New York State Electric & Gas Corporation

Jennison Transmission Solution Project

Exhibit E-4

Engineering Justification

Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document

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EXHIBIT E-4: ENGINEERING JUSTIFICATION

E-4.1 Summary of the Proposed Plan and Its Benefits

As part of its commitment to provide safe and reliable service to customers in the Oneonta Area, the Applicant[1] is proposing the Project to help meet the clean energy goals under New York State's CLCPA and to improve regional reliability and resiliency of the transmission system. In its Order Authorizing Continuation of Phase 1 Transmission Projects and Cost Recovery Measures, dated December 15, 2022 in Case 20-E-0197, the Commission identified the NYSEG proposed components that comprise the Project as a Qualifying Project qualifying for cost recovery treatment pursuant to the Commission's Order on Phase 1 Local Transmission and Distribution Project Proposals, dated February 11, 2021 in the same proceeding. Also in the above 2022 order, the Commission authorized NYSEG "to continue advancing the projects identified as Qualifying Projects and subject to the conditions and spending limitations discussed in the body of this Order." NYSEG submits that these and similar Commission determinations in the CLCPA context demonstrate the need for the Project.

The Project includes a full line rebuild of the 115kV Lines 946 and Line 949, a rebuild of the Jennison Substation 115kV facilities (including a loop of the 115kV Line 919 into the new Jennison Substation), and the replacement of the 46kV facilities. Construction of the Project will enable the Applicant to meet NERC requirements and improve reliability in the area.

E-4.2 System Description

The Project includes the rebuild/relocation of the Proposed Jennison Substation, the rebuild of the 115kV Existing Line 946 connecting the Proposed Jennison Substation and the North Pond Substation, the construction of Proposed Line 734 within the Existing ROW of the northern portion of Existing Line 946, and the rebuild of the Existing Line 949 connecting the Proposed Jennison Substation and the Eastern Terminus. The Project is in the east-central portion of the Applicant's service territory. The rebuild/relocation of the Jennison Substation will also require the partial rebuild/relocation of several 115kV transmission lines (Existing Lines 756, 943, and 954) from

[1] For clarity and consistency, the Application includes a Master Glossary of Terms that defines terms and acronyms used throughout the Application.

their connections at the Existing Jennison Substation to new connections at the Proposed Jennison Substation. The Existing Line 919 will be divided at the Proposed Jennison Substation parcel into Proposed Line 756 (west) and Proposed Line 919 (east). Figure E-4-1 shows the location of the Existing and Proposed facilities of the Project.

E-4.3 Need for the Proposed Project

NYSEG's Oneonta Division is comprised mainly of a 46kV sub-transmission network located in a central part of New York State. The limited number of 115kV/46kV source connections in this area is a contributing factor to its underlying weakness and limited load serving ability, especially under certain contingency conditions. [redacted] This 115kV transmission line topology cannot meet minimum NERC criteria and has been the primary cause of reliability needs identified in this area.

The Oneonta Division served approximately [redacted] of load during its 2021 summer peak load conditions. The NYISO forecasts that this load will increase to approximately [redacted] by 2030, including the penetration of distribution level behind-the-meter generation which contributes to a reduction in the rate of load increase. This area does not currently contain any utility scale non-renewable generation resources, but it does have approximately 41 MW of nameplate wind generation located at Madison Wind Farm and approximately 34.5 MW of nameplate wind generation at Munsville Wind Farm. Oneonta also has 1.5 MW of nameplate hydro at Goodyear Lake directly connected to Colliers Substation. There is also a considerable amount of renewable generation planned for the Oneonta Area, including High Bridge Wind Farm, an approximately 100 MW (nameplate) wind farm certified in 2021 under PSL Article 10 in Case 18-F-0262.

In addition to the renewable generation projects, there are several high-voltage direct current projects proposed to connect the Fraser 345 kV substation to a new 345 kV substation southeast of Fraser. This would enable [redacted] additional transfer capabilities between Fraser and New York City.

