

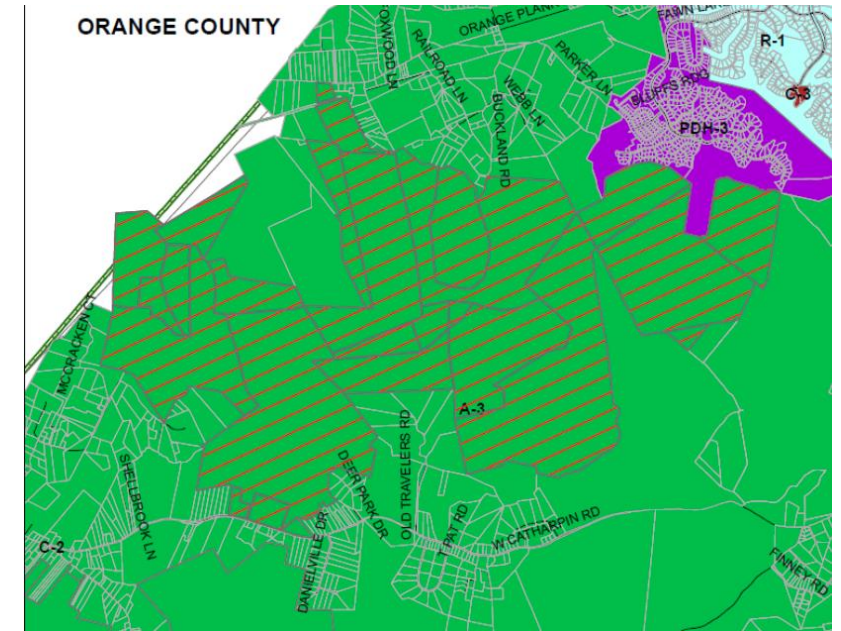
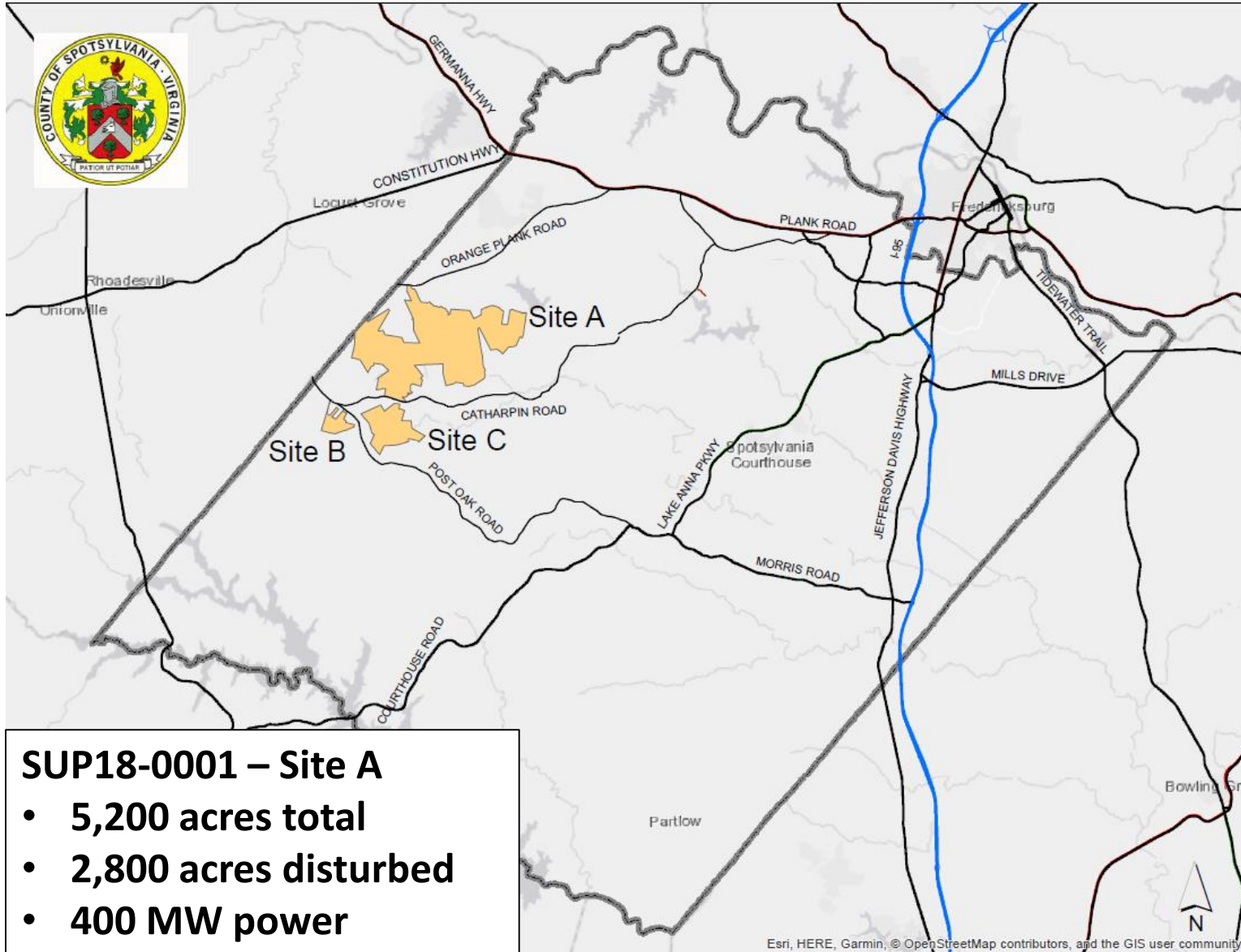


sPower Solar Energy Facility Special Use Application SUP18-0001

Spotsylvania County Board of Supervisors

February 26, 2019

Special Use Permit Application



All properties are zoned A-3.
Properties have a future land use designation of Rural Residential or Agricultural and Forestal Land Use per the Comprehensive Plan.

Recommendations

- Planning Commission public hearing 12/5/18. Discussion 1/2/19 and 1/16/19.
 - Recommend denial, 5-2 vote
 - Provided recommended conditions for Board consideration
- Staff recommends approval with conditions.

PV - Generally

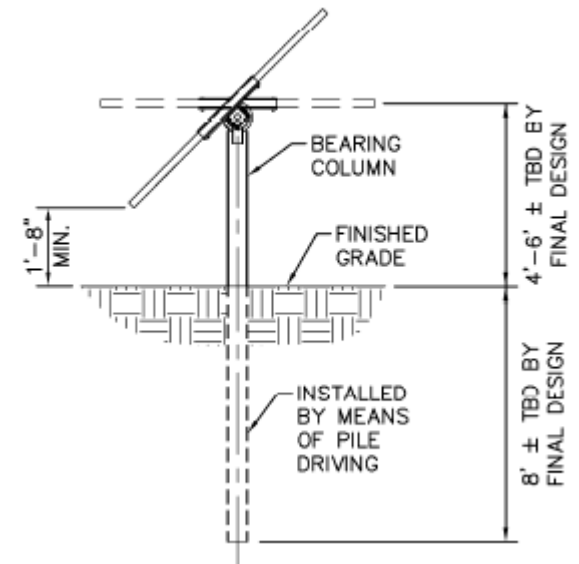
Photovoltaic panels are pre-assembled collections of integrated photovoltaic cells. They are produced from a number of manufacturers which use different materials.

The applicant has identified that they plan to use two panel manufacturers: Jinko panels and FirstSolar Series 6.

Panels are strung together into strings which are racked into rows.

Rows are equipped with hardware allowing them to automatically rotate in order to maximize sun exposure.

Rows are supported by steel pilings which are driven into the ground.



PV - Generally

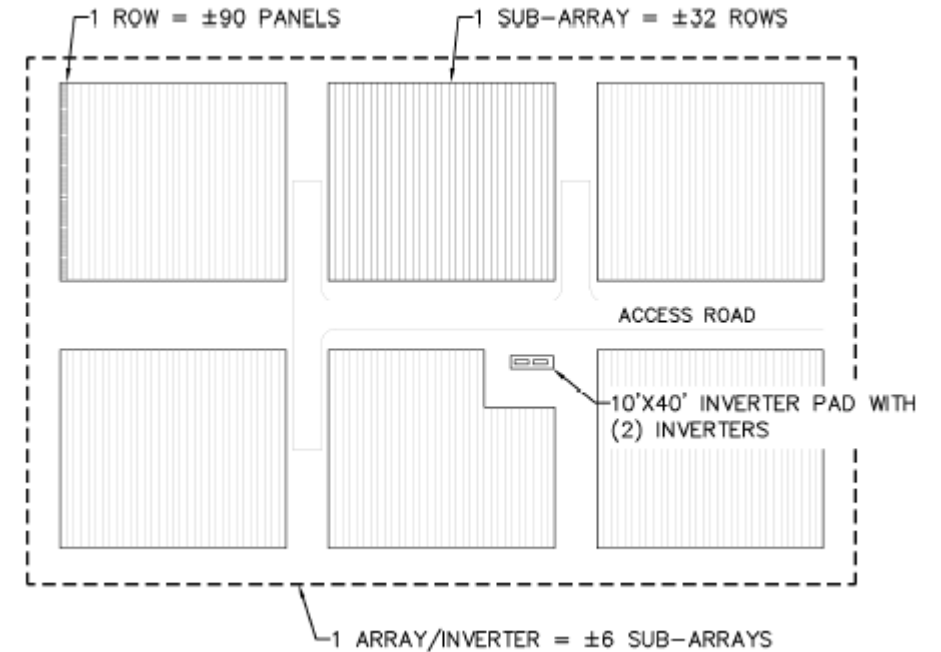
The applicant's GDP depicts a Array, which consists of 6 Sub-Arrays.

