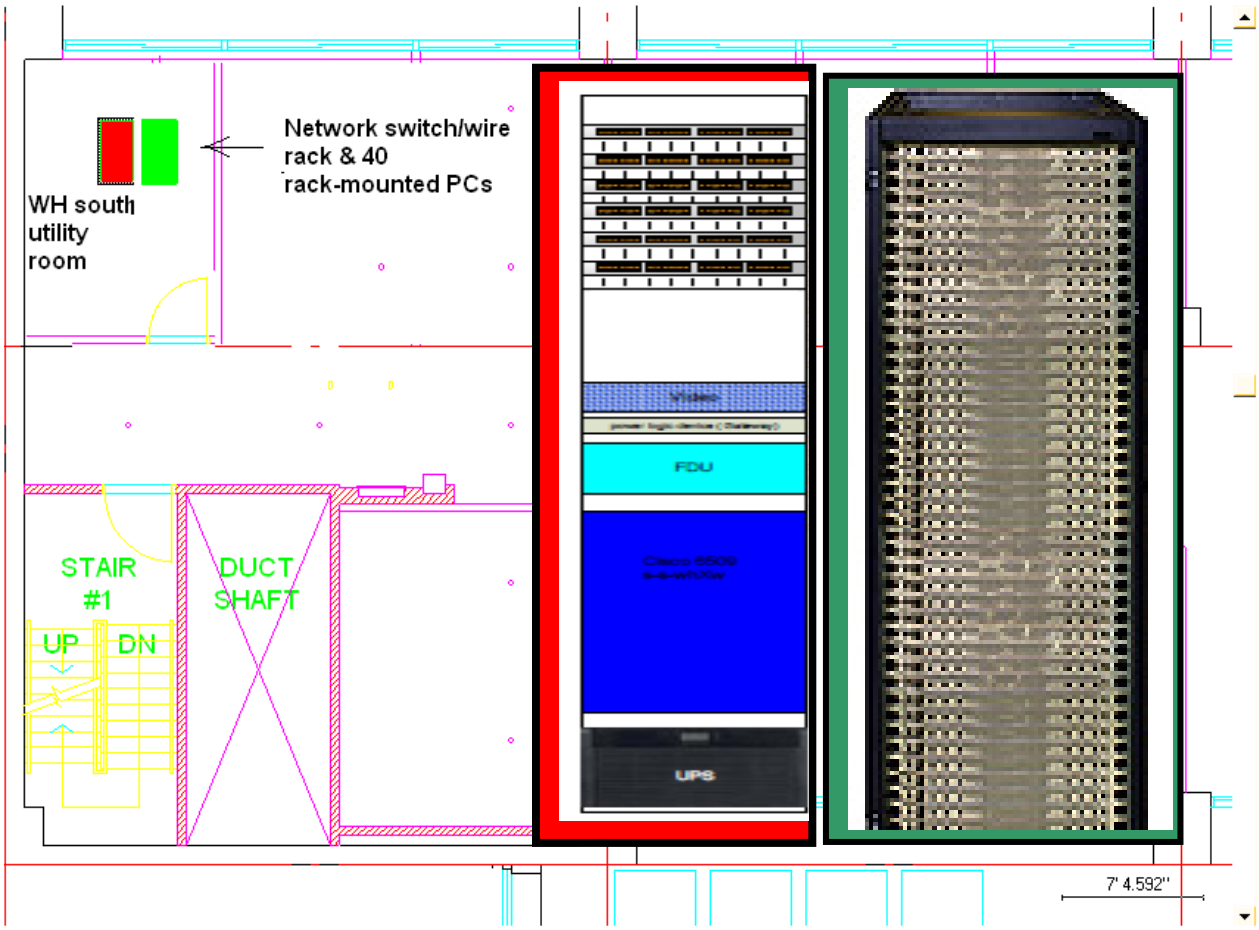
4. Add/remove/change cabling and switch ports in (and between) GCC Tape Robot and FCC as requested by Enstore to support arrival of new tape robots servers.