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An aerial overview of NYSEG's Oneonta Division can be seen in Figure E-4-2. Located at the edge of the division, Fraser Substation is a [redacted] 345 kV junction point [redacted] The Fraser Substation currently has a firm planned project to expand the 115kV facilities and install an additional 345/115/46kV transformer. In addition, the 115kV portion of the nearby Delhi substation will be re-routed to Fraser. The 46kV bus at the Delhi Substation will remain and two feeders from the Fraser Substation will connect to it. The proposed in-service date for the Fraser expansion project is December 2025. It should be noted that the electrical one-line provided below shows the 115kV portion of the Fraser expansion project [redacted]

The reliability needs in this area are described in Table E-4-1 and were originally identified in the 2018 BES Study and reconfirmed in 2021. This study was done by the Applicant's Transmission Planning team to demonstrate that the portion of the Bulk Electric System owned by the Applicant is compliant with the NERC Transmission Planning Performance Requirements standard, otherwise known as TPL-001. The results indicate several system weaknesses [redacted] These area-wide needs were considered as initiating needs and used as the basis for the Project.

Table E-4-1: Oneonta Reliability Needs (2018 BES Study)

[redacted]

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Due to the topology of the Oneonta area, there are only a few 115kV sources into the sub-transmission network. These sources are on the southern, eastern, and western borders of the Oneonta Division. There are no 115kV or higher sources in the center of the 46kV sub-transmission network. [redacted]

Table E-4-2 provides transmission deliverability needs the Applicant identified in the Oneonta area as part of the 2020 CLCPA Study. This study was done by the Applicant's Transmission Planning team to perform a comprehensive assessment of the Applicant's capital plan projects in several divisions that are mature, immediately actionable, and beneficial to the integration of renewable resources in support of New York's year 2030 climate policy objectives. [redacted]

Table E-4-2: Deliverability Needs (2020 CLCPA Study)

[redacted]

E-4.4 Proposed Plan and Its Benefits

NYSEG's Existing Jennison Substation is a 115/46kV substation originally built in 1945 with a total of eight key transmission elements. The Existing Jennison Substation was constructed to interconnect the AES Corporation Jennison fossil fuel power plant to the grid; however, this generation plant has since retired, leaving the Existing Jennison Substation with only five transmission elements. The 115kV portion of the substation [redacted] interconnects four transmission lines and a 115/46kV transformer. The 46kV portion of the Existing Jennison Substation is also configured [redacted] with two sub-transmission lines and a single

grounding transformer. Figure E-4-3 provides an aerial view of the Existing Jennison Substation as well as an electrical one-line drawing illustrating the Existing Jennison Substation topology.

The Applicant's Substation Circuit Breakers study dated April 29, 2021, was used to evaluate breaker health at the Existing Jennison Substation. [redacted]

The 115/46kV transformer (B1) consists of three single-phase units and a spare, all installed in 1947. [redacted] The 46kV ground bank was installed in 1945. [redacted]

The Existing Jennison Substation 115kV yard is located within a FEMA Special Flood Hazard Area and its 46kV yard is located within the 100-year flood zone. This is shown in Figure E-4-4. The maximum depth of water anticipated during a 500-year flood event is four feet. The station is physically constrained to the north and south by the retired AES Corporation power plant and the Existing ROW.

[redacted] Existing Line 919 must be brought into the Proposed Jennison Substation. This will strengthen the voltage profile at the Proposed Jennison Substation and allow for additional power transfer capabilities. In addition, renewable penetration has heavily overloaded the Existing Line 946, [redacted]

To aid in the mitigation of these reliability and deliverability needs as well as solve the asset condition needs at the Existing Jennison Substation, a full 115/46kV substation rebuild is proposed approximately 0.9 mile west of the existing site outside of SFHA (located just north of the Existing Line 919 ROW). The 115kV yard at the Proposed Jennison Substation includes a 4-bay [redacted] AIS design, two new 50 MVA 115/46kV transformers with dedicated low side breakers and a new 46kV yard designed as a new 69 kV AIS [redacted] The 46kV bus will be

designed with two new 46kV ground banks and two additional positions, one on each end of the bus tie, to accommodate potential future expansion.

The 115kV transformer equipment will be rated to [redacted] interrupting capability, and the 46kV equipment will be rated at [redacted] interrupting capability. This solution is also notably superior in that the Proposed Jennison Substation mitigates all identified flooding risks and allows for less complex construction sequencing, since most of the Proposed Jennison Substation work can be constructed in an off-line or de-energized manner. An electrical one-line drawing illustrating the configuration of the Proposed Jennison Substation as well as the proposed site plan depicting the general arrangement of equipment in the Proposed Jennison Substation yard can be seen in Figure E-4-5.

