PJM Generator Interconnection
ComEd Facilities Study Report
For
Queue Project AB1-089
"Byron-Wayne 345kV"

Revision 0: October 2021

Revision 1: December 2021

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A. FACILITIES STUDY INTRODUCTION

1. PROJECT DESCRIPTION

Invenergy Thermal Development LLC, the Interconnection Customer, has proposed the construction and interconnection of a new natural gas fueled combined cycle generating facility consisting of a single 575 MW turbine generator. This proposed facility will be located in Lee County, Illinois.

The generating facility will be interconnected to the Byron-Wayne 345kV transmission line L.0626 via construction of a new interconnection substation (TSS 189 White Rock) having three (3) 345kV circuit breakers positioned in a breaker-and-a-half configuration with the capacity to expand the 345kV bus for future generation.

The construction of the new interconnection substation will result in the splitting of the existing line into two lines on the transmission system. The new L.18905 will connect TSS 189 White Rock to TSS 144 Wayne and L.0626 will connect TSS 189 White Rock to STA 6 Byron. The proposed generation interconnection is shown on the High Level Planning Diagram in Attachment #1.

2. AMENDMENTS TO THE IMPACT STUDY DATA OR IMPACT STUDY RESULTS

2.1 Facility Name and In-Service Date

2.1.1 The IC's facility name is Byron to Wayne Thermal #1 Project.

2.1.2 The AB1-089 project's proposed in-service timeline is shown in section 7 "Milestone Schedule".

2.1.3 The Interconnection Customer entity name has been updated from Invenergy Nelson LLC to Invenergy Thermal Development LLC.

2.1.4 The AB1-089 requested in-service date is June 1, 2026. This report does not imply a Transmission Owner commitment to this date.

2.2 Direct Connection Cost Estimate

2.2.1 This Facilities Study was developed based on the IC choosing the "Option to Build" provision for the construction of TSS 189 White Rock substation. IC is responsible for performing the design, procurement, construction and testing to install a new 345kV TSS 189 White Rock substation with three 345kV circuit breakers arranged in breaker-and-a half configuration with future provision to expand per ComEd specifications.

3. INTERCONNECTION CUSTOMER SCHEDULE

The schedule which is based upon the assumption that a CPCN (Certificate of Public Convenience and Necessity, from the ICC (Illinois Commerce Commission) will not be required. Additionally, the customer schedule for construction of their collector substation will need to be coordinated with the construction of the interconnection substation (TSS 189 White Rock).

4. SCOPE OF WORK BY INTERCONNECTION CUSTOMER (IC)

4.1 The IC is responsible for construction of the 550MW of combined cycle natural gas turbine generators, which includes the generator step-up transformers (GSU's), two (2) main transformers 25kV to 345kV (grounded wye high side), three (3) 345kV circuit breakers, four (4) 345kV motor operated disconnect switches, two (2) 25kV circuit breakers, two (2) 25kV disconnect switches, and a 345kV transmission line terminating at TSS 189 White Rock.

4.2 The IC has elected the "Option to Build" provision to construct TSS 189 White Rock substation, it will transfer its ownership to ComEd prior to commercial operation of AB1-089 generation.

4.3 The IC will purchase the real estate to accommodate the construction of TSS 189 White Rock substation.

4.4 The IC will be responsible to purchase real estate or obtain the necessary right-of-way easement to install the 345kV transmission line tap to TSS 189 White Rock substation.

4.5 The IC will be responsible to request and bear the cost of any outages required on existing transmission

or distribution lines that may be required for the transport of any large equipment, i.e. turbines, rotors, turbine structures, etc.

4.6 IC will be responsible for installation and ownership of fiber between TSS 189 White Rock and the IC's collector substation. Fiber connection between stations should include two physically diverse routes.

4.7 ComEd Requirements:

IC shall engineer, design, procure, construct and test the facilities to be owned and operated by ComEd in accordance with all ComEd standards, guidelines, and review protocol.

IC shall make appropriate accommodations in the project plan where Nuclear or NERC / CIP reviews will be required.

The facilities shall be designed in accordance with ComEd security standards.

The IC shall provide and install metering equipment including a 345kV optical CT/PT and bi-directional revenue grade meter, on ComEd side of the Point-of-Interconnection at TSS 189 White Rock substation on the line to the IC's collector substation.

The metering equipment shall be designed to measure both wholesale energy (high KWH and KVARH readings) and retail energy (low KWH and KVARH readings) and meet metering requirements stated in 'ComEd Interconnection Guidelines for Generators Greater than 20MW'.

ComEd will own and maintain the metering equipment. The metering equipment shall provide the following data:

a) Instantaneous net KW and KVAR values TO and FROM the generator.

b) Instantaneous Voltage value and circuit breaker status.

c) Hourly compensated KWH and KVARH values TO and FROM the generator.

The metering equipment shall be capable to transmit the real-time data to ComEd and the PJM via a SCADA RTU. The metering equipment shall comply with PJM Manuals M-01 & M-14D, and PJM tariff.

5. DESCRIPTION OF FACILITIES INCLUDED IN THE FACILITIES STUDY

5.1 TSS 189 White Rock Substation (PJM Network Upgrade Number n6934)

5.1.1 The IC will be responsible for performing the design, procurement, and construction to install a new 345kV TSS 189 White Rock substation with three 345kV circuit breakers arranged in breaker-and-a-half configuration with future provision to expand.