5. Add 50u Laser Optimized multimode fiber trunk cable between GCC NR-A and NR-B for expected CMS 10GE local switch inter-connectivity using short range (SR) XenPaks. Add additional network racks in NR-A to except FCC-WH network redundancy switches.



6. Provision substantial singlemode fiber circuits between GCC NR-A, NR-B and FCC2 for expected CMS 10GE remote switch inter-connectivity using long range (LR) XenPaks. Add additional CMS network rack in FCC2 to except new Cisco 7000 switch. Provision rack space in GCC NR-B for new CMS Cisco 7000 switch.

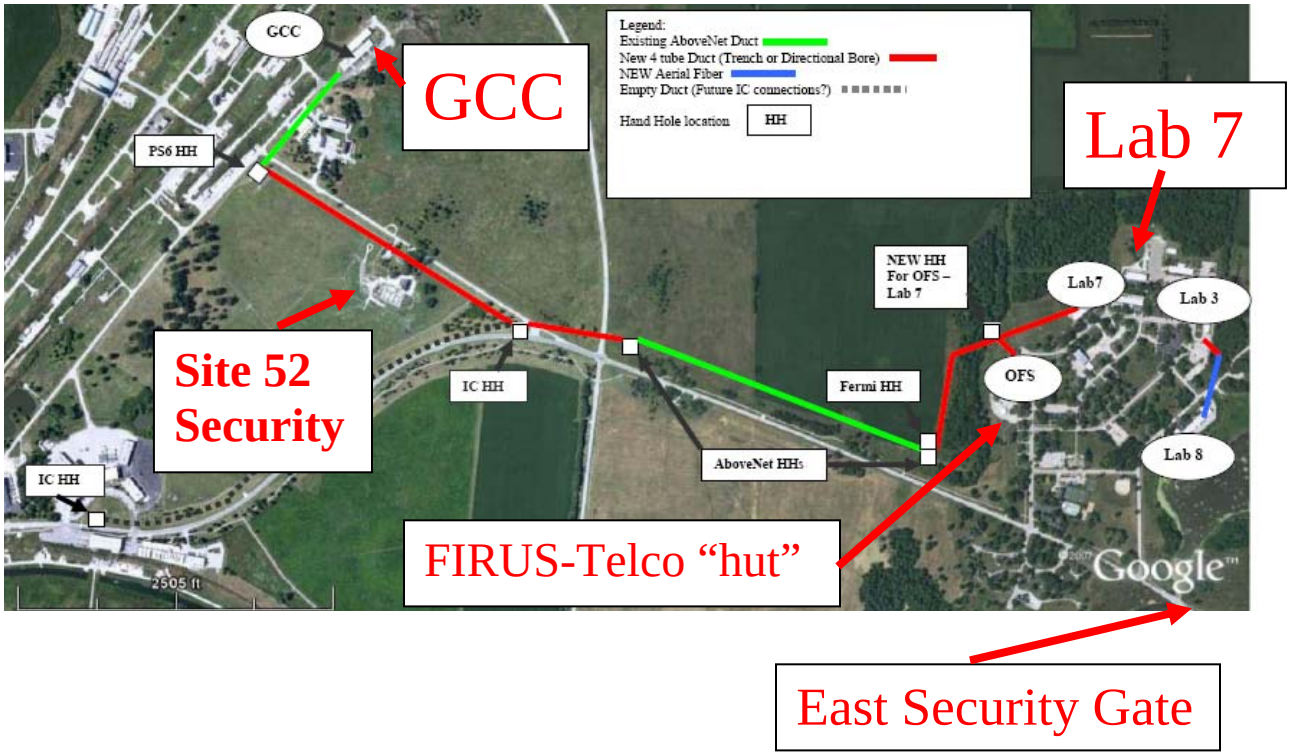
7. Begin upgrade of WH4 & 5 BSS by replacing hubs and dumb 100Mbps office switches with management-to-the-user (MTTU) switch ports. Build utility rooms on Wilson Hall south for network and PC racks. Proposing a paradigm shift in desktop deployment by having rack of 1u PCs housed in utility room and use KVM extenders on Cat5e to offices. Reduces need for high-bandwidth (Cat6) cabling. May lead to KVVM (Keyboard, Video, VoIP, Mouse) “phone station”. May lend-lead to cloud-style computing. May reuse data center End-of-Life PCs for GREENing credits.