The Proposed Line 919 will be sectionalized and brought in-and-out of the new [redacted] Proposed Jennison Substation. The Proposed Line 919 sections will be served from adjacent bay positions. This will strengthen the 115kV voltages at the Proposed Jennison Substation and help allow for additional power transfer capabilities.

In addition, the Existing Lines 946 and 949 need to be upgraded due to asset condition to ensure future reliability in the area. Existing Lines 756, 919, 943, 954, 818, and 823 will also be relocated/rebuilt to reconnect from the Existing Jennison Substation to the proposed location.

The system reinforcements proposed in the Project include:

- Rebuilding Existing Lines 946 and 949; and
- Replacing all limiting equipment in the series path of the Existing Lines.

Existing Lines 818 and 823 will be rerouted from the Existing Jennison Substation to the Proposed Jennison Substation. Existing Line 919 will be divided at the Proposed Jennison Substation parcel into Proposed Line 756 (west) Proposed Line 919 (east).

A one-line diagram of the Proposed Lines is provided in Figure E-4-5.

In consultation with the NYISO, NYSEG performed all the necessary analyses for an SIS screening and determined that an SIS is not necessary for the Project. The NYISO agreed. This is documented in the correspondence, dated October 25, 2023, provided as Attachment E-4-A.

E-4.5 Construction Schedule

The Project is proposed to be in service by March 2030. A delay in the construction of the Project will impact customers in the local area should the contingencies identified occur. This will also have an impact upon NYSEG's compliance with NERC, NPCC, and NYSRC standards.

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Jennison Transmission Solution Project

Exhibit E-4

Engineering Justification

Figures

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Exhibit E-4

Engineering Justification

Figure E-4-1

Existing and Proposed Facilities

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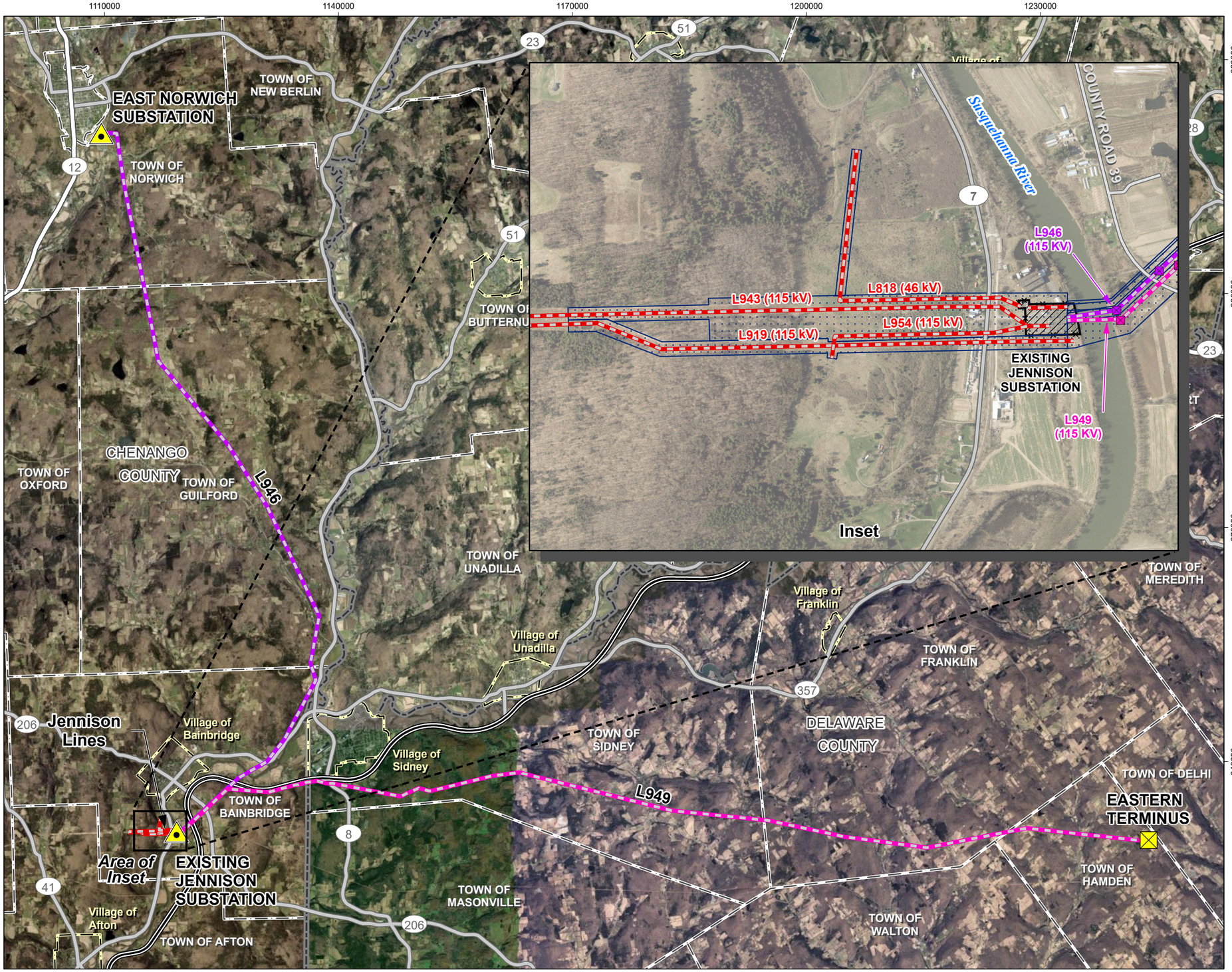