5.1.2 The IC will be responsible for performing the design, procurement, and construction to install System 1 and System 2 line protection and communication systems.

5.1.3 The IC will be responsible for obtaining telephone/data circuits from the local telecommunications provider for 911 emergency locating, circuits required to be leased per local ordinances, and/or other circuits that cannot be provided via other means of communication (fire/security alarm notification, SCADA, and revenue metering).

5.1.4 The IC will be responsible to install the following inside the Control Building: 125VDC battery system, DC distribution panels, relay panels, marshalling cabinet, aux AC power panels, building HVAC system, fire/security system, SCADA, metering equipment, and Mux equipment for fiber communication to Byron-Wayne.

5.1.5 The IC will be responsible for performing design, procurement, and construction to install normal and emergency source of 120/208VAC three (3) phase auxiliary power through local utility service request process.

5.1.6 ComEd will provide engineering and construction oversight of the IC's scope of work to construct TSS 189 White Rock substation under the "Option to Build".

5.1.7 ComEd will provide legal support related to the transfer of TSS 189 White Rock substation ownership from IC to ComEd.

5.1.8 ComEd at IC cost will procure, install, own and maintain the AMI meter including 345kV optical CT/PT on ComEd side of the point-of-interconnection at TSS 189 White Rock substation for retail metering.

5.2 Transmission Line Cut-in-Tap (PJM Network Upgrade Number n6935)

5.2.1 ComEd will be responsible for performing the design, procurement, and construction to install new line facilities required to connect 345kV L.0626 and 345kV L.18905 into the TSS 189 White Rock Substation. ComEd will be responsible for all transmission line work up to the 345kV dead-ends that are provided by the IC at the TSS 189 White Rock Substation.

5.2.2 ComEd will be responsible to schedule and coordinate all transmission line outages necessary to make cut-in interconnect tie point connections.

5.3 STA 6 Byron (RMT1) (PJM Network Upgrade Number n6937)

5.3.1 ComEd will be responsible to perform design, procurement, and construction to upgrade existing System 1 and System 2 line protection for 345kV L.0626.

5.3.2 ComEd will be responsible to evaluate the adequacy of existing batteries and battery chargers due to new microprocessor relays and SCADA communication equipment.

5.4 TSS 144 Wayne (RMT2) (PJM Network Upgrade Number n6938)

5.4.1 ComEd will be responsible to perform design, procurement, and construction to upgrade existing System 1 and System 2 line protection for 345kV L.18905.

5.4.2 ComEd will be responsible to evaluate the adequacy of existing batteries and battery chargers due to new microprocessor relays and SCADA communication equipment

5.5 Rock River Fiber Ring Reconfiguration (PJM Network Upgrade Number n6936)

5.1.1 ComEd will be responsible to perform design, procurement, and construction to reconfigure the Rock River Fiber Ring at ring nodes in various substations to allot for the addition of the new node at TSS 189 White Rock Substation.

6. TOTAL COSTS OF TRANSMISSION OWNER FACILITIES INCLUDE IN FACILIITES STUD

NETWORK #	SITE LOCATION	TOTAL PROJECT COST
n6934	**Engineering and Construction Oversight TSS 189 White Rock**	**$1,777,216**
n6935	**Transmission Line Cut-in Tap into TSS 189 White Rock**	**$3,403,783**
n6937	**Relay and Protection Work at STA 6 Byron**	**$502,498**
n6938	**Relay and Protection Work at TSS 144 Wayne**	**$502,498**
n6936	**Rock River Fiber Ring Reconfiguration**	**$570,348**
	Total Cost of ComEd Work	**$6,756,343**

7. SUMMARY OF MILESTONE SCHEDULES FOR COMPLETION OF WORK INCLUDED IN FACILIITES STUDY

Description	Start	Finish
Prepare Project Diagram & Specifications	Day 1	Day 100
Project Design	Day 100	Day 360
Material Procurement	Day 250	Day 480
Tie-In Construction at TSS 189	Day 480	Day 540
Acceptance Testing at TSS 189	Day 540	Day 600

The above Milestone Schedule is based on the Interconnection Services Agreement and the Construction Services Agreement (if applicable) to be executed. The schedules are based upon the assumption that the CPCN from the ICC will not be required. The exact Milestone Schedule will be negotiated and determined upon the execution of Construction Services Agreement.

B. TRANSMISSION OWNER (COMED) FACILITIES STUDY RESULTS

1. TRANMISSION LINES -NEW

1.1 Not applicable.

2. TRANSMISSION LINES - UPGRADES

2.1 Transmission Line Cut-in-Tap (PJM Network Upgrade Number n6935)

2.1.1 ComEd will be performing the design, procurement, and construction to install new line facilities at White Rock substation. ComEd will be responsible for all transmission line work up to the 345kV dead-ends that are provided by the IC at the TSS 189 White Rock Substation.

2.1.2 It is feasible to cut-in the existing single circuit 345kV L.0626 at the proposed location of the new TSS 189 interconnection. This splits the existing 345kV line into L.0626 to Byron and L.18905 to Wayne. With the information presently available it is determined that the cut-in will be near existing overhead transmission Structure #64.