Each Sub-Array is a collection of 32+- rows.

Each Row is a collection of 90 PV panels.

These feed two inverters which collect the energy (in DC form) and convert it to AC power.

This electricity is then transferred via underground conduit to an sPower substation, proposed near the existing Dominion substation, which increases the voltage, measures it, and transfers it for connection to the power grid via the Dominion substation.



The GDP - Generally

These inverters can easily be identified on the GDP as small black rectangles which sit slightly apart from panel rows or blocks. Their locations may change through final site design.

They are proposed to be setback a minimum of 400 feet because they produce a small electronic hum and they are often accompanied by small generators.



The GDP - Generally

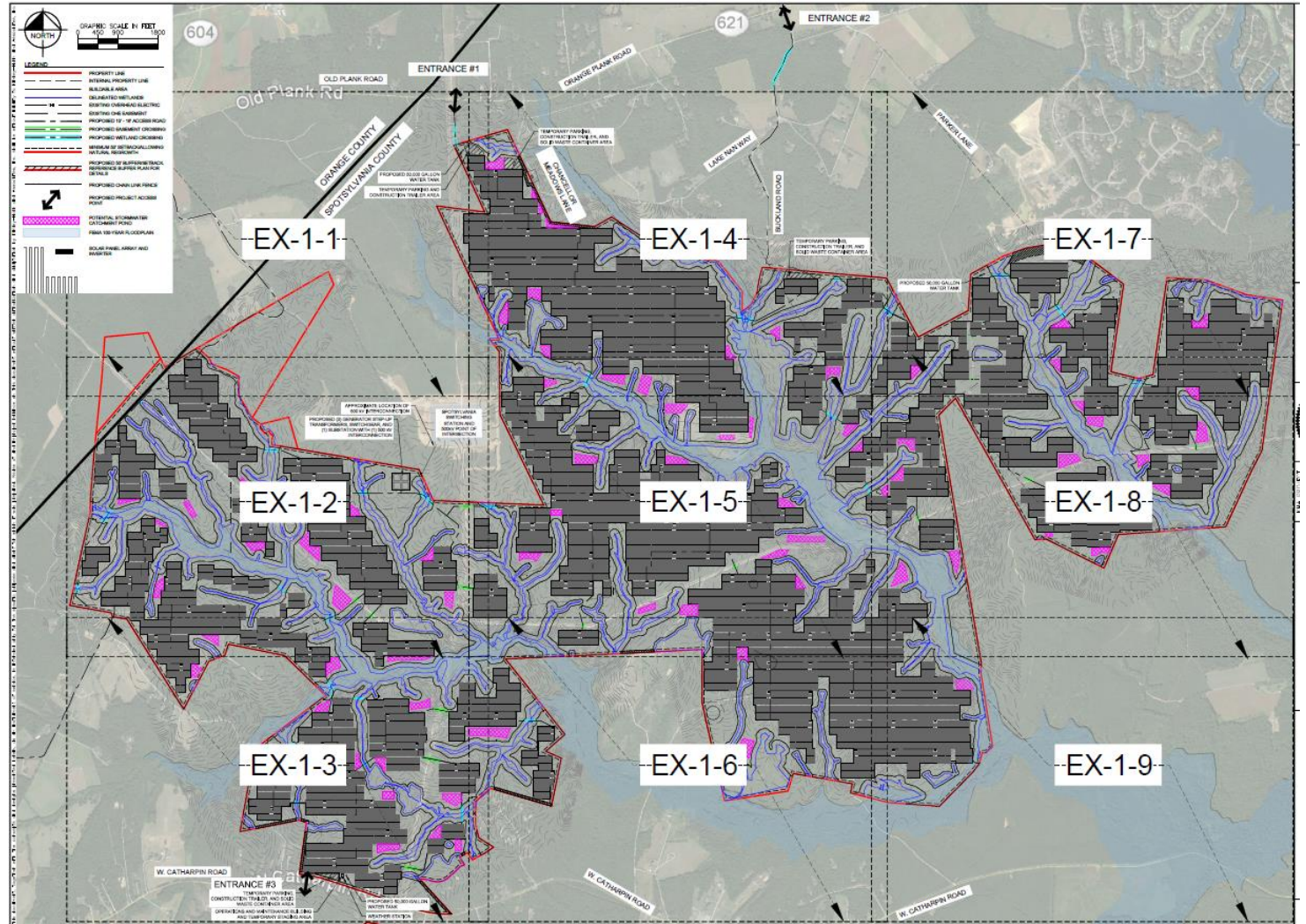
The GDP depicts the general plan of the proposal.

It is not a final design.

If the Special Use is approved, detailed site engineering is submitted to the County for Site Plan Review

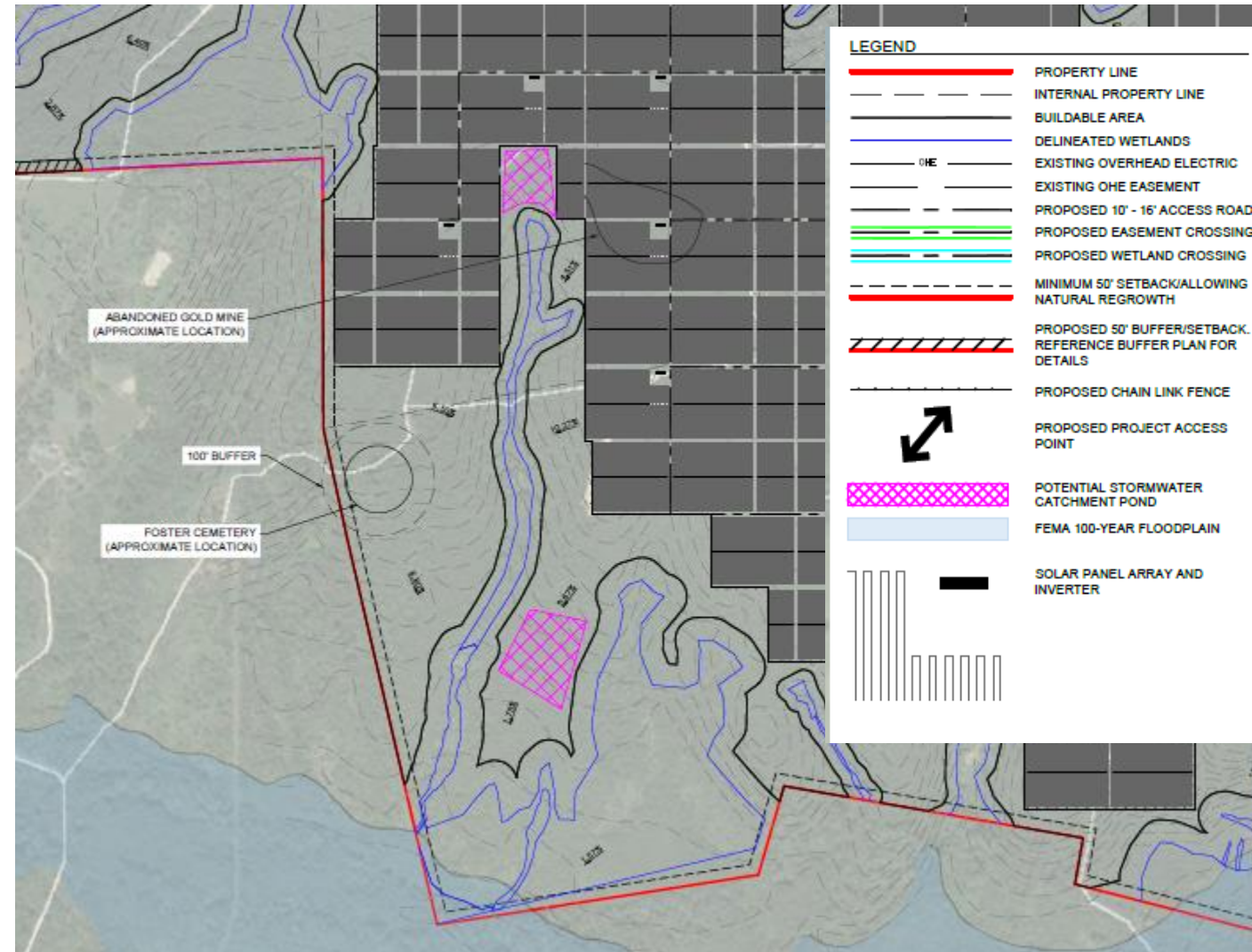
The Site Plan Review process verifies compliance with County codes, laws, and any conditions of the SUP.

The Building Permit Review process would verify compliance with building and electrical codes.