NYSEG
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Jennison Transmission Solution Project

- Eastern Terminus
- Line 946 Structure, Existing
- Line 949 Structure, Existing
- Substation, Existing
- Existing Line 946
- Existing Line 949
- Existing Jennison Line
- Existing Right-of-Way
- Existing Jennison Substation

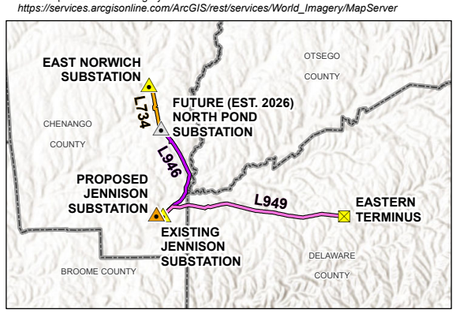
Road or Highway

- Interstate
- U.S. or State Highway
- Secondary State or County Highway
- City or Town Boundary
- County Boundary
- Village Boundary

N

0 1 2 Miles
(At original document size of 11x17)
1:155,000

Notes
1. Coordinate System: NAD 1983 StatePlane New York Central FIPS 3102 Feet
2. Data Sources: NYSEG Data, 2024; Esri North American Detailed Streets, 2012; NYS OITS GIS Program Office Civil Boundaries, 2018
3. Background: Primary Map - USGS Topo (The National Map):
   https://basemap.nationalmap.gov/arcgis/rest/services/USGSTopo/MapServer
   Inset Map - Esri World Imagery:
   https://services.arcgisonline.com/ArcGIS/rest/services/World_Imagery/MapServer



Project Location
Chenango, Delaware, & Otsego Counties, NY

Prepared by DG on 2024-08-07
TR by AB on 2024-08-07
IR by BS on 2024-08-14

Client/Project
213415070 REVA
Jennison Transmission Solution Project
NYSEG CLCPA Program