Proposed WH4SW utility room for local network equipment and PC rack providing Management-To-The-User.

8. Continue installation of ~90 wireless 802.11n Access Points at WH. Expect to complete VoIP pilot project roll out this FY.

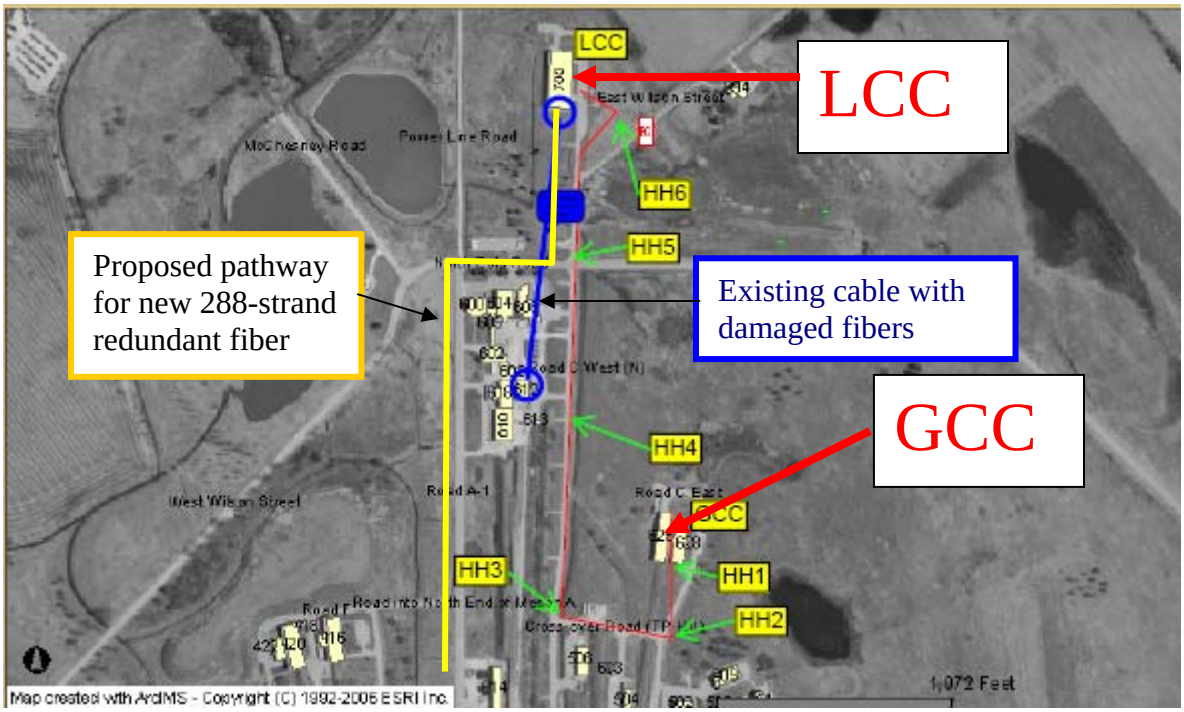
9. Install fiber from GCC to Village Lab7, dropping hand-holes at Site 52 and Village Telco "hut" and south Village building complex for Security, FIRUS, networking, VoIP and Wireless access. Re-establish east-boundary fibers to Abovenet hand-hole from Lab7 using new trunk cable. Thread fiber from Lab7 to the east security gate, Aspen East, Users Center and Barn for security cameras. Thread fiber from Lab7-5-3 to Lab8. Thread fiber from Lab7-6 to Lab1.