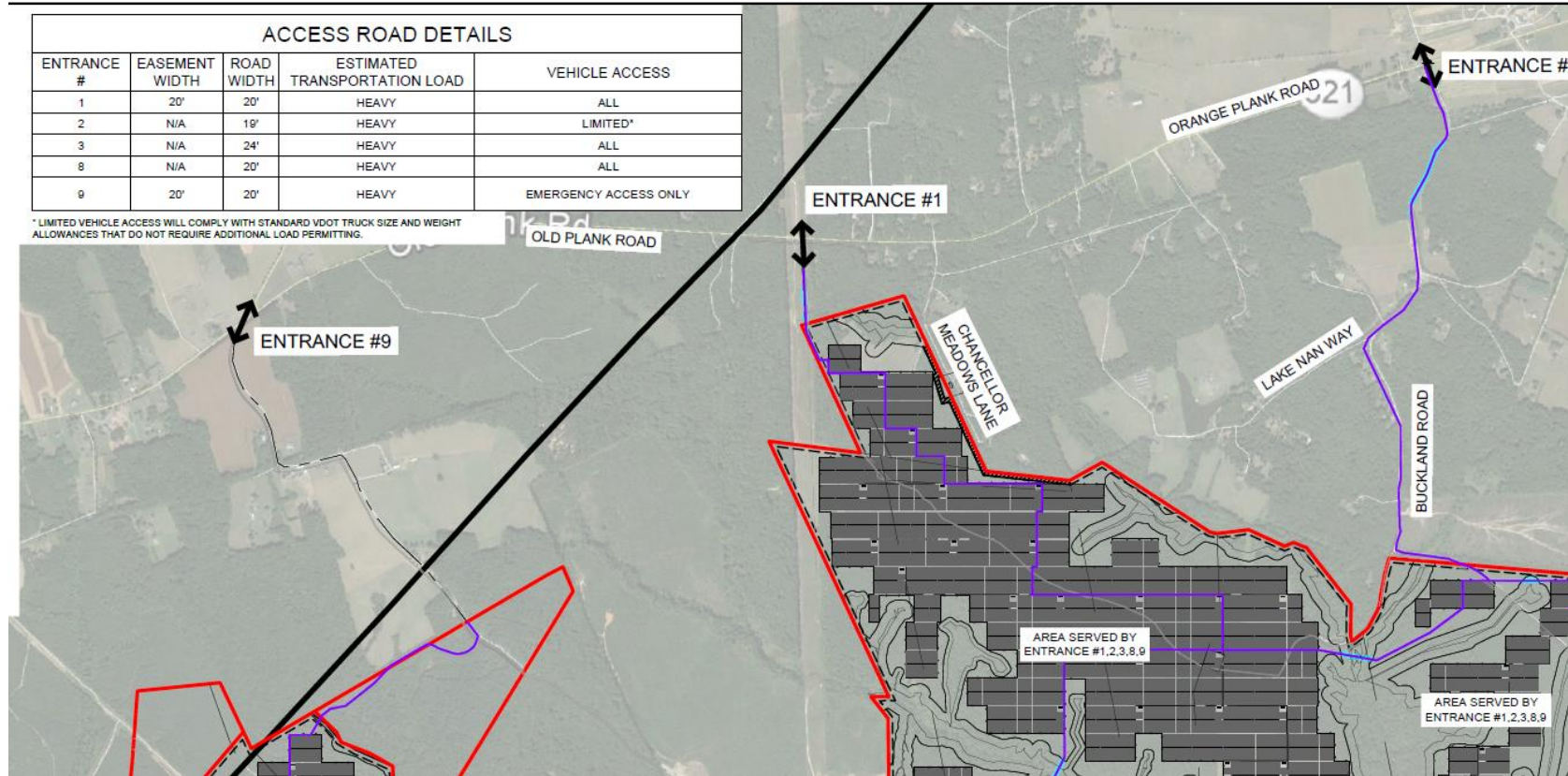


The GDP - Generally

The GDP is also used to depict access points, setbacks, buffers, resource protection areas (RPA's), Stormwater collection features, and designates other significant points of interest.



Access

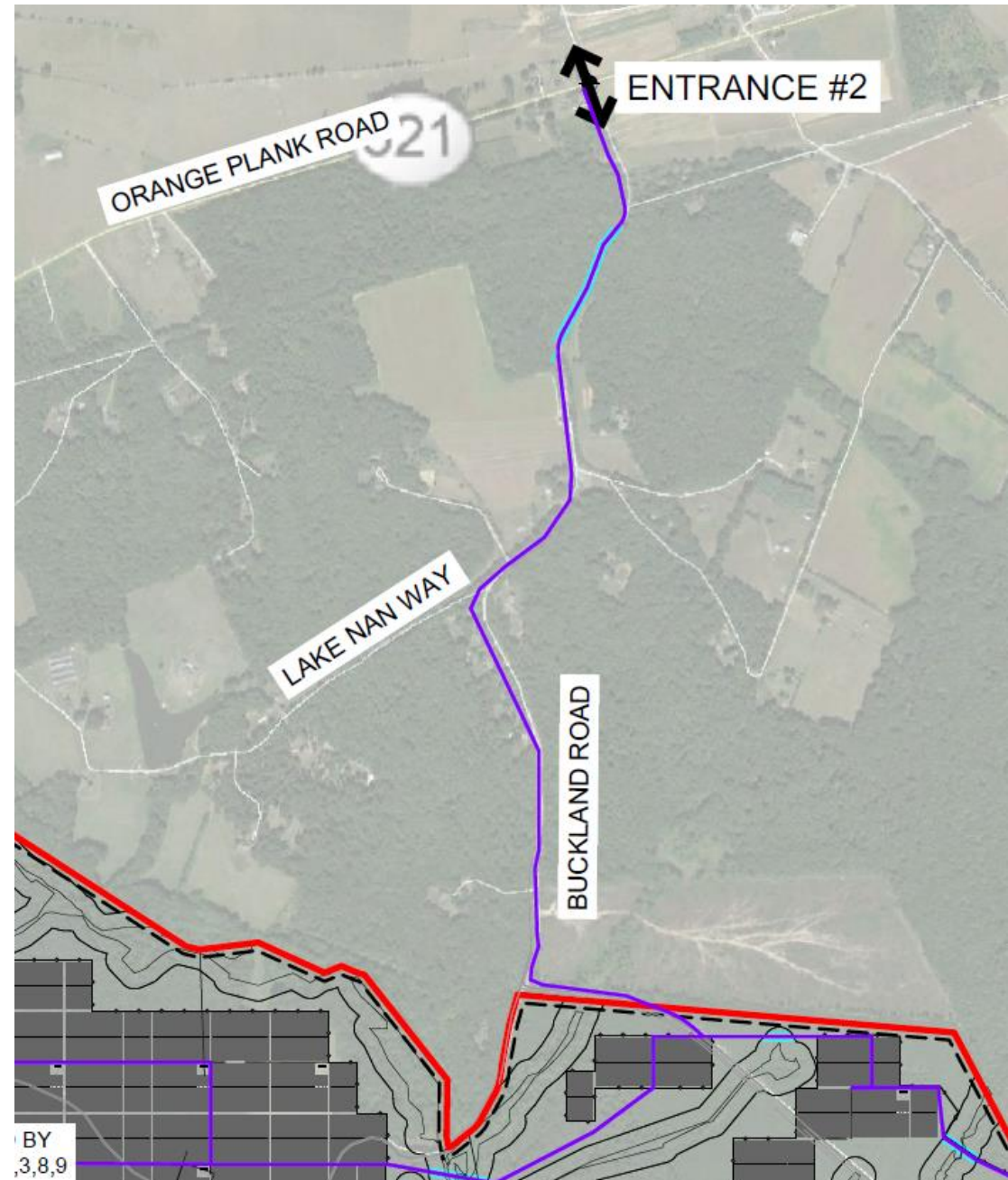


Three points of access are available from the north of the project site. Access 9 (leftmost) is for emergency access only via Gold Dale Lane in Orange Co. Access 1 runs through an existing Dominion Transmission line corridor fronting on Orange Plank Road.