Figure No.
E-4-1

Title
Existing and Proposed Facilities
Mapsheet 1 of 2 - Existing Facilities

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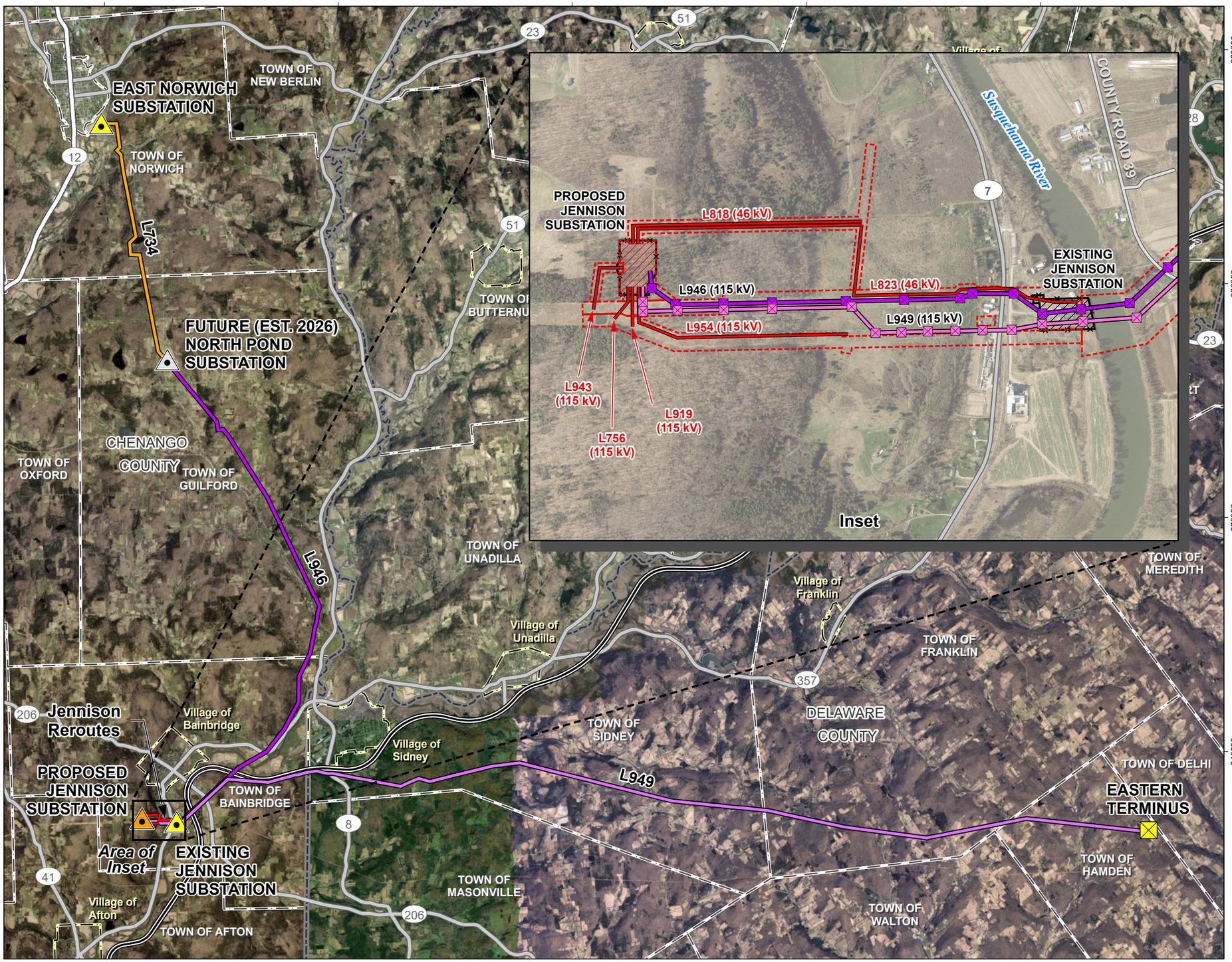

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Jennison Transmission Solution Project

- Eastern Terminus
- Line 946 Structure, Proposed
- Line 949 Structure, Proposed
- Substation, Existing
- Substation, Future
- Substation, Proposed
- Proposed Line 734
- Proposed Line 946
- Proposed Line 949
- Jennison Reroute
- Proposed Right-of-Way
- Existing Jennison Substation
- Proposed Jennison Substation

Road or Highway

- Interstate
- U.S. or State Highway
- Secondary State or County Highway
- City or Town Boundary
- County Boundary
- Village Boundary

N

0 1 2 Miles
(At original document size of 11x17)
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Notes
1. Coordinate System: NAD 1983 StatePlane New York Central FIPS 3102 Feet
2. Data Sources: NYSEG Data, 2024; Esri North American Detailed Streets, 2012; NYS OITS GIS Program Office Civil Boundaries, 2018
3. Background: Primary Map - USGS Topo (The National Map):
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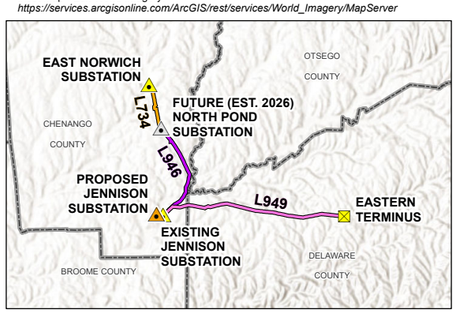
   https://services.arcgisonline.com/ArcGIS/rest/services/World_Imagery/MapServer



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Jennison Transmission Solution Project
NYSEG CLCPA Program

Figure No.
E-4-1

Title
Existing and Proposed Facilities
Mapsheet 2 of 2 - Proposed Facilities

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Jennison Transmission Solution Project