2.1.3 The proposed cut-in can be achieved by dead ending the line with Proposed Structure #63D inserted into L.0626 approximately 263 feet in-line west of Structure #64, and Proposed Structure #63E inserted approximately 30 feet in-line west of Structure #64. The existing Structure #64 shall be removed. The existing OPGW wires shall be cut and routed in to TSS 189 White Rock. L.0626 shall turn 90 degrees at Proposed Structure 63D and terminate at TSS 189 White Rock. Similarly, L.18905 shall turn 60 degrees at Proposed Structure #63E and head southwest to terminate at TSS 189 White Rock.

2.1.4 Both new structures #63D and #63E along with their associated foundations will be installed along the existing L.0626 conductor, in the transmission right-of-way.

2.1.5 Using the current design standards, the conductor attachment heights of the proposed terminal structures would range from 55 to 70 feet, depending on the final grade and proposed conductor attachment heights of Proposed Structures #63D and #63E.

2.1.6 ComEd will be responsible to perform detailed site-specific survey of existing 345kV L.0626 to complete final design. The two structures in this study refer to a ComEd standard single-circuit structure design.

2.1.7 Description of Proposed Cut-In Configuration:

Structure #63D and #63E:

2-345kV ComEd standard EM10496.3, 0–90 degree Single-Circuit Heavy Angle Dead-End Steel Pole.

The configuration will be a horizontal "T" type with static wire arms. The conductor will roll from existing vertical configuration at existing Structures #63 and #65 to horizontal configuration at Proposed Structures #63D and #63E.

2.1.8 OPGW fiber routed along L.0626 will be terminated at separate splice boxes at structures #63D and #63E and routed maintaining diverse paths to TSS 189 White Rock.

3. NEW SUBSTATION / SWITCHYARD FACILITIES

3.1 TSS 189 White Rock Substation (PJM Network Upgrade Number n6934)

ComEd will review and provide oversight of the Interconnection Customer's ("Option to Build") design, procurement, construction, and testing of ComEd's new 345kV interconnection substation at TSS 189 White Rock having the following equipment (per ComEd Interconnection Guideline):

3.1.1 Three (3) 345kV line dead end structures with testing to check proper phase and identification is correct.

3.1.2 Nine (9) 345kV motor operated disconnect switches (includes two (2) line side, six (6) on both sides of all three (3) circuit breakers and one (1) on line to CCGT 345kV circuit breaker.

3.1.3 Three (3) 345kV, 3000A, 63kA SF6 gas circuit breakers.

3.1.4 A 345kV control building to accommodate System 1 and System 2 batteries, battery chargers, AC/DC panels, protective relaying, communication, SCADA, metering equipment, etc. 125VDC battery system, DC distribution panels, relay panels, marshalling cabinet, aux AC power panels, building HVAC system, fire/security system, SCADA, metering equipment, and MUX equipment.

3.1.5 Foundations and structures for all new equipment.

3.1.6 For Line protection: Protective relaying for 345kV L.0626:

Install SEL-411L relay for System 1, SEL-311L for System 2 for current differential schemes over segregated fibers.

Connect System 1 and System 2 fiber jumpers to utilize existing fiber cables on separate static wires from STA 6 Byron substation to TSS 189 White Rock.

Breaker Failure Protection: Install one SEL-451 relay for breaker failure protection, manual close supervision, and auto reclose function.

Breaker Auto Reclose adjacent line: Install a SEL-351A relay (SEL-451 to only auto reclose for one side of circuit breaker).

3.1.7 For Line protection: Protective relaying for 345kV L.18905:

Install SEL-411L relay for System 1, SEL-311L for System 2 for current differential schemes over segregated fibers.

Connect System 1 and System 2 fiber jumpers to utilize existing fiber cables on separate static wires from TSS 144 Wayne substation to TSS 189 White Rock.

Breaker Failure Protection: Install one SEL-451 relay for breaker failure protection, manual close supervision, and auto reclose function.

Breaker Auto Reclose adjacent line: Install a SEL-351A relay (SEL-451 to only auto reclose for one side of circuit breaker).

3.1.8 For IC Interconnection Line Protection: Protective relaying for 345kV line L.94202:

Install SEL-411L relay for System 1, SEL-311L for System 2 for current differential schemes over segregated fibers.

Install System 1 and System 2 fiber cables in separate static wires from IC's collector substation to TSS 189 White Rock. The fiber optic cables will be owned by the IC and ownership will terminate at the fiber distribution panel at TSS 189 White Rock.

3.1.9 IC is responsible for installation of normal and emergency source of three (3) phase auxiliary power through local service request process.

4. UPGRADES TO EXISTING SUBSTATION / SWITCHYARD FACILITIES

4.1 STA 6 Byron Substation (RMT1) – (PJM Network Upgrade Number n6937)

4.1.1 ComEd, will be responsible for performing design, procurement, and construction to upgrade existing protective relaying, SCADA and communication equipment for 345kV L.0626 from Byron to new TSS 189 White Rock substation. Refer to appendix of communication and relay notes for more detail.

4.2 TSS 144 Wayne Facilities (RMT2) (PJM Network Upgrade Number n6938)

4.1.1 ComEd, will be responsible for performing design, procurement, and construction to upgrade existing protective relaying, SCADA and communication equipment for 345kV L.18905 from Wayne to new TSS 189 White Rock substation. Refer to appendix of communication and relay notes for more detail.