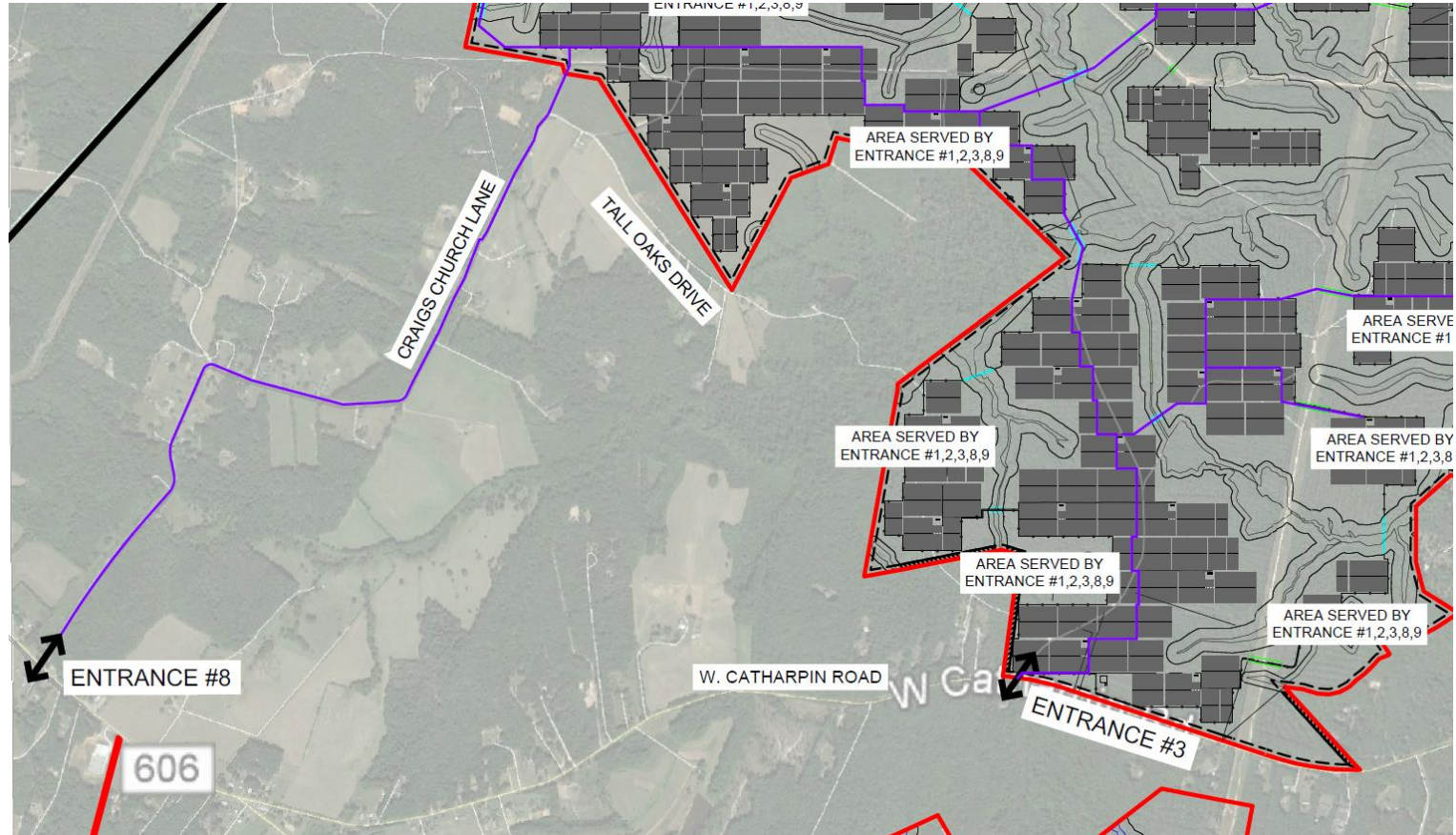
Access

Access 2 is proposed via the existing Windy Acres Lane and Buckland Road.

Due to potential impacts from increased vehicle traffic on this path staff is recommending that this access be for employee and light truck delivery only. Vehicles with more than 2 axels are proposed to be prohibited along this path.



Access



Two points of access are available from the south of the project site, via W. Catharpin Road. Access 8 (leftmost) is via Craigs Church Ln. Like Access 2, staff recommends this access include a prohibition on trucks with more than 2 axels to limit impacts on residents along this path. Access 3 is via the applicant's property and will serve as a permanent and principal entrance to the site.

Access

The GDP depicts interconnected access throughout Site A, meaning that a vehicle could enter from any entrance, and traverse the site without having to exit and re-enter from another point.

Vehicular routes off-site will be documented to record their current condition should roads be impacted by construction traffic. The applicant's preliminary estimates of construction trips are included in the Construction Access and Access Evaluation.

40% of estimated construction traffic is expected to use Orange Plank Rd. access and 60% via W. Catharpin.

Estimated 467 daily employee trips (Site A), 70 total daily delivery trips (Sites A, B, C).

That traffic analysis proposes a new left turn lane at Access 2, a new right turn lane at access 3, and an extension of Craigs Church Lane at Access 8.

Access

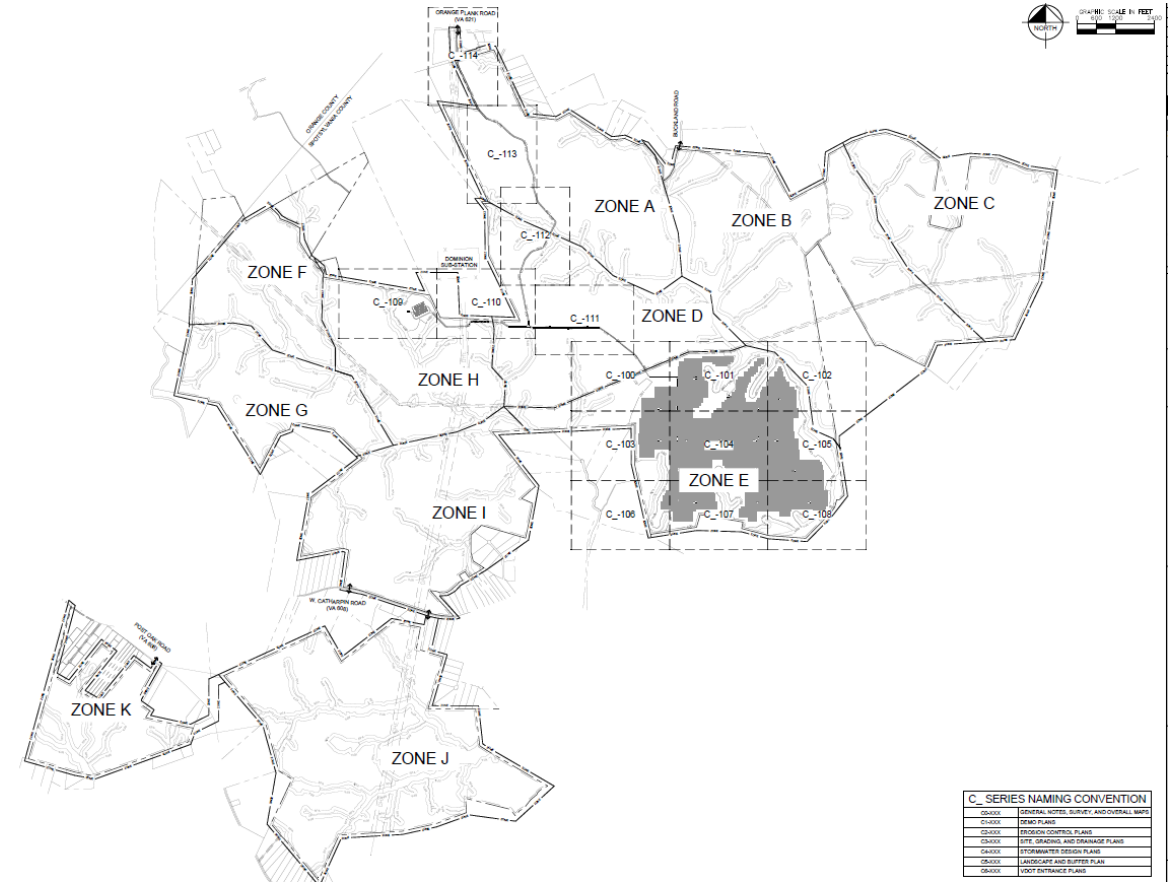
The current Construction Access and Access Evaluation also provides estimated new trips due to construction which County Traffic Engineering used to estimate level of service impacts on major road segments. Staff found generally that through the construction period levels of service would decrease on all major roads providing access to the site.

Following construction these should return to normal operating levels.

Erosion and Sediment Control

Spotsylvania is a local VSMP authority, meaning that the County regulates Stormwater management in accordance with Virginia laws, rather than the Virginia Dept. of Environmental Quality.

A conceptual, but more detailed design of the applicant's first phase was provided to E&S staff for consideration, it identifies a Zone E in the SE corner of the overall site.



Erosion and Sediment Control

It presently includes details on resource protection areas, perimeter controls, silt fencing, sediment traps, ponds and basins, etc.

If this special use permit is approved, this plan will be further developed to a fully designed site plan for Phase 1 of the project.

The concept plan provides a template for how the rest of site will be constructed.

There are additionally a significant number of E&S conditions provided in the staff report which allow the County to confidently mitigate the substantial erosion and sediment control concerns resulting from a project of this magnitude.



Erosion and Sediment Control

- The proposed E&S and stormwater management plans are in technical compliance with code requirements
 - 3rd party engineer review
- Limit to 400 acres land disturbance in aggregate
 - Manageable area for mandated inspections given staffing levels
- Inspections during construction
 - County staff
 - 3 engineering firms under procurement contract
- Inspection costs to the County
 - Addressed with recent adoption of new fee schedule for erosion inspection fees large projects

Environmental Construction Concerns

Minimum Required by Code

- Perimeter control silt fence typical
- Basin construction 50% full then maintenance
- No required upslope barrier protections
- Basins are removed after stabilization
- No onsite personnel dedicated to ESC upkeep
- RLD required but person not typically on site
- Diversion single windrow designs atypical
- Broadcast seeding typical
- Soil testing and amendments not required
- Equipment not always for ESC maintenance
- No use of drone technology. Walk entire site

sPower Plan Zone Template

- Adding super silt fencing and filtering barriers
- SPower will clean at 25% capacity
- Upslope siltation socks - left or cut
- Basins to be converted to permanent facilities
- On site ready response force for ESC
- RLD on site
- Additional windrow barrier to direct to basins
- Drill seeding for quicker seed ESC germination
- Soil testing before drill seeding
- On site equipment for ESC controls/repairs
- Use of drone technology points to focus area

Protected Species

Apart from the large land disturbance, another contributing reason for the additional concerns over E&S is due to the finding of protected species; two in particular reside downstream.

The Dwarf Wedgemussel, a federal and state listed endangered mussel since 1990 resides in silt-free streams and is known to inhabit the Po River.

The Yellow Lance is proposed to be similarly protected in the future and shares a similar habitat to the Dwarf.

