FCC Org Chart
System Design

**NEON System Design**

**DAQ – Data Acquisition**
- AOP
- FI
- FSU
- AQU

**IDP – Integrated Data Processing**
- DRR
- DPM
- DSS
- OSS

**OLS – Operations, Logistics and Supportability**
- NI
- NMC
- Technical Facilities
- Support Facilities

**SDPM – Science and Data Products Management**
- CAL/VAL
- Data Products

**EI – Education and Interface**
- Web Portal
- Education and Outreach

Nov 2009 3NEON FDR
Subsystem Documents

- NEON.DSDV.FCC.001000.PLA _ FCC Acquisition Plan
- NEON.DSDV.FCC.001002.PLA.C _ FCC Management Plan
- NEON.DSDV.FCC.001005.PLA.B _ FCC Construction Requirements
- NEON.DSDV.FCC.001006.PLA.B_FCC Construction Plan and Procedures

- NEON.DSDV.FCC.001026.DSN.A_D01 FINAL REV 20090407
- NEON.DSDV.FCC.001027.DSN.A_D02 FINAL REV 20090409
- NEON.DSDV.FCC.001028.DSN.B _ D03 FINAL_20090414

- NEON.DSDV.FCC.001042.DSN.A _ D18 FINAL 20090413
- NEON.DSDV.FCC.001043.DSN.A _ D19 FINAL 20090409
- NEON.DSDV.FCC.001044.DSN.A _ D20 FINAL 20090324
Domain Facilities [x 20]

- Access
- Boardwalks and Paths
- Auxiliary Portal
- Power Supply/Power Generation
- Towers: 1 Core, 2 Relocatables (typ.)
- Instrument Hut: 1 per Tower (typ.)
- Soil Arrays: 5 per Tower (typ.)
- Power & Signal Distribution
- Fencing and Security
- Aquatic Array/STREON
- Domain Lab, Office, Classroom (LOC)
- Portal Container Sets (PCS)
Tower Site Schematic Layout
NOTES:
1. THE ELECTROLUX AND INTEGRITY/COMMUNICATION SERVICES FROM THE AUXILIARY PORTAL TO THE INSTRUMENT HUT WILL BE WITHIN THE SAME TRENCH TO THE EXTENT POSSIBLE.
D10 Core Site Map and Survey

SURVEY NOTES
2. SITE BENCHMARK TOP OF SET # 822 WITH ORANGE PLASTIC CAP AS SHOWN
3. THIS TOPOGRAPHIC SURVEY IS NOT AN "IMPROVEMENT SURVEY PLAT OR TAX SURVEY PLAT" NO BOUNDARY DEMARCATIONS HAVE BEEN MADE OR TITLE SEARCHES PERFORMED
4. THE LOCATION OF THE ABOVE-GROUND UTILITIES SHOWN HEREIN ARE BASED ON THE FIELD SURVEY BY SCOTT, COX & ASSOCIATES, INC. THE LOCATIONS OF THE UNDERGROUND UTILITIES SHOWN HEREIN ARE BASED ON LAND SURVEY AND INFORMATION PROVIDED BY OTHERS (WHICH MAY INCLUDE THE UTILITY OWNER OR UTILITY LOCATION SERVICES) SCOTT, COX & ASSOCIATES, INC. DO NOT REPRESENT THE LOCATION OF THE UNDERGROUND UTILITIES OWNED OR OPERATED BY OTHERS SCOTT, COX & ASSOCIATES, INC. RECOMMEND THAT THE LOCATION OF THE UTILITIES BE FIELD CHECKED PRIOR TO ANY DIGGER ON OR ADJACENT TO THE SUBJECT PROPERTY
5. THIS DRAWING IS BASED ON A FIELD SURVEY COMPLETED ON 08/06/09
6. NOTICE: ACCORDING TO COLORADO LAW, YOU MUST COMPLY WITH ANY LOCAL ACTION BASED ON ANY OBJECT IN THIS SURVEY WITHIN THREE (3) YEARS OF THE DATE OF COMPLETION OF THIS SURVEY
7. BASIS OF COORDINATES: BASED ON NAD 95, 3RD PLATE, COLORADO NORTH (SRF) CO emitted, 3RD PLATE (CO) NA0845077 WITH A PUBLISHED COMBINED FACTOR OF COMBINED WORKING COORDINATE ARE MODIFIED (ADJUSTED TO GROUND) WORK CO emitted USING THE COMBINED FACTOR. HORIZONTAL AND VERTICAL POSITIONS WERE ESTABLISHED ON THE SURVEY FROM THE NAD 95 POINT USING SPS METHODS
8. USER ROUND MAP REFERENCES: DRAG RUPPT SH AND 1910
9. CRESTED RIVER- CONSENT FOR FILE INSURANCE- ORDER NUMBER #2100- EFFECTIVE DATE: JUNE 29, 2023, AT 7:30 AM. MINIMUM IN THE PREPARATION OF THIS SURVEY. 9-2, EXCEPTIONS AFFECT THE PROPERTY BUT ARE UNLOCATED OR BLANKET IN NATURE.
D10 Core Site Plan