4.3 Rock River Fiber Ring Reconfiguration (PJM Network Upgrade Number n6936)

4.3.1 ComEd will be responsible to perform design, procurement, and construction to reconfigure the Rock River Fiber Ring at ring nodes in various substations to allot for the addition of the new node at TSS 189 White Rock Substation.

4.3.2 Create new Wayne Dixon Ring via modification of existing Rock River ring nodes. Modify and reconfigure existing nodes into new fiber ring via new local fiber jumpers and DTT cards at STA6 Byron, TSS 144 Wayne, TSS 111 Electric Junction, TSS 155 Nelson, TSS 937 Lee County, and TSS 113 Waterman.

4.3.3 Rebuild Rock River ring via new JMUX nodes, added via new JMUX cards, at TSS 111 Electric Junction and TSS 113 Waterman and modification of existing nodes at STA6 Byron, TSS 144 Wayne, TSS 155 Nelson, Rockford Headquarters, phone room and Crystal Lake Headquarters, phone room.

5. METERING

5.2.1 For PJM:

The IC will be required to install equipment, at TSS 189 White Rock, necessary to provide Revenue Metering (kWH, kVARH) and real time data (kW, kVAR) for interconnection customer's generating resource. See PJM Manuals M-01 & M-14D, and PJM tariff.

5.1.2 For ComEd:

The Interconnection Customer will be required to install equipment necessary to provide bi-directional revenue metering (kWH, kVARH) and real time data (kW, kVAR, and circuit breaker status and 345kV voltage) for IC's generating resource. See ComEd applicable standards available on the PJM website (TO Standards). Optical metering will be installed to eliminate the need for individual metering at each individual wind turbine site. Optical metering has the ability to record both the large outflow of power generation and the sometimes small inflow of auxiliary power requirements of individual wind turbines. It is assumed that required analog and digital communication circuits will be available and obtainable from the Local Telecommunication Provider to meet the Milestone Schedule.

5.1.3 ComEd at IC cost will procure, install, own and maintain the AMI meter including 345kV optical CT/PT on ComEd side of the point-of-interconnection at TSS 189 White Rock substation for retail metering.

6. ENVIRONMENTAL, REAL ESTATE, AND PERMITING

6.1 IC will be responsible to obtain phase-1 environmental assessment and phase-2 approvals, if necessary, for the construction of 345kV TSS 189 White Rock substation.

6.2 IC will be responsible for any remediation costs if location is found to have environmental contaminations.

6.3 IC shall procure a minimum 800' (N-S) x 880' (E-W) property plot to accommodate the construction of 345kV TSS 189 White Rock substation to be owned by ComEd at completion of project turnover. The current project shall be designed on the eastern half of the property allowing for future expansion on the west half of the property. The general arrangement shown in Attachment 2 depicts the concept. The IC is responsible to purchase, grade and fence for current project.

6.4 The IC will be responsible to purchase real estate or obtain the necessary right-of-way easement to install the transmission line tap to 345kV TSS 189 White Rock substation.

6.5 IC will be responsible for any permits and associated cost, including storm water permitting.

6.6 IC will consult ComEd and engage environmental during initial design process in regards to requirements involving drainage and grading.

6.7 It is assumed that all necessary permits will be obtained in a timely manner so as to allow engineering and construction to proceed according to the Milestone Schedule.

6.8 It is assumed that conveyance of property and rights will be obtained to support the PJM Transmission Outage Schedule.

6.9 It is assumed that the required Environmental Study will yield no impediments to the development of the site.

7. SUMMARY OF RESULTS OF STUDY

7.1 Cost Estimate:

NETWORK #	SITE LOCATION	TOTAL PROJECT COST
n6934	**Engineering and Construction Oversight TSS 189 White Rock**	**$1,777,216**
n6935	**Transmission Line Cut-in Tap into TSS 189 White Rock**	**$3,403,783**
n6937	**Relay and Protection Work at STA 6 Byron**	**$502,498**
n6938	**Relay and Protection Work at TSS 144 Wayne**	**$502,498**
n6936	**Rock River Fiber Ring Reconfiguration**	**$570,348**
	Total Cost of ComEd Work	**$6,756,343**

Note:

Costs are based on 2021 rates and do not reflect potential increase of labor or material costs.

[1] IL sales taxes not reflected in this cost estimate.

[2] Carrying charges are anticipated to be zero.

Given that costs associated with this project, it will be invoiced on a quarterly basis prior to work being completed; carrying charges are anticipated to be zero.

7.2 Milestone Schedule

Description	Start	Finish
Prepare Project Diagram & Specifications	Day 1	Day 100
Project Design	Day 100	Day 360
Material Procurement	Day 250	Day 480
Tie-In Construction at TSS 189	Day 480	Day 540
Acceptance Testing at TSS 189	Day 540	Day 600

8. ASSUMPTIONS IN DEVELOPING COSTS AND SCHEDULES

8.1 ComEd estimate is based on the IC agreement of the option to build. ComEd estimate does not include costs of design and construction of TSS 189 White Rock substation as described in IC scope of work. ComEd Schedule dates Estimates based on ISA/CSA contract being executed by all parties.

8.2 ComEd Cost Estimates assume that work will be performed during normal weekdays and with no overtime.

8.3 Transmission line outages for the tap construction have not been identified, but generally are available in spring (March to May) and fall (September to November). These outages are controlled by PJM.