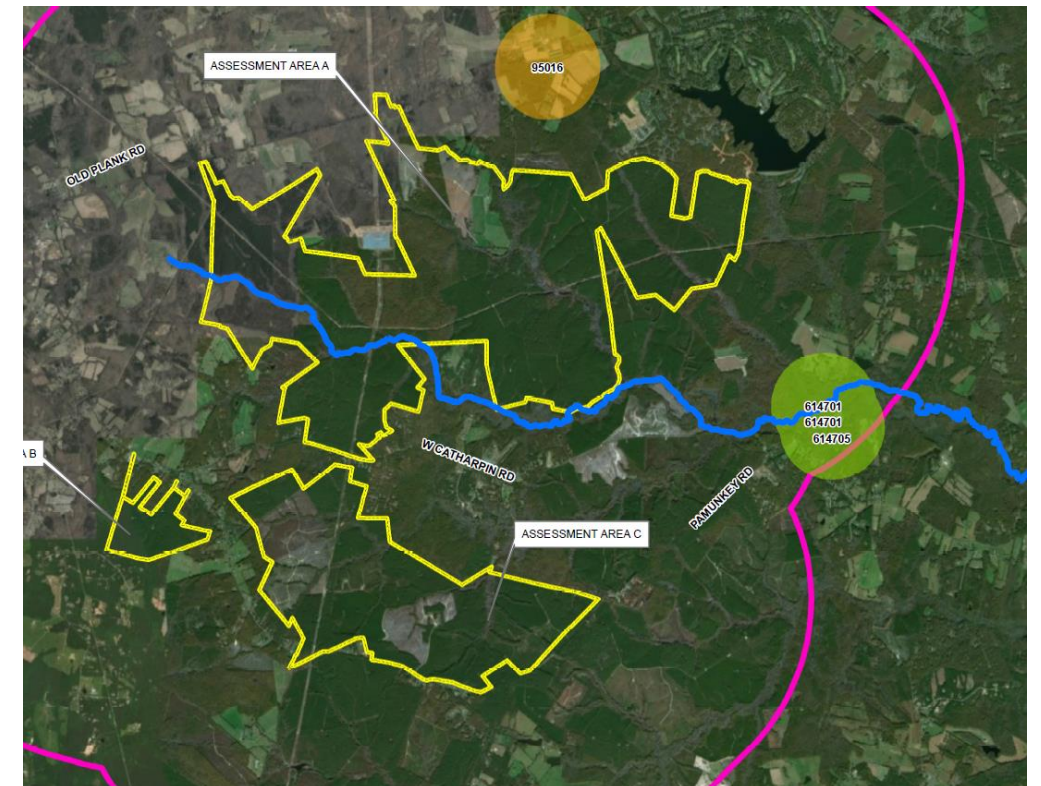
The introduction of sediment into on-site water ways could negatively affect these mussels.

Staff has recommended conditions which should mitigate impacts on their habitats.

Protected Species

The Loggerhead Shrike, aka the Butcher Bird was spotted approximately 3,000 feet north of the site. The bird is a threatened species. (In orange).

The Northern long-eared bat may reside in the area, although no identified habitats or roost tries were identified. Staff has recommended a condition to train employees to identify and report potential sightings of these two species to DGIF.



Protected Species

- The Small whorled pogonia is a perennial orchid classified as threatened by the United States Fish and Wildlife Service and endangered by the Virginia Department of Agriculture and Consumer Services.
- Only one potential likely habitat was identified via survey, although no actual orchids were found. The survey was coordinate through the Virginia Dept. of Conservation and Recreation (VDCR). Staff has conditioned that this small habitat area be preserved.
- VDCR also noted concerns over the fragmentation of existing forests. Efforts to mitigate forestal fragmentation are proposed through the use of wildlife compatible fencing at regular intervals and prescribed locations. However the large loss of existing forested areas from timber harvest operations has already occurred.

Cultural

Archeological and Architectural Surveys were conducted with cooperation of the Virginia Department of Historic Resources (VDHR). The surveys examined above and below ground resources for potential inclusions in the Virginia Landmarks Register or the National Register of Historic Resources.

Although a number of resources were identified there were generally no significant impacts were identified. Two cemeteries were identified and are protected. One railhead was identified which staff has proposed to be provided with a trail easement for future trail construction of the VCR Trail.

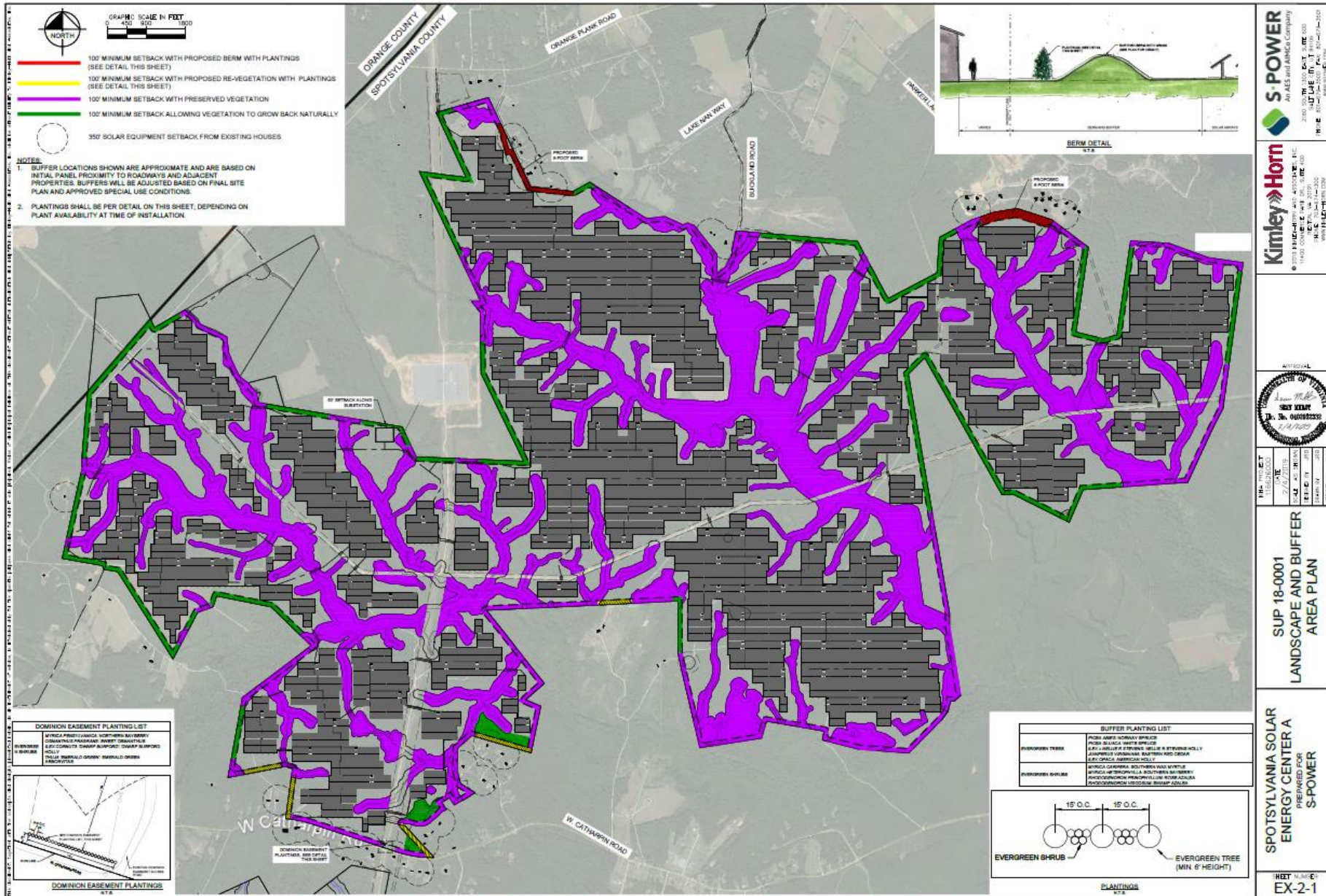
The National Park Service provided comments noting that an agreement exists preserving the existing intersection of Orange Plank and Brock Rds. and notes that a permit shall be required from the NPS for commercial traffic on Fredericksburg & Spotsylvania National Military Park Roads.

Heat Island Effect

The County requested input from Dewberry consulting regarding any potential heat island effect. They found that there is no heat island effect, though a temporary temperature increase is possible that dissipates with distance from the solar panels.

- Enhanced setbacks of 350' from residential properties (Planning Commission conditions include 350' setback from all property boundaries).
- Buffers and berms should include shade trees and shrubs to create dense screens to absorb radiative heat and should be maintained.
- Vegetative coverage must be maximized with grasses to assist in evapotranspiration and soil heat absorption.

New sPower Buffer Proposal



Setbacks -Conditions

Prescribed setbacks are 50 feet except that:

- Fencing, berms, landscaping, roads, bridges, utility poles are exempt.
- No trees shall be removed from any of 50 setback or 50 buffer except for exotic species removal, hand-clearing of dead or dying trees, or any clearing for ingress/egress or infrastructure connections.
- Inverters and generators shall be setback 400 feet.
- Staff - Adjacent to a residential property triggers a 350 foot setback of solar arrays and supporting structures from the shared property boundary.
- Planning Commission – Consistent 350 foot setback from property boundary.

Buffers - Conditions

Buffers:

Residential structures within 300 feet which are not separated by an existing 40 preserved buffer will be screened with a bermed buffer.

- The berm shall be 8 feet in height
- Plantings shall be atop and/or outside of the berm.
- The berm shall be outside of any fencing.
- The berms shall be installed coincident with each phases construction and before any pile driving within 1,000 feet of the berm.

Buffers - Conditions

Residential structures within 300 feet which are not separated by an existing 40 preserved buffer will be screened with a bermed buffer.

Plantings on and outside the bermed buffer:

- Shall be designed by certified landscape designer or landscape architect to minimize visibility, maximize survivability, and minimize losses from deer or other wildlife consumption.
- Shall consist of a minimum of:
 - One (1) evergreen tree with a minimum height of six (6) feet every ten (10) feet
 - One (1) large deciduous tree with a minimum trunk caliper of two (2) inches measured six (6) inches from the ground every fifteen (15) feet
 - One (1) understory deciduous tree with a minimum trunk caliper of two (2) inches measured six (6) inches from the ground every fifteen (15) feet
 - One (1) evergreen shrub with a minimum height of four (4) feet every ten (10) feet.