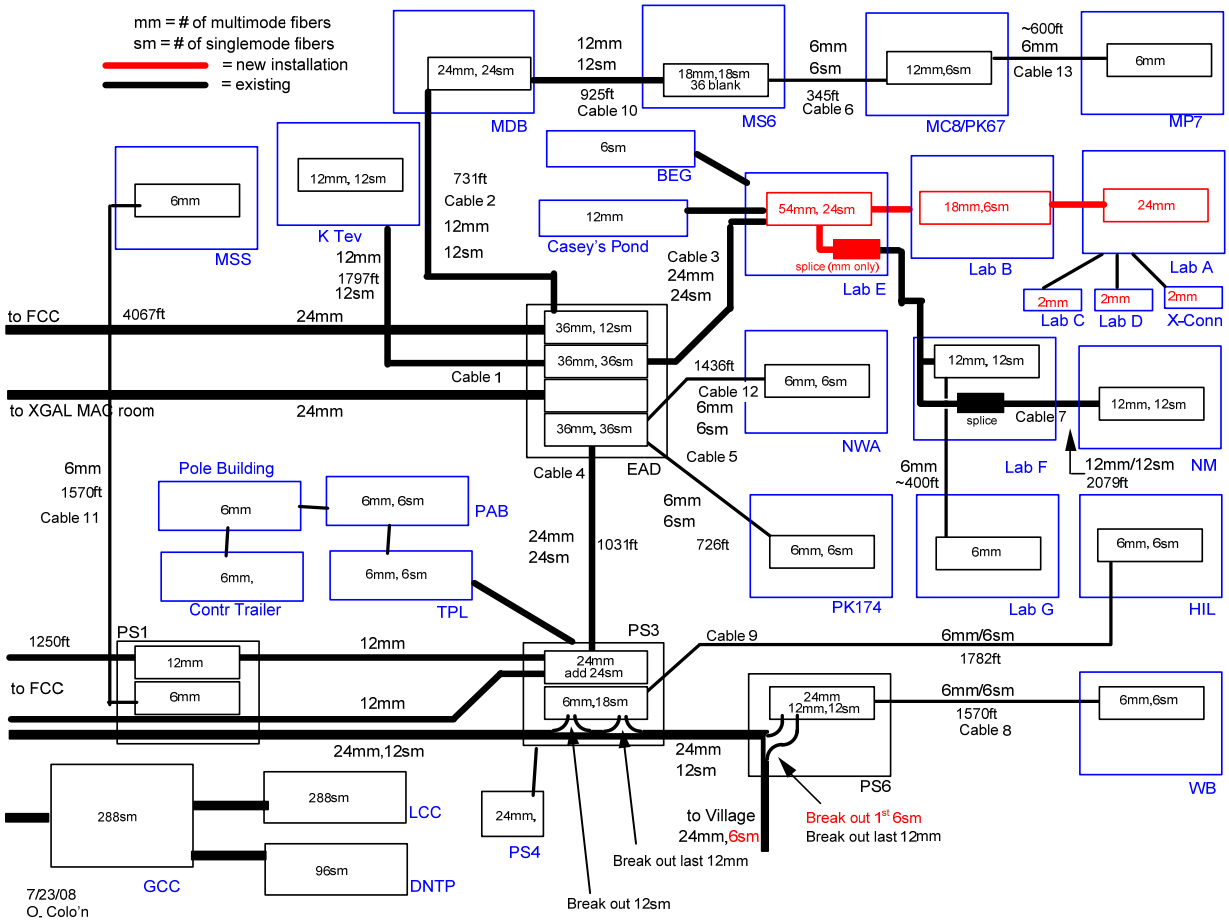
East Security Gate

10. Assist FIRUS and Security with connectivity to Village Telco "hut", Site 52 east Security Gate and south Village complex using GCC-Lab7 pathway. Assist FIRUS with connectivity to rest of site. Assist Security with video connections for security cameras.

11. Establish fiber path leading to redundant capability between FCC, GCC, LCC, & WH. Work with AD using AD fibers from XGAL to LCC for emergency restoration and connections to A2, G2 and SSB to support new experiments. Provide fibers to AD for connections to KTEV and C0. Install additional fiber from Training Center (EAD) to LabA-G to clean up existing convoluted Fixed Target fiber plant.