8.4 A CPCN from the ICC will not be required for installation of ComEd interconnection to the new TSS 189 White Rock.

8.5 Foundation design assumes typical soil conditions at locations and will be subject to change after soil boring tests.

8.6 The IC will be responsible to request and bear the cost for relocation of existing transmission or distribution lines (including structures) that may be required for transmission line crossings, the transport of any large equipment, such as turbines, rotors, turbine structures, cranes, etc.

8.7 An outage at a nuclear facility may be required for 345kV L0626 which will be dependent on station availability. Additionally, modifications associated with L.0626 and STA 6 Byron will be assumed to require additional review time for plant review.

8.8 It is assumed that there will be no additional Right of Way work required outside of modifications associated with new structures 63D and 63G.

8.9 IC is assumed to be responsible for obtaining station aux and emergency service power.

8.10 Fiber cost is based on the assumption spare fiber is available for use to reconfigure existing fiber ring. If spare dark fibers do not exist, new fiber cables will potentially need to be routed between substations, which will increase the cost of the proposed modification.

8.11 Arrangement is based on target property provided by IC. Changes to property location have potential to impact this arrangement.

8.12 This Facilities Study is time dependent. If the project is not into construction within one year of the issuance, the Facilities Study will be void and the project re-studied, requiring completion of a new Facilities Study.

9. INFORMATION REQUIRED FOR INTERCONNECTION SERVICE AGREEMENT (ISA)

The following cost estimate is a breakdown of the costs of the ComEd work for # AB1-089 project.

Network	Site Location	Direct Material	Indirect Material	Direct Labor	Indirect Labor	Total Project Cost
n6934	**Engineering and Construction Oversight TSS 189 White Rock**	**$0**	**$0**	**$1,062,049**	**$715,167**	**$1,777,216**
n6935	**Transmission Line Cut-in Tap into TSS 189 White Rock**	**$380,813**	**$713,205**	**$609,363**	**$1,700,402**	**$3,403,783**
n6937	**Relay and Protection Work at STA 6 Byron**	**$16,117**	**$27,000**	**$247,686**	**$211,695**	**$502,498**
n6938	**Relay and Protection Work at TSS 144 Wayne**	**$16,117**	**$27,000**	**$247,686**	**$211,695**	**$502,498**
n6936	**Rock River Fiber Ring Reconfiguration**	**$34,360**	**$1404**	**$199,324**	**$335,260**	**$570,348**
	Total Cost of ComEd Work	**$447,407**	**$768,609**	**$2,366,108**	**$3,174,219**	**$6,756,343**

Note:

[1] IL sales taxes not reflected in this cost estimate.

[2] Carrying charges are anticipated to be zero.

C. APPENDIX

Attachment #1: Project Diagram Depicting Interconnection Facilities and Points of Ownership/Demarcation

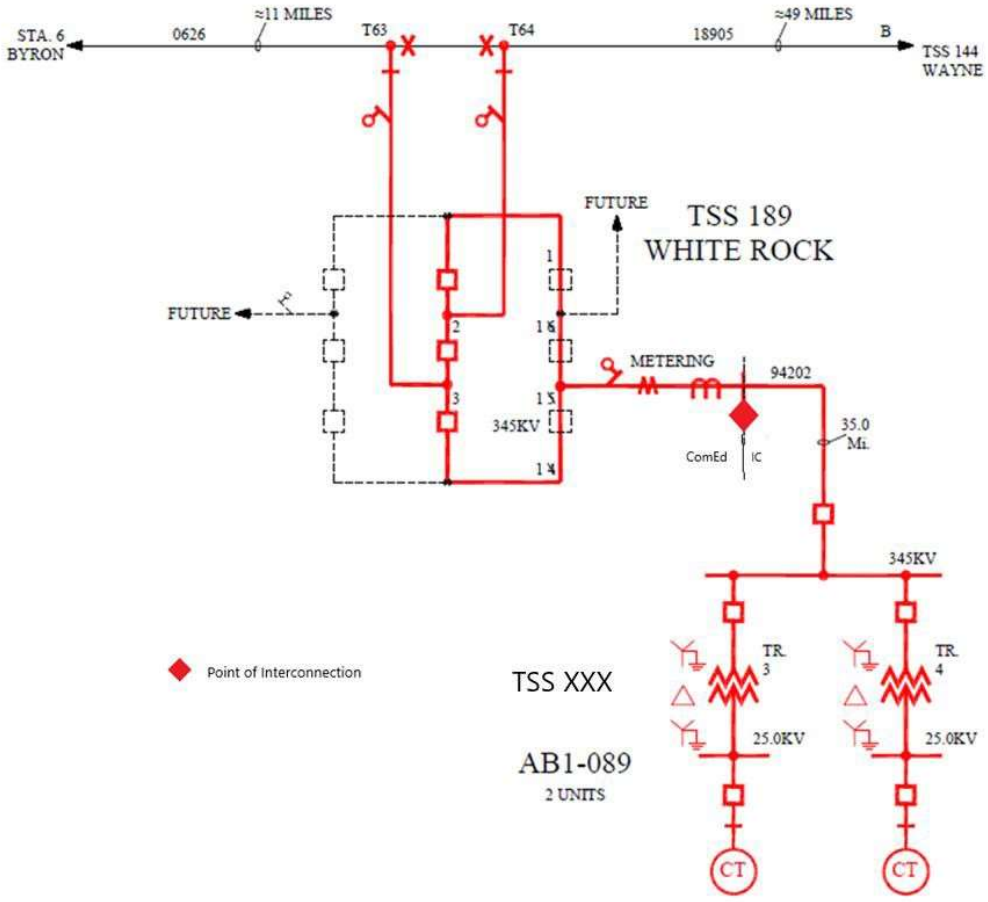
Attachment #2: General Arrangement, TSS 189 White Rock