Buffers - Conditions

Residential structures within 300 feet which are separated by an existing 40 preserved buffer AND any adjacent residential structures within 600 AND any VDOT maintained right-of-way shall be screened with a supplemental buffer which shall consist of a minimum of:

- one (1) evergreen tree with a minimum height of six (6) feet every fifteen (15) feet
- one (1) large deciduous tree with a minimum trunk caliper of two (2) inches measured six (6) inches from the ground every ten (10) feet.

These buffers shall also be designed by a certified landscape designer or landscape architect to minimize visibility, maximize survivability, and minimize losses from deer or other wildlife consumption.

Existing landscaping and regrowth is expected to provide a significant contribution to screening.

Buffers and Setbacks

- The applicant has indicated that the 350' setback will impede their ability to develop the project as proposed.
 - Submitted an increased buffer plan that provides a 100' vegetated buffer.
- Policy Question: Appropriate Buffers and Setbacks?
 - 350' setback of panels and inverters to property boundary
 - 100' buffer proposed by applicant

Noise

The construction of the proposed facility will generate construction noise from onsite vehicles and activities. Construction noise will reach its highest point when the support pilings are being driven into the ground near residential homes. This activity should last approximately 4 days and then lessen substantially as the pile driving is completed in proximity to the homes. The applicant's submitted noise map should be substantially improved by the new conditions related to setbacks and buffering.

Construction activities are exempt from County noise ordinances, but staff has proposed conditions to mitigate noise on neighboring residents. Exclusive of additional setbacks or buffers, other conditions include:

- All clearing, grading, and construction of the Property shall be limited to the hours of 7:00 a.m. to 7:00 p.m. Monday through Friday and 8:00 a.m. to 6:00 p.m. Saturday and Sunday (Planning Commission conditions prohibit work on Sunday);
- Pile driving within 500 feet of any residence shall cease at 5:00 p.m. daily and shall be prohibited on Sundays.

Noise

- Advance notice shall be mailed by first class mail to properties within 1,000 feet of a pile driving location no less than seven (7) days prior to the start of such activities and shall include the estimated start date, estimated end date, and the liaison's contact information. The notice and a list of recipient addresses shall also be mailed to the Zoning Administrator.
- The following noise-reducing practices shall be followed to reduce construction noise:
 - Trucks and engine-powered equipment shall include mufflers and engine shrouds no less effective than those originally installed by the manufacturer;
 - Trucks and engine-powered equipment shall be maintained in proper tune according to manufacturers' specifications;
 - Truck engine exhaust braking shall be limited to emergencies; and
 - The use of noise-producing signals, including horns, whistles, alarms, and bells shall be for safety warning purposes only.

Fire, Rescue, and Emergency Mgmt.

Solar energy facilities are known to be relatively safe land uses with respect to electric shock, fire, toxicity and EMF fields. The proposed facility will also be monitored via Supervisor Control and Data Acquisition (SCADA) systems.

Additionally, the applicant's supplied Emergency Operations Plan – Construction and Emergency Operations Plan – Operations are proposed to be conditioned.

These documents were created with the collaboration of County FIREM and Planning staff and provide information on varying topics including but not limited to:

- **Employee roles, training, and communication procedures**
- **Unique concerns from PV systems**
- **Fire prevention and response**
- **Storms and natural disasters**
- **Spills**
- **Hazardous materials**

Fire, Rescue, and Emergency Mgmt.

Staff conditions allow trench burning with limitations, including 3,000' distance to residential properties. The Planning Commission conditions prohibit burning.

Additional burning conditions exist within the Emergency Management Plan – Construction:

- A permit shall be acquired from Spotsylvania County.
- All combustible materials shall be removed within 35 feet of trench burning.
- A water truck shall be on standby.
- Trench burners shall be equipped with fire extinguishers.

Fire, Rescue, and Emergency Mgmt.

- Burning shall take into consideration sensitive receptors and prevailing wind direction at lower speeds (<25 mph).
- Burning shall cease 2 hours prior to end of work day.
- A Fire Watch Person will be designated to monitor all trench burning activities.
- The Fire Watch Person shall remain within the immediate area of the trench burning at all times and shall not be assigned any other duties.
- If the burn area is still producing smoke, it is technically still burning and must be attended.

Cadmium Telluride PV Panels

The County requested input from Dewberry consulting regarding the safety of PV panels containing Cadmium Telluride. They responded:

“Cadmium Telluride (CdTe) is a compound that contains cadmium and tellurium. It is a black crystalline powder that is odorless, not water soluble and non-flammable. It has a melting point of above 1000 °C and the boiling point is above 1100 °C. Cadmium by itself is a highly toxic material, however, based on research cadmium telluride is much less toxic than pure cadmium. CdTe can be toxic if it is ingested, inhaled or comes in direct contact with skin.”

“If they are handled properly during all phases of construction and disposal, they will not emit any toxicity into the environment.”

The Planning Commission’s conditions prohibit the use of CdTe panels. Staff’s conditions do not prohibit the use of CdTe panels.

Decommissioning

Both staff and Planning Commission recommended conditions include detailed list of requirements for decommission and the engineer's estimate on which the bond is based.

- Does not allow for a credit for recycling costs
- Policy Question: Considering 2-year updates, is a credit appropriate?

Public Drinking Water Consideration

Connection Considerations

- Is the connection mandated?
- Size of connection and consumption
 - Larger volumes require more review
- No adverse impacts to existing customers
- Overall Pressure Zone Health
 - Redundancy
 - Fire flow
 - Static and residual pressures
 - Water Tank Storage
 - Finished water availability
 - Water quality
- System improvement opportunities