NOTES:

1. THE ELECTRICAL AND COMMUNICATION SERVICES ARE PUBLIC UP TO THE METER PEDESTAL. FROM THE METER PEDESTAL TO THE INSTRUMENT HUT AND BEYOND THE SERVICES ARE PRIVATE. ALL ELECTRIC AND COMMUNICATION SERVICE/CONDUITS SHALL BE SEPARATED BY 1 FOOT HORIZONTALLY AND VERTICALLY.

2. SEE SHEET 10C1.24 FOR PROFILE OF IMPROVED/CLEARED PATH.
D10 Core Site Layout
D10 Instrument Hut Detail

Legend:

(A) Double Door, 4’0” x 7’0”, insulated
(B) Disconnect – 200 amp
(C) Disconnect – 100 amp
(D) HVAC – 2 ton cooling
(E) GFI receptacle
(F) Ground bar 12”x4"x1/4” – exterior to ship loose
(G) Front entry port
(H) 12” cable runway 8”-0” A/F
(I) Load Center – 200 amp service
(J) Steel building skid
(K) Exhaust fan
(L) 1-1/2” EB
(M) Fluorescent Light
(N) Techo board – 2'-0” x 4'-0”
(O) DOUBLE DOOR, 4'-0” x 7'-0”, INSULATED
(P) EXTERIOR LIGHT - PHOTOCCEL

- QUADPLEX WALL RECEPTACLES
- DUPLEX WALL RECEPTACLES
- LIGHT SWITCH
- 4 X 4 BOX

16’ X 15’ ENVIRONMENT BUILDING
Instrument Hut Example
TMTB Tower
Structural Analysis Report

PIF Project No.: 41704-0050
Structure: 181.5 ft Guyed Tower

Prepared for:
neon
5340 Airport Boulevard
Boulder, CO 80301

October 9, 2009

Analysis by:
Kevin P. Bauman, P.E.
Tower Department Manager
kbauman@pfiweb.com

Tower Structural Analysis Report
Tower Face Details
Tower Installation Procedure Graphic
D10 Tower Lightning Protection

**INSTRUMENT TOWER PLAN**

**INSTRUMENT TOWER ELEVATION**

**KEYED NOTES:**

1. BOND TO TOWER LEG AND CONNECT TO COUNTERPOISE WITH BARE 
   #4/0 COPPER CONDUCTORS AS SHOWN.
2. ROUTE FUTUR CONDUCTOR TO TOP EQUIPOTENTIAL LOOP DOWN TOWER 
   LEG AND CONNECT TO COUNTERPOISE AS SHOWN.
3. PROVIDE AIR TERMINAL AT EACH CORNER OF TOWER AS SHOWN.
4. PROVIDE EQUIPOTENTIAL LOOP AT TOP OF TOWER TO INTERCONNECT ALL 
   FOUR AIR TERMINALS.
5. PROVIDE #4/0 BARE CONDUCTOR AROUND TOWER AS SHOWN TO FORM 
   COUNTERPOISE. MAKE ALL CONNECTIONS WITH EXOTHERMIC WELDS.
6. PROVIDE 1/2" BY 10' COPPER GROUND RODS WHERE SHOWN. CONNECT TO 
   COUNTERPOISE.
PDR Comments & Responses

- Prior to FDR, NEON, Inc. critical personnel should visit, identify and catalogue site challenges for all 20 Domains and incorporate into final design.  
  Done/Ongoing.

- Prior to FDR, NEON, Inc. should refine their Risk Register to include probability of occurrence as a factor in contingency calculations. The project should also take into account the findings of the ground construction assessments recommended above.  
  Done.

- Remain vigilant for construction difficulties that could occur at more difficult and complex sites.  
  Continual.

- The panel recommends that site-by-site antenna grounding plans are reviewed by an independent consulting company and that the recommendations and final design are available at FDR.  
  Done.