Attachment #3: Real Estate Map Layout

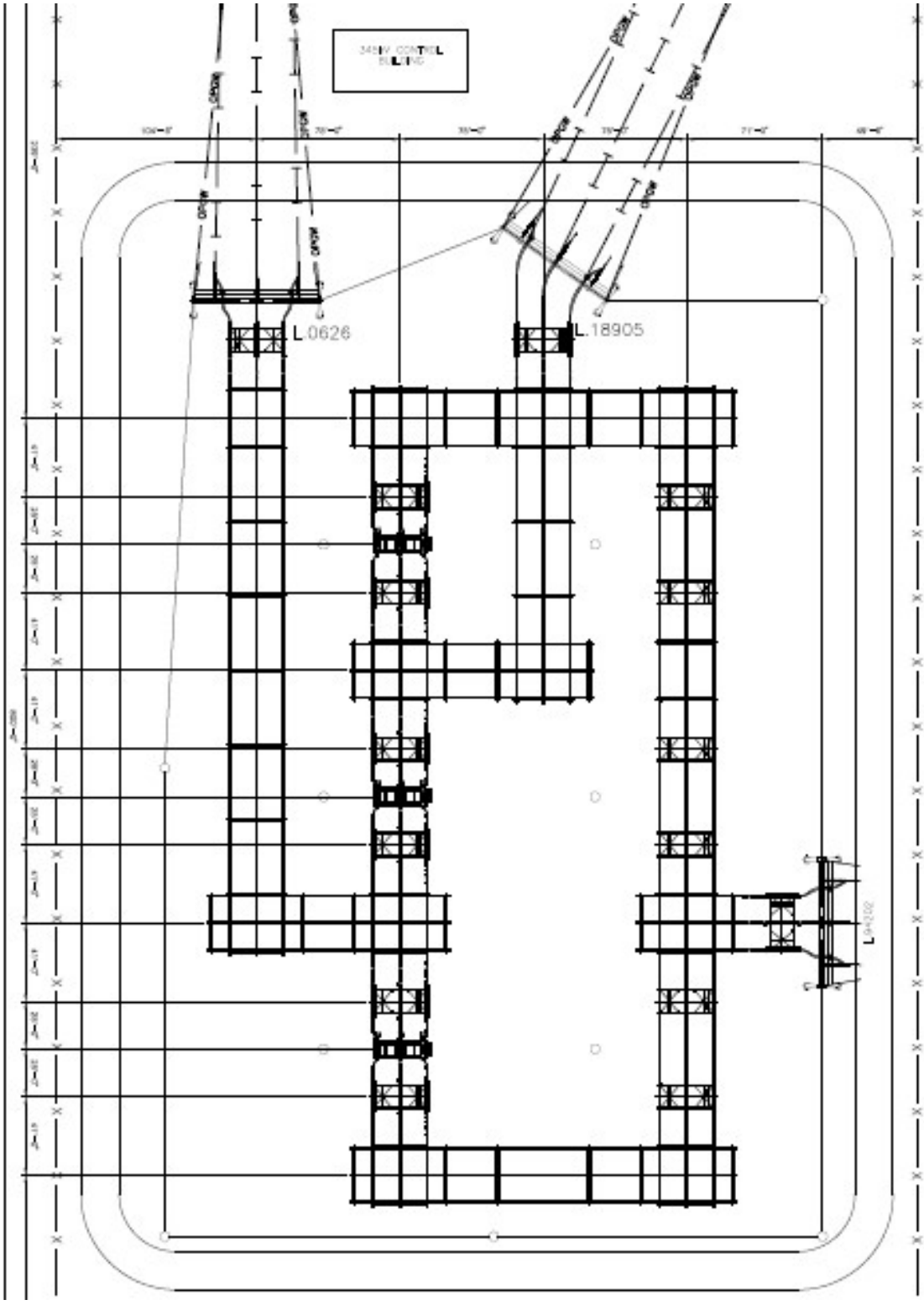
Attachment #4: Relay and Communication Notes

Attachment #5: Real Estate Requirements

Attachment #1: High Level Planning Diagram Depicting Interconnection Facilities and Points of Ownership/Demarcation



Attachment #2: General Arrangement, TSS 189 White Rock



Attachment #3: Real Estate Map Layout

(Provided by Interconnection Customer)

Attachment #4: Relay and Communication Notes

Protection Requirements for AB1-089 Byron-Wayne

1. At STA6 Byron, modify existing L0626 relaying and communications so that remote terminal is at TSS189 White Rock. At TSS189 White Rock for L0626, install new relaying using 87L-1 SEL-411L and an 87L-2 SEL-311L per GDD2302.

2. At TSS144 Wayne, modify existing L0626 relaying and communications so that remote terminal is TSS189 White Rock. This line will become L18905 at TSS189 White Rock for L.18905, install new relaying using 87L-1 SEL-411L and an 87L-2 SEL-311L per GDD2302.