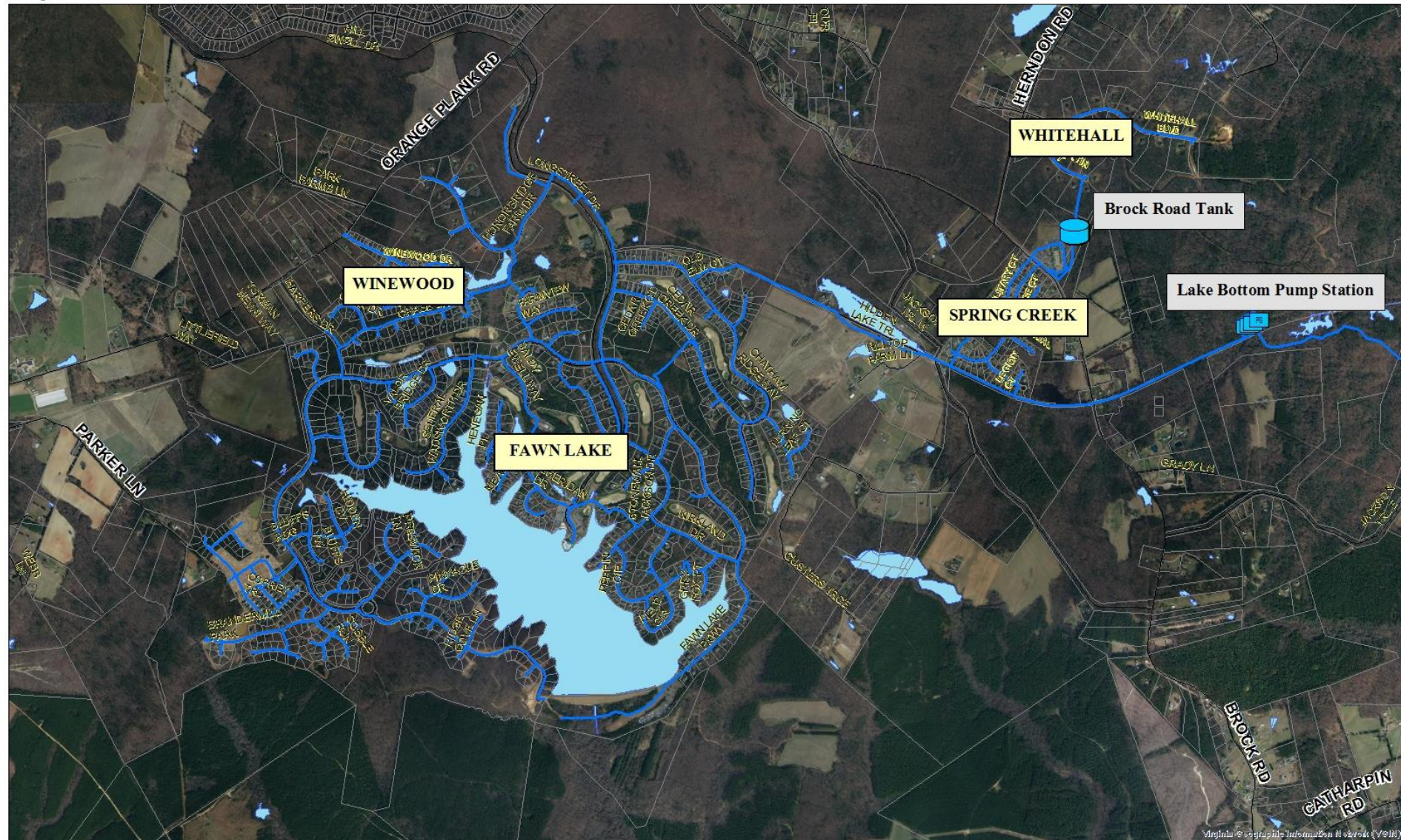
Fawn Lake Zone

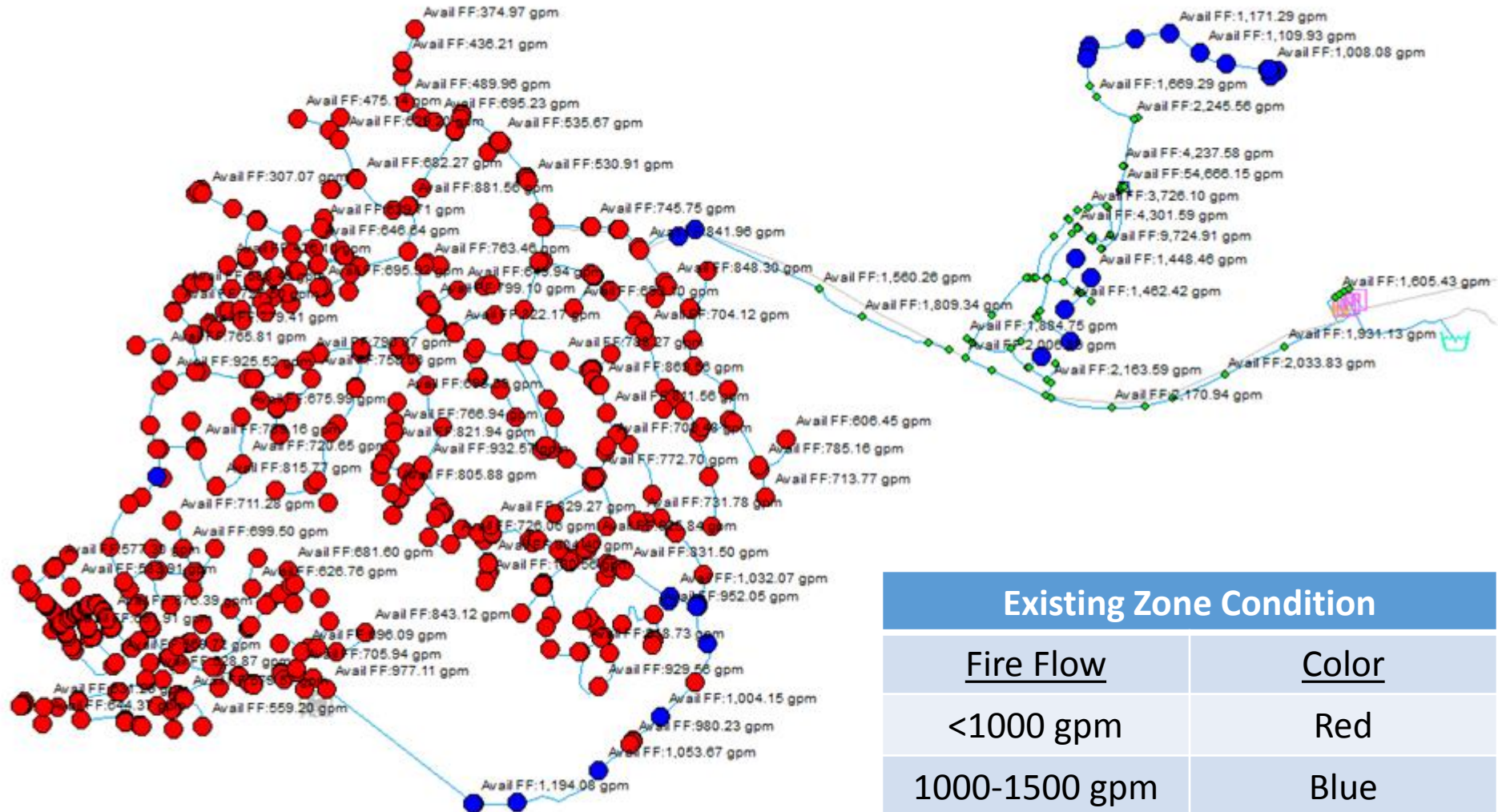
- 80% of homes <1,000 gallons per minute (gpm) fire flow
- Areas of marginal pressure (30 psi)
- Limited flushing capacity
 - Water quality
- Customer Concern
 - 5 per month (non-peak)
 - 10 to 15 per month (peak)



EXISTING 531 PRESSURE ZONE

0 0.125 0.25 0.5 0.75 1 Miles





Existing Zone Condition	
Fire Flow	Color
<1000 gpm	Red
1000-1500 gpm	Blue
Over 1500 gpm	No Color

sPower Connection - Public Water

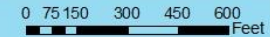
Potential sPower Connection

- Desired volume
 - 100,000 gallons/day - construction
 - 350 gallons/day - operation
- Not mandated by ordinance
- Nearest connection point is Fawn Lake
- Regulated to ensure no adverse impact
 - Volume of withdrawal
 - Time of withdrawal
 - Protect existing customer pressure

Existing System Connection – Public Water

Terms of connection

- Limit of withdrawal
 - 10:00 pm to 4:00 am
- October to April
 - 69,000 gallons/day
- May to September
 - 56,000 gallons/day
- Additional water could be obtained through existing bulk water program (i.e. tanker trucks)



Improved System Connection – Public Water

Terms of Connection

- Limit of withdrawal
 - 10:00 pm to 4:00 am
- October to April
 - 166,000 gallons/day
- May to September
 - 153,000 gallons/day
- Additional water could be obtained through existing bulk water program (i.e. tanker trucks)