Exhibit E-4

Engineering Justification

Figure E-4-2

Aerial Overview of Oneonta Area Bulk Transmission Lines

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Engineering Justification

Figure E-4-3

Existing Jennison Substation Aerial View and One-Line Drawing

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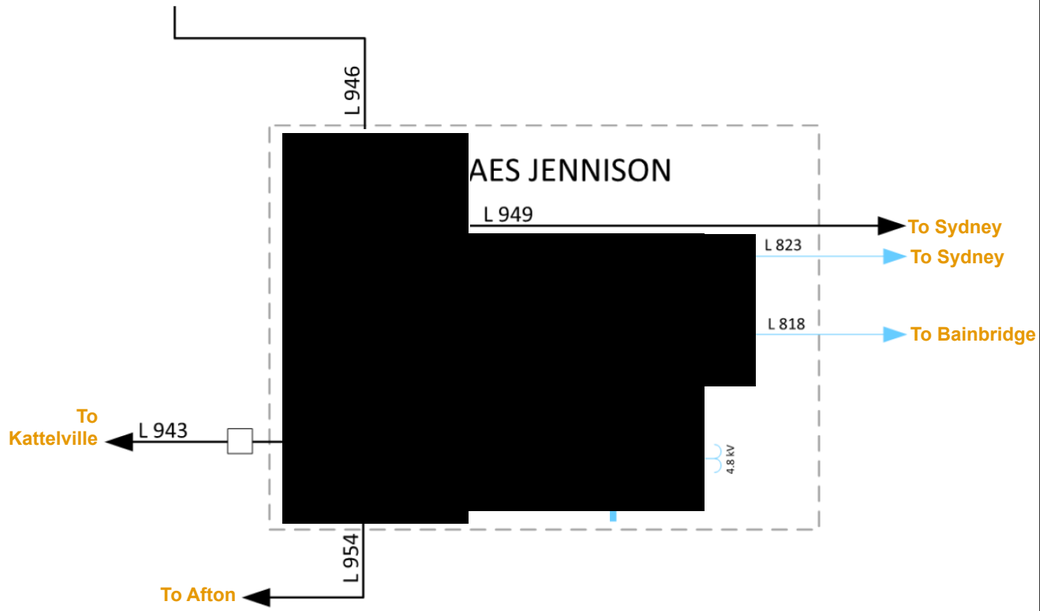

Critical Energy/Electric Infrastructure Information (CEII) Has Been Redacted From This Document

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Existing Jennison Substation

46 kV

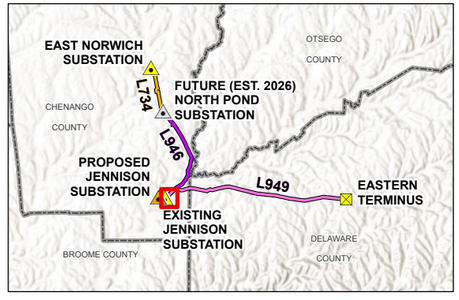
115 kV

N

0 100 200 Feet

(At original document size of 11x17)
1:2,000

Notes
1. Scale applies to aerial view of substation only; one-line diagram is not to scale.
2. Aerial Background: Esri World Imagery:
https://services.arcgisonline.com/ArcGIS/rest/services/World_Imagery/MapServer



Project Location
Chenango, Delaware, &
Otsego Counties, NY

Prepared by AB on 2024-07-29
TR by DG on 2024-08-07
IR by BS on 2024-08-14

Client/Project
213415070 REVA

Jennison Transmission Solution Project
NYSEG CLCPA Program

Figure No.
E-4-3

Title
Existing Jennison Substation Electrical One-Line Diagram and Site Plan

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New York State Electric & Gas Corporation