3. At TSS 189 White Rock, install a 50BF/25/79 SEL-451 Relay and associated lockout relay (LOR) on each 345kV circuit breaker to perform Breaker Failure, Synch Check and Auto reclosing. Reference GDD2303 for breaker failure design. Breaker Failure on either L0626 CB shall transfer trip to STA6 Byron. Breaker Failure on either L18905 CB shall provide a Stop Block to TSS144 Wayne.

4. For each new circuit breaker:
    a. All new 345kV & 138kV CB to have a 451 BF relay installed per GDD2303
    b. If the SF6 gas drops to the critical level, the breaker shall be sent a trip signal and both of its MOD's shall be opened because of the reduced insulations in the CB (see EP-5206E). Note if on high side of TR, ok to trip LS CB.
    c. All new CB's will have 3000:5 CT
    d. All new CB will have a SEL2411 for CB monitoring. A local FDP will be installed, and a fiber cable run into the building to an OCEF panel.
    e. For IPP CB, only require item “a” (an equivalent BF) and item “b”

5. Install a 351A relay for 345kV bus tie CB's at TSS 189 White Rock for a 2nd shot from the other direction. Include in BF panel for each bus tie.

6. For 345kV L94202 at TSS 189 White Rock and TSS942 Nelson Energy, install standard ComEd 345 IPP interface relaying consisting of a primary 87L-1 SEL-411L current differential scheme and a secondary 87L-2 SEL-311L-1 current differential scheme; see Communications Table below for required functions. At TSS189, utilize in-line CTs (3000:5 tapped at 3000) for 87L-1 and 87L-2. (Reference TSS945 L94501, Drawings 945E-4101, 4156, and 4157, except add 345Kv Bus 3 phase voltages to both 87L-1 and 87L-2 relays) Install load rejection logic such that transfer trip is initiated on both primary and secondary relaying to IC’s collector substation if both BT1-3 and BT1-2 are open. Current Differential relay communications to be over single mode fiber with diverse routing of Primary and Secondary fiber cables.

7. At IC’s collector substation, Protection System design must adhere to the following project specific notes:
    a. ComEd Protection and Control Engineering must review all customer relay protection design drawings and relay settings
    b. Customer equipment impedance and/or test data must be provided to ComEd Protection and Control
    c. Customer to include Over/Under frequency and voltage protection at wind farm collector bus.
    d. Over/Under-frequency settings are to comply with PJM Requirements.
    e. Dual TRFM protection and site protection must be compliant with NERC & PJM Manual 7 requirements
    f. Metering is required to be installed per ComEd & PJM standards

g. A SCADA interface must be included to provide ComEd with Customer BES equipment status.
h. Witness testing by ComEd or a DA will be required and must be pre-scheduled at least 90 days in advance

8. For any new equipment connected to the BES (Bulk Electric System rated at 100kV or above) ComEd requires the associated primary and secondary protective schemes to have a minimum redundant:
   a. Connected CTs
   b. PT secondary DC control circuits
   c. Auxiliary trip relays
   d. Circuit breaker trip coils.

9. Communications and SCADA specs to be issued separately.

10. Install freestanding in-line CTs, with 4 sets of multi-ratio CTs with an overall ratio of 3000:5, C800 accuracy class, and at least a 1.5 times rating factor.

11. At TSS 189 White Rock, 345Kv Bus 3 relay protection to include an 87B1-1 MFAC34 High Impedance Bus Differential relay and associated 86B1-1/LOR, and an 87B1-2 SEL-487B-1. Reference TSS935 Bus 10, prints 935E-4108, 4108A and 4184.

12. At TSS189 White Rock, install 3 phases of CCVTs on each new 345kV Bus.

138kV Line 94201: Direct Fiber

	Function	TSS 189	TSS 942
SEL-411L	LTT, BFTT, Load Rejection**, Curr Diff	T	R
	LTT, BFTT, Curr Diff	R	T
SEL-311L	LTT, BFTT, Load Rejection**, Curr Diff	T	R
	LTT, BFTT, Curr Diff	R	T

** Load rejection transfer trip to TSS942 if any of the below conditions occur (logic via 52b breaker aux contacts):

Attachment #5: Real Estate Requirements

It is the IC's responsibility to purchase property, acquire rights, and obtain any required permits for the transmission, distribution, and or communication lines required to interconnect its generation. In addition, the IC will grant to ComEd such rights and interests as may be reasonably necessary to interconnect the generation facility and associated network upgrades to the ComEd system. Real estate transactions will be determined by the type of interconnection configuration employed, which may include:

Conveyance of fee simple ownership to ComEd for a switchyard.

Conveyance of perpetual easements (exclusive and nonexclusive) associated with the switchyard including, but not limited to, access, drainage, and such overhead and underground facilities as ComEd may reasonably require for the construction, use, maintenance, and operation of the switchyard.

Conveyance and or acquisition of perpetual easements (exclusive and nonexclusive) and or other property rights for all purposes of interconnecting the generation facilities and associated network upgrades with the ComEd transmission, distribution and communication systems, including such overhead and underground electrical and related communications, transmission and distribution facilities.

In each of the three transaction scenarios outlined above, or any combination thereof, the IC will be responsible for executing and delivering all documentation requested by ComEd, which may include deeds, easements, purchase agreements, assignments, affidavits, certifications, statements and releases, and for providing a title policy, with the appropriate endorsements, covering the rights and interests conveyed.