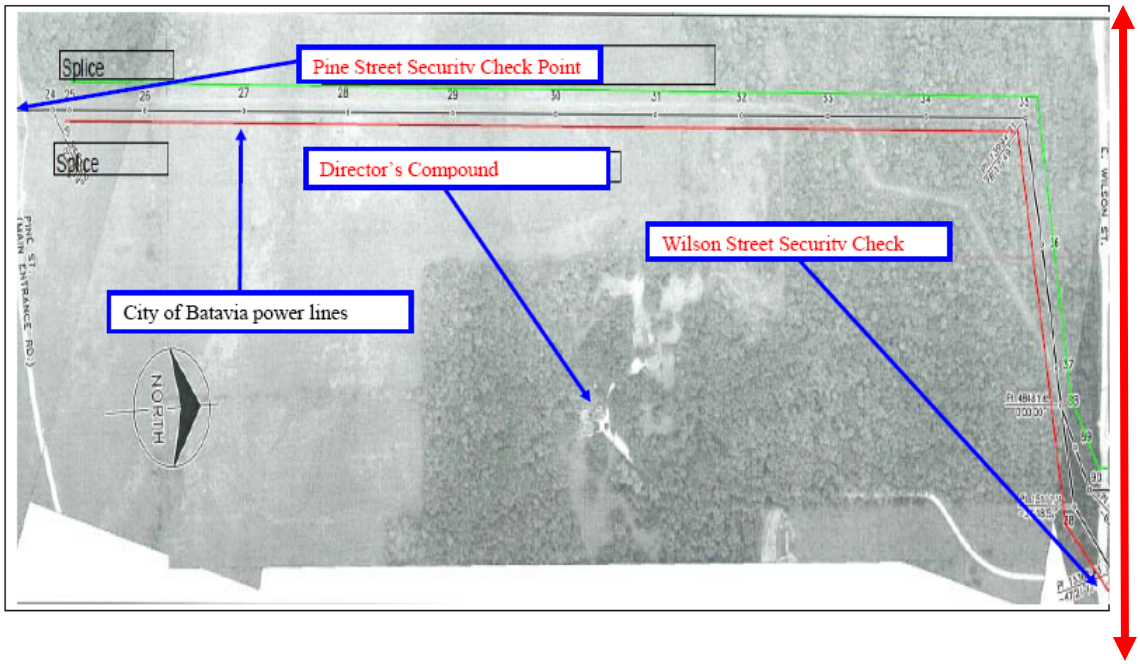


Proposed redundant fiber path will upgrade much of existing Fixed Target fiber plant.

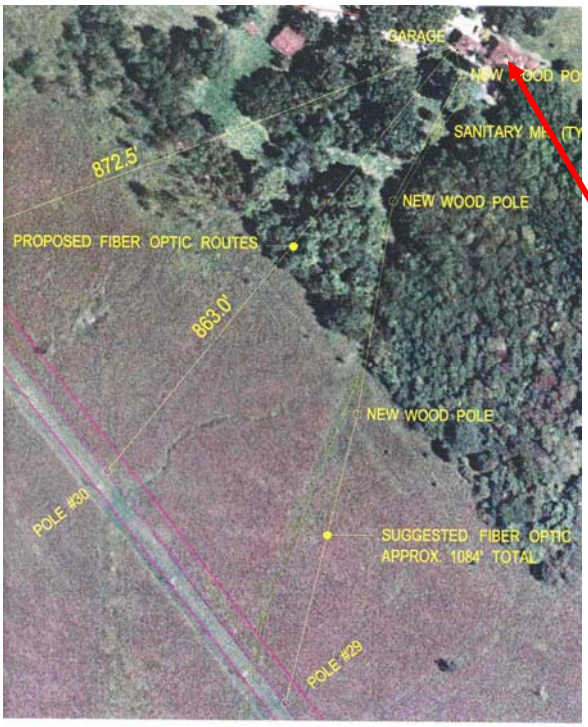


Existing Fixed Target Fiber Plant

12. Establish fiber path along west boundary on City of Batavia power poles for connections to Pine St, Wilson St security gates and Director's site connecting via Giese Rd fiber back to FCC. Leave hand hole at Wilson St for future connection to LCC-GCC via Abovenet-proposed right of way.



Abovenet proposed right of way from Kirk Rd, along Wilson St to Mc Chesney Rd.