- Prior to FDR, establish a process to include local expertise and domain managers at an appropriately early time.  
  Done.
## 2.01 Facilities - WBS

<table>
<thead>
<tr>
<th>WBS</th>
<th>Title</th>
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<tbody>
<tr>
<td>2</td>
<td>NEON Ecological Observatory Network</td>
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<tr>
<td>2.01</td>
<td>Facilities Management</td>
</tr>
<tr>
<td>2.01.10</td>
<td>Domain Facility Infrastructure</td>
</tr>
<tr>
<td>2.01.30</td>
<td>Northeast Domain Infrastructure</td>
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<td>2.01.30.01</td>
<td>Mid Atlantic Domain Infrastructure</td>
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<td>Southeast Domain Infrastructure</td>
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<td>Atlantic Neotropical Domain Infrastructure</td>
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<td>Great Lakes Domain</td>
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<td>2.01.30.05</td>
<td>Prairie Peninsula Domain Infrastructure</td>
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<td>2.01.30.06</td>
<td>Appalachians/Cumberland Plateau Domain Domain</td>
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<td>2.01.30.07</td>
<td>Ozarks Complex Domain Infrastructure</td>
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<td>2.01.30.08</td>
<td>Northern Plains Domain Infrastructure</td>
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<td>2.01.30.09</td>
<td>Central Plains Domain Infrastructure</td>
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<tr>
<td>2.01.30.10</td>
<td>Southern Plains Domain Infrastructure</td>
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<td>2.01.30.11</td>
<td>Northern Rockies Domain Infrastructure</td>
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<td>2.01.30.12</td>
<td>Southern Rockies/Colorado Plateau Domain Infrastructure</td>
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<td>Desert Southwest Domain Infrastructure</td>
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<td>Pacific Northwest Domain Infrastructure</td>
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<td>Tundra Domain Infrastructure</td>
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<td>2.01.30.18</td>
<td>Taiga Domain Infrastructure</td>
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<td>Pacific Tropical Domain Infrastructure</td>
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<td>2.01.30.20</td>
<td>Pacific Tropical Domain Infrastructure</td>
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2.01 Facilities - FTE Spread by FY

2.01 Facilities FTE Summary

<table>
<thead>
<tr>
<th>Year</th>
<th>FTEs</th>
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<tbody>
<tr>
<td>FY11</td>
<td>8</td>
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<tr>
<td>FY12</td>
<td>8</td>
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<tr>
<td>FY13</td>
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<tr>
<td>FY14</td>
<td>8</td>
</tr>
<tr>
<td>FY15</td>
<td>0</td>
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</table>

FTE Grand Total: 32
FCC PT Risk Summary

Total Number of Risks: 11
Total Occurrence Cost of Risks: $6,960,000
## FCC PT Risk Register