ComEd will grant to the IC, subject to engineering review and approval, easement rights or consents, as applicable, for:

Perpendicular crossings of ComEd transmission / distribution right of way to accommodate facilities such as roadways and various utilities.

ComEd Scope

ComEd will provide the following:

Real estate forms of agreement, which incorporate terms and conditions that reflect ComEd's standard business practices.

Engineering review of proposed IC facilities that involve real estate and/or right of way in which ComEd has an interest.

IC's Scope

It is imperative, when the IC is required by the scope of a project to provide information, that the deliverables itemized below be received by ComEd as soon as possible. This will facilitate a timely review and will allow ComEd to address the real estate aspects of the project in a timely manner.

The IC is responsible for providing the following:

The following current information covering all interests and rights to be conveyed to ComEd:

- Title Policy/Commitment.
- Copies of all recorded documents listed in above-mentioned Title Policy/Commitment.

- ALTA/ACSM Land Title Survey, which will include adjoining Exelon property, if applicable.
- Phase I Environmental Assessment Report (Phase 2 also if there is a fee conveyance to ComEd) and any other environmental reports, notifications and documents as required. IC to utilize only contractors approved by ComEd Environmental department for this work.
- Wetland Delineation reports. IC to utilize only contractors approved by ComEd Environmental department for this work
- Annexation Agreement(s), zoning changes or other governmental agreements or approvals entered into or proposed for the Project.
- All jurisdictional permits, such as special use and building permits, that have been issued for the project or copies of pending applications that relate to or affect property in which ComEd has or will have a right or interest.
- Detailed civil engineering drawings showing the proposed site plan, layout, drainage, access and facilities.

Additional information may also be required, depending on specific project requirements. Requests for such information will be transmitted to the IC during project development

IPP REAL ESTATE CHECKLIST

DUE DILIGENCE CHECKLIST – PROPERTY TO BE CONVEYED

Note: This list is somewhat project specific and is offered as a guide. All of the information listed is to be submitted by the Interconnection Customer as available during project development. Real Estate & Facilities and Legal will determine what information is required on a project specific basis.

	Item/Document
1.	Title Documents a. Copy of the Policy or Commitment b. Copies of all Schedule B exception documents
2.	Environmental Documents a. Phase 1 Environmental Assessment report (and Phase II Environmental Assessment report, if necessary) b. Wetland delineation report c. Other pertinent reports, notifications and approvals
3.	Zoning/Subdivision Documents a. Copies of any permits that have been issued (special use, building, access, etc.) or pending applications
4.	Land survey(s) with legal description(s)
5.	Site plan, layout drawing(s)

SWITCHYARD/SUBSTATION CONVEYANCE CLOSING CHECKLIST

Note: Several of the items/documents below require due diligence documentation, for example, Items 3 through 5.

	Item/Document	Party Responsible
1.	Purchase and Sale Agreement	ComEd Form
2.	Deed	IPP
	a. Legal Description	IPP
	b. Plat Act Affidavit, if necessary	IPP
3.	Bill of Sale	IPP

	a. List of Personal Property	IPP
4.	Assignment of Contracts and Permits a. List of Contracts and Permits	ComEd Form IPP
5.	Assignment of Warranties (General) a. List of Purchase Orders	ComEd Form IPP
6.	Assignment of Warranties (Primary Contractor(s))	ComEd Form
7.	Copies of all Construction and Development Contracts and Purchase Orders	IPP
8.	Copies of all plans, specifications, operating manuals and warranties	IPP
9.	Copies of any permits necessary for the ownership, construction and use of the Substation, including: a. Certificate of Occupancy b. Driveway / Curb Cut / Access Permits c. Building Permit for Substation d. Drainage Permits	IPP
10.	Transmission Easement (if necessary)	ComEd Form
11.	Drainage Easement (if necessary)	ComEd Form
12.	Electrical (Distribution) Easement (if necessary)	ComEd Form
13.	Fiber Optic Easement (if necessary)	ComEd Form
14.	Ingress-Egress Easement (if necessary)	ComEd Form
15.	Illinois Transfer Tax Declaration (and any local or county declarations, if necessary)	IPP
16.	As-built ALTA Survey	IPP
17.	Title Commitment / Policy (including all endorsements)	IPP

18.	Copies of all underlying title documents	IPP
19.	FIRPTA Certificate	IPP
20.	ALTA Statement	IPP
21.	Gap Undertaking	IPP
22.	Any documents required by the title company to issue affirmative mechanic's lien coverage in favor of ComEd	IPP
23.	Closing Statement	ComEd/IPP
24.	Certified IPP/Corporate or Partnership Authority, Organizational and Good Standing documents	IPP
25.	Plat of Subdivision (formally subdividing the ComEd parcel from the IPP Parcel), if necessary	IPP
26.	Copy of any Annexation Agreement, Redevelopment Agreement, Economic Incentive Agreement or similar document affecting the IPP property, and all related documents	IPP
27.	Comfort letter from municipality regarding zoning, subdivision and land use issues	IPP
28.	Copies of applicable zoning ordinances and maps, and subdivision ordinances and maps	IPP
29.	Release and Subordination documents from IPP's lender (if any) with respect to substation and ComEd's easements	IPP
30.	Any necessary consents for consummation of transaction	IPP