Directors Complex - Site 29

13. Work with Argonne/ESNET to insure MAN/WAN installations, troubleshooting and equipment sparing support. Assist NIU with their MAN/WAN links through FNAL. Assist WAN with NWU-Starlight support.
14. Provide incidental video conference room installation and troubleshooting support.
15. Rewire Lab-D with Cat5 and fiber to remove thickwire and hubs.

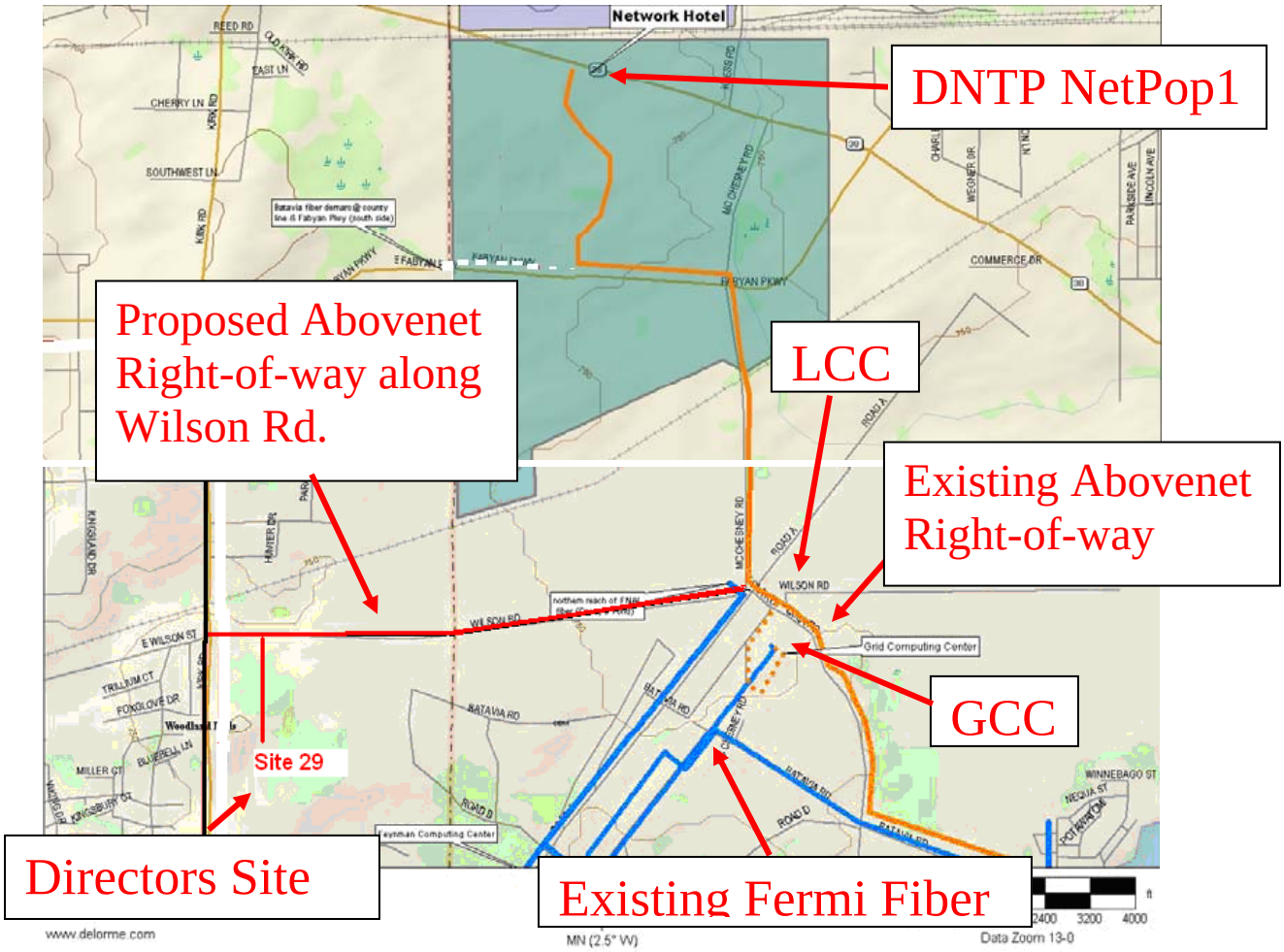
<u>Related</u>

I. Work with the other division computer support groups (AD, TD, D0, CDF) to:

a.) reduce redundant connectivity efforts
b.) provide technical specifications and guidelines for their internally-funded wiring projects
c.) provide labor and material if approved by CD management
d.) create an open working atmosphere of cooperation and resource sharing.