<table>
<thead>
<tr>
<th>Risk ID</th>
<th>Risk Title</th>
<th>Description</th>
<th>RRS</th>
<th>Risk Exposure</th>
<th>Occurrence Cost</th>
<th>Program Area</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Host Agreement Delays (MOU, MOA, etc.)</td>
<td>Every NEON site requires an agreement with the host agency, institution, or landowner in order for the construction to proceed. If the agreements are not in place, construction cannot begin. Cost: $100k. Reason: Cost is impacted by construction cost inflation, schedule delays, etc. Add 3% to average domain cost. Apply to 5 domains (25%).</td>
<td>2</td>
<td>Medium</td>
<td>$500,000</td>
<td>FCC</td>
<td>Monitor</td>
</tr>
<tr>
<td>95</td>
<td>Contract Price Increase Requests by Contractors</td>
<td>Most construction materials and commodities will be purchased by contractors under their construction contracts w/ NEON. If these materials become scarce or rise inordinately in price, contractors may request price increases. Cost Estimate: 572k. Reason: Increased cost would be a small percentage addition to material costs. Assume 6% of 40% (material) of average domain cost. Applies to 25% of domains.</td>
<td>1.5</td>
<td>Medium</td>
<td>$360,000</td>
<td>FCC</td>
<td>Monitor</td>
</tr>
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<td>103</td>
<td>Logistics Issues</td>
<td>Some NEON sites are remote and inaccessible by normal material delivery means. Cost: $150k. Reason: Remoteness factor is considered in the engineering cost estimates; however, if they prove insufficient, an additional 5% is considered as sufficient mitigation cost per domain. Apply to half of Medium and Hard sites = 9D x 3 S/D x 0.5 = 13.</td>
<td>1</td>
<td>Medium</td>
<td>$1,950,000</td>
<td>FCC</td>
<td>Monitor</td>
</tr>
<tr>
<td>104</td>
<td>Procurement Delays</td>
<td>Procurement process not accomplished timely. Cost: $100k. Reason: Procurement delay costs are driven by price increase over time, inflation, and project schedule loss. Assume 3% to 5% of average domain cost. Apply to 3 contracts.</td>
<td>1</td>
<td>Medium</td>
<td>$300,000</td>
<td>FCC</td>
<td>Monitor</td>
</tr>
<tr>
<td>96</td>
<td>Construction Flaws</td>
<td>The contractor does not successfully or faithfully execute the approved design during construction. Cost: $150k. Reason: R/R of flawed construction generally will be the responsibility of the contractor under the warranty. Associated costs will be more in terms of schedule loss. Assume 5% of average domain cost. Applies to 25% of domains.</td>
<td>0.9</td>
<td>Medium</td>
<td>$750,000</td>
<td>FCC</td>
<td>Monitor</td>
</tr>
<tr>
<td>97</td>
<td>Contractor Bid Pricing</td>
<td>Construction of the NEON Domain sites will be by contractors procured under a competitive bid process. Bid pricing will be a function of quality of the bid documents, contractor schedule availability, hunger, perception of the NEON project, and perception of NEON as a client, etc. Applies to 1 contract. Cost: $200k to $300k. Reason: Average domain cost is ~$3M. If bids come in 7% - 10% high, cost effect is ~$250,000.</td>
<td>0.9</td>
<td>Medium</td>
<td>$250,000</td>
<td>FCC</td>
<td>Monitor</td>
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<td>101</td>
<td>Site Use Costs</td>
<td>As a result of MOU/MOA negotiations, NEON may have to share site construction improvement and/or maintenance costs with host organizations (cf.: NEON-100). Maintenance is an Operations budget cost; however, site improvements may be an unbudgeted construction cost. Cost: $100k Reason: Difficult to estimate, since tied to specific sites and host requirements. Assume 5% of domain construction cost. Apply to 20% of sites (12 sites).</td>
<td>0.9</td>
<td>Medium</td>
<td>$1,200,000</td>
<td>FCC</td>
<td>Monitor</td>
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<tr>
<td>102</td>
<td>High Inflation</td>
<td>Economic factors influence construction costs, both material and labor. Normal inflation levels are generally anticipated in construction bids; however, inordinately high inflation may lead to higher prices. Cost: $60k Reason: Assume inflation at 5% will add 2% to 2.5% to total domain construction cost. Applies to 50% of domains.</td>
<td>0.9</td>
<td>Medium</td>
<td>$500,000</td>
<td>FCC</td>
<td>Monitor</td>
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<td>98</td>
<td>Contractor Default</td>
<td>Contractor fails and is unable to complete the construction. Cost: $100k to $150k Reason: Cost of non-performance will be covered by performance bond. Cost to project will be in lost time and some peripheral expenses (travel, meetings, etc.). Assume 3% additional cost. Applies to 20% of total no of contracts (D10, D01, D15. Regional contracts = total of 10) or 2 contracts.</td>
<td>0.6</td>
<td>Low</td>
<td>$250,000</td>
<td>FCC</td>
<td>Monitor</td>
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<tr>
<td>94</td>
<td>Weather Delays</td>
<td>Weather delays at various sites cause construction delays. Cost Estimate: $50k Reason: Weather delays generally are priced into a contractor's bid. Hence, if a weather delay is incurred, there should be low cost impact. Assume 1 week delay (1/20th schedule delay equiv to ~5% of site cost). Domains judged most likely to experience weather delays: 1,5,9,12,13,15,16,17,18,19.</td>
<td>0.5</td>
<td>Low</td>
<td>$500,000</td>
<td>FCC</td>
<td>Monitor</td>
</tr>
<tr>
<td>99</td>
<td>Contractor Protests</td>
<td>Contractor believes he has been treated unfairly, unethically, or illegally. Cost: $300k Reason: Nuisance settlement costs, arbitration costs, legal costs, cost of judgment, lost time, etc. Assume 10% of average domain cost. Apply to 1 contract.</td>
<td>0.5</td>
<td>Low</td>
<td>$300,000</td>
<td>FCC</td>
<td>Monitor</td>
</tr>
</tbody>
</table>
FCC Operations

Responsibility for:
- Relocating the Relocatables
- Special Maintenance/Repair Callouts
- Headquarter Facilities Maintenance Support (if needed)
Operations Staffing

• FCC Operations
  – Civil Engineer
  – Field Construction Supervisors (x2)

• Contract Administration → P&C (Overhead)
Future Work
(Present to Construction Start)

• Continue Domain / Site Designs
  – Confer on Site Characterizations and Final Site Configuration
  – Visit Sites w/ Design Firm
    • Ground Survey
    • Geotechnical Borings
    • Electrical Utility Provider
    • Jurisdictional Construction Permitting
  – Manage Final Design Development
• Manage Tower Contractor
• Participate in GC Bid Document Preparation
• Participate in GC Selection
• Coordinate Contractor Pre-Construction Activities
The National Ecological Observatory Network is a project sponsored by the National Science Foundation and managed under cooperative agreement by NEON Inc.