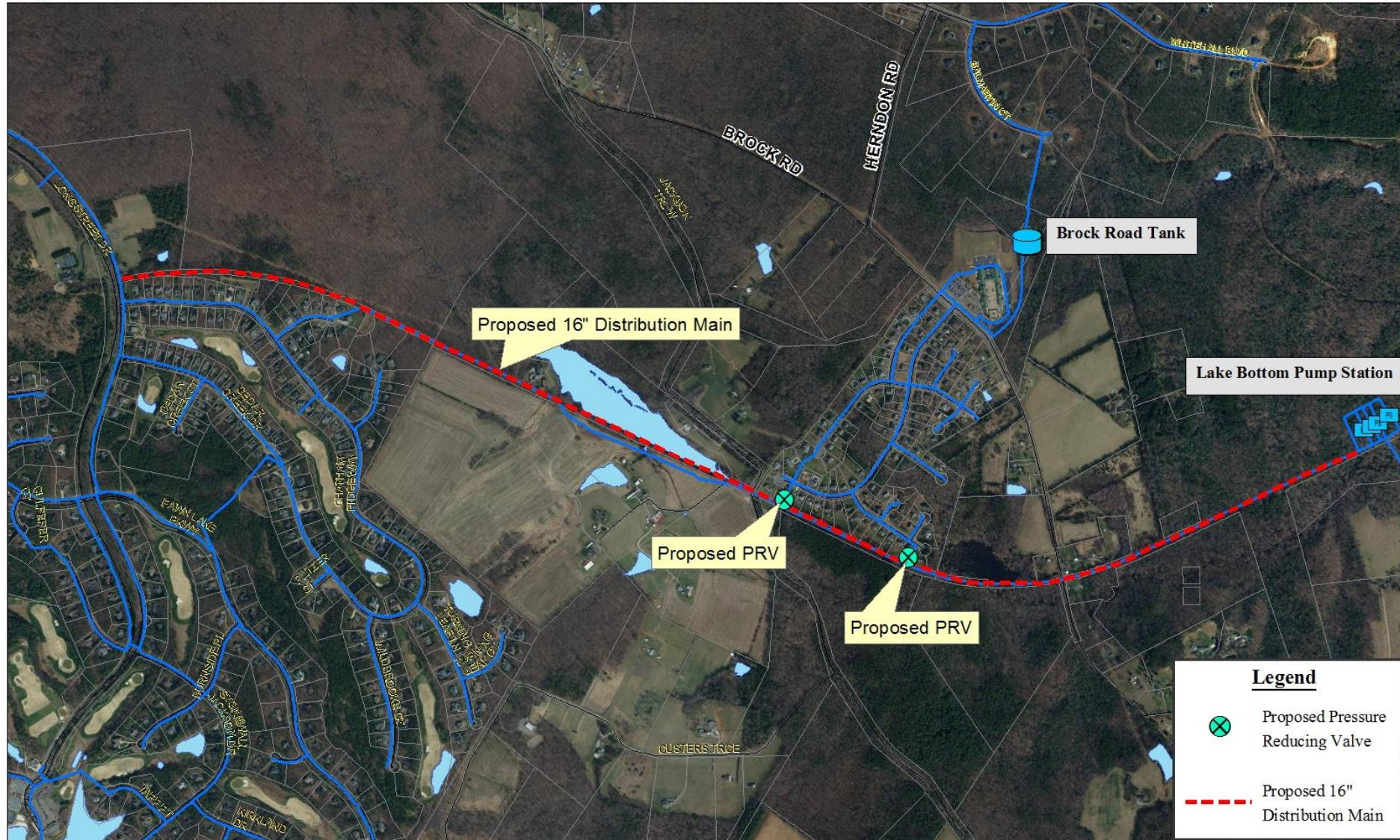
Zone Feed Improvements

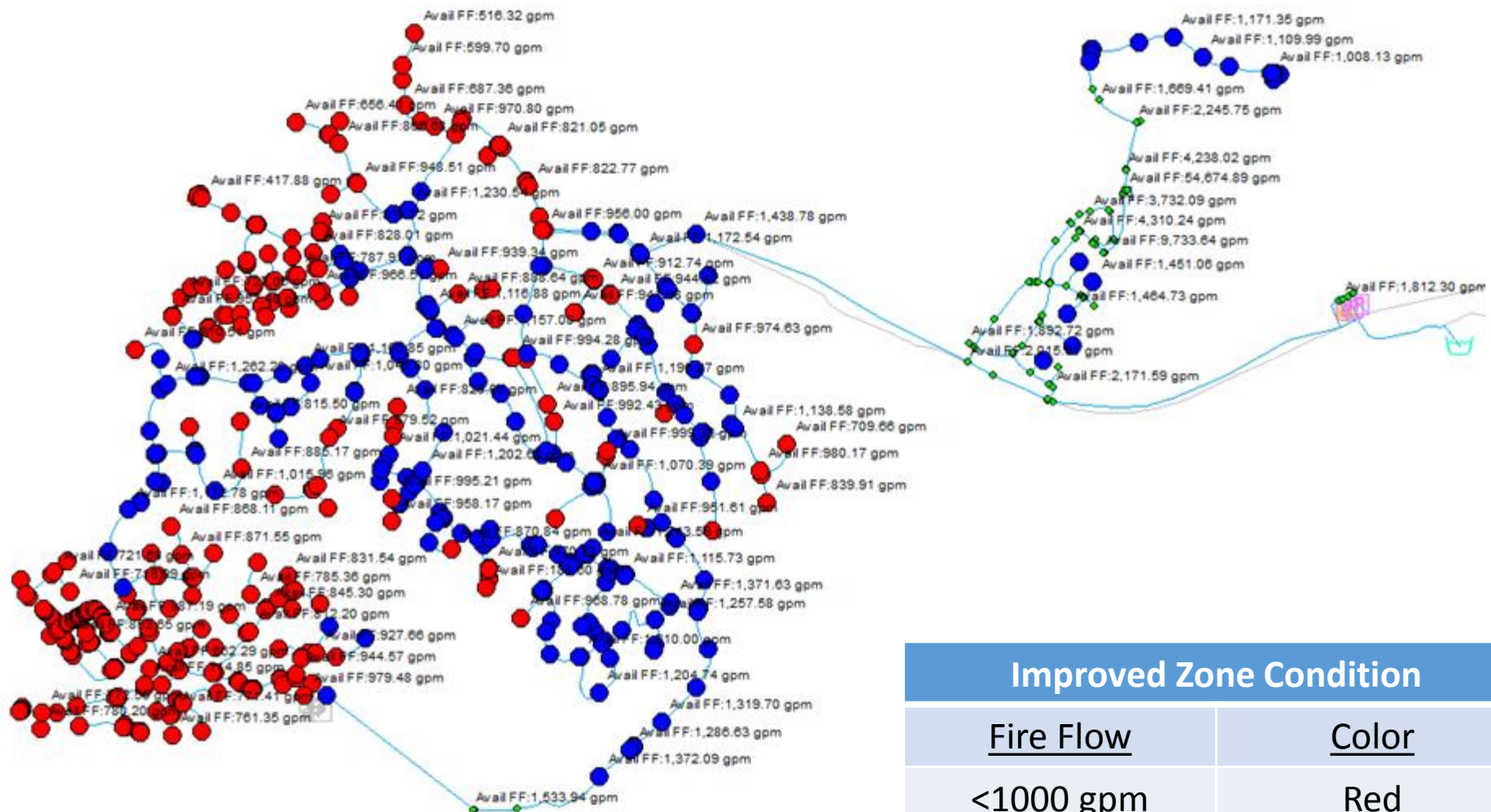
- Existing Utility Capital Plan (since 2000's)
- Age and capacity
- Ex. 12" Asbestos Cement (end of life)
- Proposed 16" Ductile Iron
- Project Timeline
 - County Project
 - 5 to 7 years
 - sPower Project
 - 12 to 18 months or less



PROPOSED 16" DISTRIBUTION MAIN

0 250 500 1,000 1,500 2,000 Feet



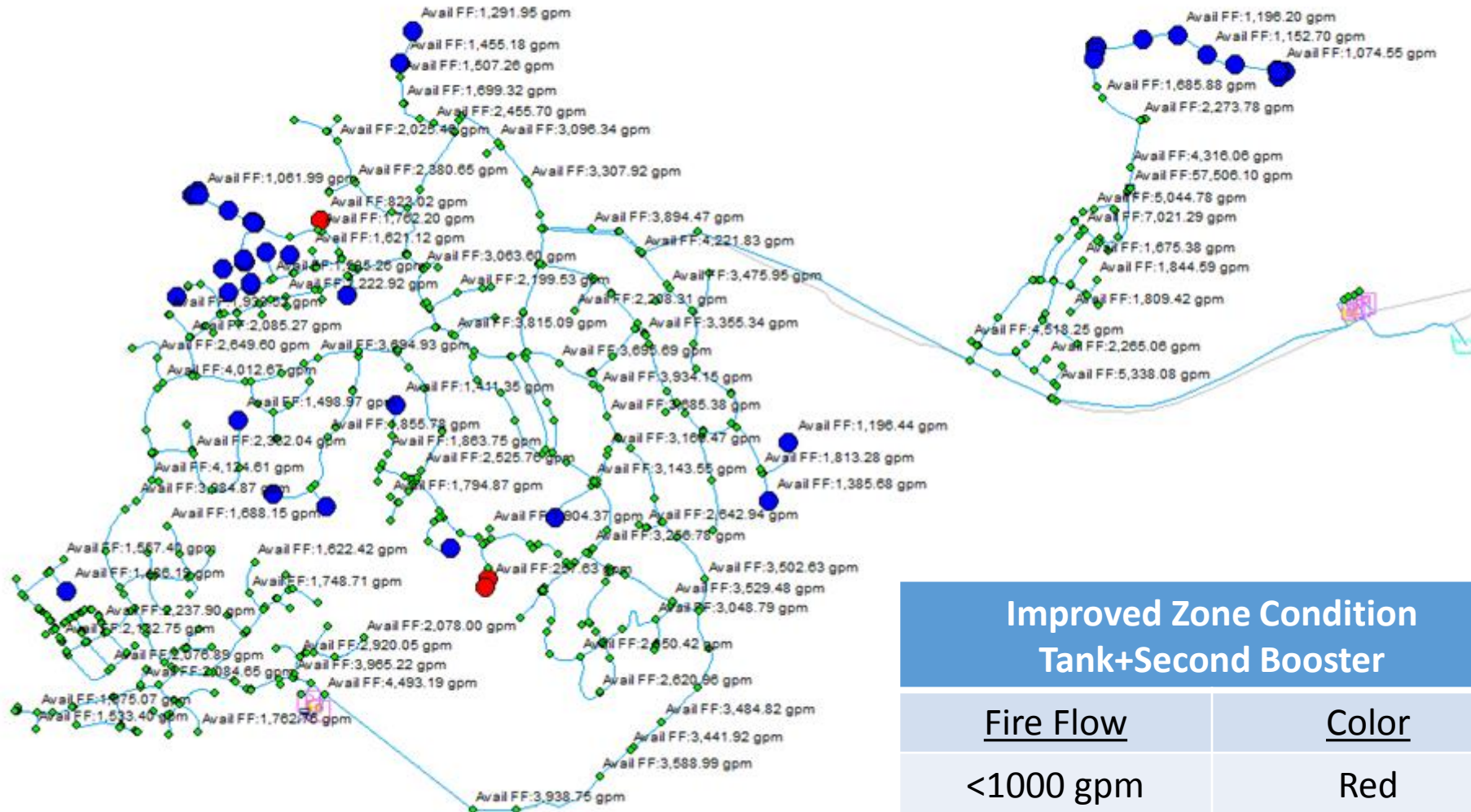


Improved Zone Condition

<u>Fire Flow</u>	<u>Color</u>
<1000 gpm	Red
1000-1500 gpm	Blue
Over 1500 gpm	No Color

Future Public Water County System Improvements

- Improved Lake Bottom Booster Station
- 400,000 gallon storage tank
- New Fawn Lake Booster Station
- Improved system pressures
 - Static pressure as much as 15 psi
 - Residual pressures as much as 25 psi
- Improved fire flows
 - <1% below 1,000 gallons/minute
- Improved flushing ability
 - Improved water quality
 - Less water loss



Improved Zone Condition Tank+Second Booster	
Fire Flow	Color
<1000 gpm	Red
1000-1500 gpm	Blue
Over 1500 gpm	No Color

Fiscal Impact – Public Water

- Potential Cost Share Opportunities
 - Tank construction
 - Transmission main upgrade/replacement
 - After SUP determination
- Availability Fees: \$74,970
- Consumption Revenue
 - \$400,000 per year at 100,000 gallons per day
 - \$1,630 per year at 350 gallons per day

Project Fiscal Impact

- Rollback tax is approximately \$471K (one time payment)
- Real Property taxes for the land only – currently \$82,321
- Code of Virginia provides tax exemptions
 - For the sPower project (500 MW) the M&T exemption is 80%
 - The County collects taxes at the real estate tax rate on 20% of the assessed value of the facility as assessed by the State Corporation Commission (SCC)
- sPower provided a Fiscal and Economic Impact Analysis
 - Based on value of \$552.5M (at build out) & at current tax rate M&T revenues are projected as:
 - Year 1 = ~\$715K
 - Year 10 = ~\$604K
 - Year 20 = ~\$262K
 - Year 24 on = ~\$79K

Plan and Code Analysis

- Comprehensive Plan
- Special Use Standards of Review

Conditions

Condition Categories:

- General
- Construction
- Erosion and Sediment Control
- Fire, Rescue, and Emergency Management
- Landscaping, Maintenance, Setbacks, and Buffers
- Biological
- Cultural
- Water

Questions?