II. Provide wiring recommendations, guidelines and/or assistance to the Laboratory's non-computer facility support groups such as Data Acquisition, Security, FESS, VMS FIRUS, etc.

III. Investigate AboveNet's request for right-of-way from Mc Chesney Rd west to Kirk Rd. Determine if there is an opportunity to connect with proposed fiber to the Site 29 area for Directorate, Pine St & Wilson St security gates and potentially to future experiment service buildings in the Site 29 area connecting back to LCC-GCC.



IV. Investigate establishing fiber connections to City of Batavia and Abovenet at DuPage National Technology Park NetPop1 for alternate MAN/WAN paths west to Argonne. Doing so would free up present fibers at Giese Road for connections to west security gates and Directors site.

Networks/NPI/General Support

- Activity type: Ongoing
- Timescale: Continuous
- Milestones: ------
- Metrics Job installation queue times – target 10 business days (FY08: 200+ logged Installation Requests)
- Repair queue times – target 4 hours (FY08: 100+ via CiscoWorks, 100+ via Helpdesk tickets.)
- JULIE requests – target 1 day (FY08: 70+ logged via Helpdesk.)

Sampling of Network Connections – Oct.- '08

2008 **October**

Req#	M 1	T 2	W 3	T 4	F 5	M 8	T 9	W 10	T 11	F 12	M 15	T 16	W 17	T 18	F 19	M 22	T 23	W 24	T 25	F 26
65840		10																		
65847																				
65861																				
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65979																				
65994														1						
65989																				
65999														1						
66003																8				
66004																8				
66015																	1			
66016																				

FCC UTP
JULIEs
WH-FTTD
CDF-FTTD
FCC-GCC 10G
GCC UTP
WH-UTP

Networks/NPI/GCC NR-A to NR-B

- Activity type: New
- Timescale: Start Q2, ’09; Complete: Q2 ‘09
- Milestones: FESS has mapped conduit pathway.
- Metrics Ordered cable.

Networks/NPI/GCC CR-C to NR-B

- Activity type: New
- Timescale: Start: Dec, ’08; Complete: Jan, ‘09
- Milestones: Reviewing occupant requirements.
- Metrics ----------

Networks/NPI/FCC3 Computer Room

- Activity type: New
- Timescale: Q1 ‘09
- Milestones: FESS drawings reviewed for power and pathways. All good for networking.
- Metrics ----------
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Networks/NPI/FCC2 Computer Room

- Activity type: Ongoing
- Timescale: Continuous
- Milestones: Over-head “Air-Zones” installation has begun. CMS connections first to go live. Using 50u Laser Optimized fiber and Cat6. KVM moved to Air-Zones and structured wiring.
- Metrics Building Air-Zones over Fiber Channel areas preparing to patch to Brocade switches. Also patching over BluArc racks for 10GE.

Networks/NPI/FCC-GCC-LCC-XGal-WH redundancy fiber cable

- Activity type: New
- Timescale: Start: 2th quarter, ’09; Complete: 3rd quarter, ‘09
- Milestones: LBeverly contracted to find best pathway and assist with supervising installation. Leon has begun surveying.
- Metrics Met with DFeatherston and reviewed AD fiber pull from NML to XGAL. May need pumps and Roads & Grounds assistance.

Networks/NPI/GCC to Village Lab7 fiber

- Activity type: New
- Timescale: Start: Q1 ’09 Complete: Q2, ‘09
- Milestones: Met with FESS and determined best pathway.
- Metrics FESS working out details. Security & FIRUS included.

Networks/NPI/Giese Rd to PineSt-Director-WilsonSt fiber

- Activity type: New
- Timescale: Start: Q2 ’09 Complete: Q2, ‘09
- Milestones: Sent request to City of Batavia for permission to run cable on their power poles.
- Metrics Ordered cable.

Networks/NPI/WH4 & WH5 BSS Upgrade

- Activity type: New
- Timescale: Start: Q2, ’09; Complete: Q2: ‘09
- Milestones: BSS has agreed to reuse their old racks. Have begun re-terminating old BSS Cat5 wires and deploying VoIP.
- Metrics Need to finalize proposed utility room for network and PC racks. Also need to establish new cable pathways in ceiling.

Networks/NPI/Site Wide wireless upgrade & VoIP pilot

- Activity type: Ongoing
- Timescale: Continuous
- Milestones: 802.11n deployed at Site 38 Warehouse I & II
- Metrics Expect most locations to be 802.11n compliant by Sept. ‘09 Expect to install all VoIP phones for pilot projects by Sept. ’09..

Networks/NPI/Lab D

- Activity type: Remove existing thickwire. Upgrade to structured wiring.
- Timescale: Start: Jun, ’09; Complete: Jul, ‘09
- Milestones: Surveyed.
- Metrics -------

Staffing: In FY09 we utilized outside contractor service at a level of 3.0 FTE for installation & technician types of tasks, up from 1.5 FTE in FY08 due to increased expectations of non-network systems and expanded infrastructure projects. Fermi staff required for design/planning/supervision is 1.5 FTE.

Resource Summary: Details are found in the activities entered in the budget request.

M&S

Item	Comment	Dept	Sub-Activity	Amount	Eq/Op
Network contractor '09	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/Core	$400K	Op
Misc. Procard	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/Core	$75K	Op
Fiber restoration contract service	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/Core	$10K	Op
FCC-GCC-LCC-XGal-WH redundancy fiber cables	Q2 '09	CNCS	Site Networking /Physical Infrastructure/Core	$100K	Op
GCC-Village fiber cable	Q2 '09	CNCS	Site Networking /Physical Infrastructure/Core	$150K	Op
GCC CR-C to NR-B fiber duct	Q1 '09	CNCS	Site Networking /Physical Infrastructure/GCC	$15K	Op
GCC NR-A to NR-B multimode fiber trunk cable	Q4 '08	CNCS	Site Networking /Physical Infrastructure/GCC	$5K	Op
FCC2CR fiber duct, fiber, & Cat6 wiring	Q2 '09	CNCS	Site Networking /Physical Infrastructure/FCC	$25K	Op
New FCC3CR Cat6 wiring	Q1 '09?	CNCS	Site Networking /Physical Infrastructure/FCC	$75K	Op
FCC1CR & new office area	Q1 '09?	CNCS	Site Networking /Physical Infrastructure/FCC	$5K	Op
WH4&5 BSS MTTU	Q2 '09	CNCS	Site Networking /Physical Infrastructure/WH	$50K	Op
Lab D rewire for shared media removal	Q2 '09	CNCS	Site Networking /Physical Infrastructure/Lab D	$10K	Op
BSS Site 37, 38, 39	Q2 '09	CNCS	Site Networking /Physical	$10K	Op

			Infrastructure/WH		
Wireless 802.11n site wide and VoIP pilot	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/WH	$10K	Op
Wilson Hall FTTD additions/modifications	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/WH	$10K	Op
CDF Hall	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/CDF	$10K	Op
D0 Assembly Hall	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/D0	$10K	Op
Fixed Target (Meson, Neutrino & Proton buildings)	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/PPD	$50K	Op
TD (ICB, IB1-4, Village & WH machine shops)	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/TD	$10K	Op
VMS, Conf., Etc.	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/BSS	$10K	Op
LSS Ed Center	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/LSS	$10K	Op
FESS	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/FESS	$10K	Op
ES&H	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/ESH	$10K	Op
MAN/WAN Support	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/Core	$10K	Op
Directorate Site 29	Need Throughout Year	CNCS	Site Networking /Physical Infrastructure/Director	$10K	Op
West-Boundary fiber to Security Gates, Directorate Site 29	Q3	CNCS	Site Networking /Physical Infrastructure/Director	$70K	Op