Jennison Transmission Solution Project

Exhibit E-4

Engineering Justification

Figure E-4-4

Existing Jennison Substation Flood Zone Overlay

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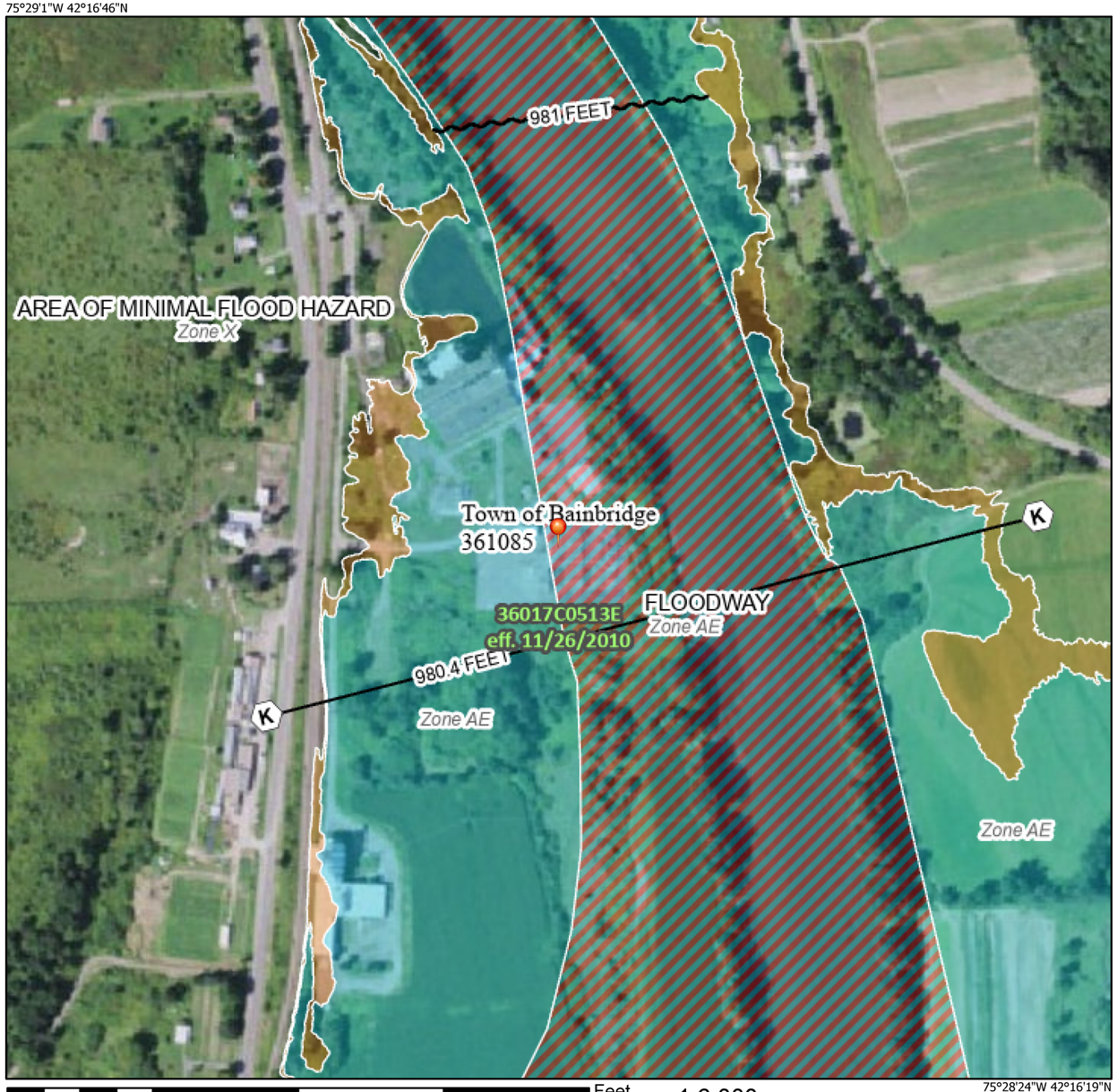
National Flood Hazard Layer FIRMette

FEMA

75°29'1"W 42°16'46"N



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

1:6,000

75°28'24"W 42°16'19"N

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 8/8/2024 at 2:31 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

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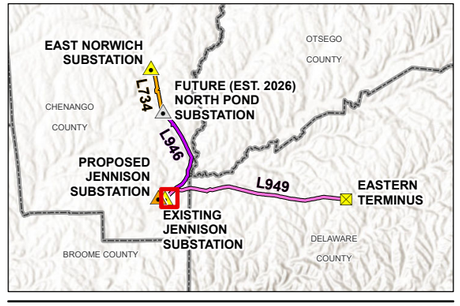

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NYSEG CLCPA Program

Figure No.
E-4-4

Title
Existing Jennison Substation Flood Zone Overlay

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Exhibit E-4

Engineering Justification

Figure E-4-5

Proposed Jennison Substation Electrical One-Line Drawing and Site Plan

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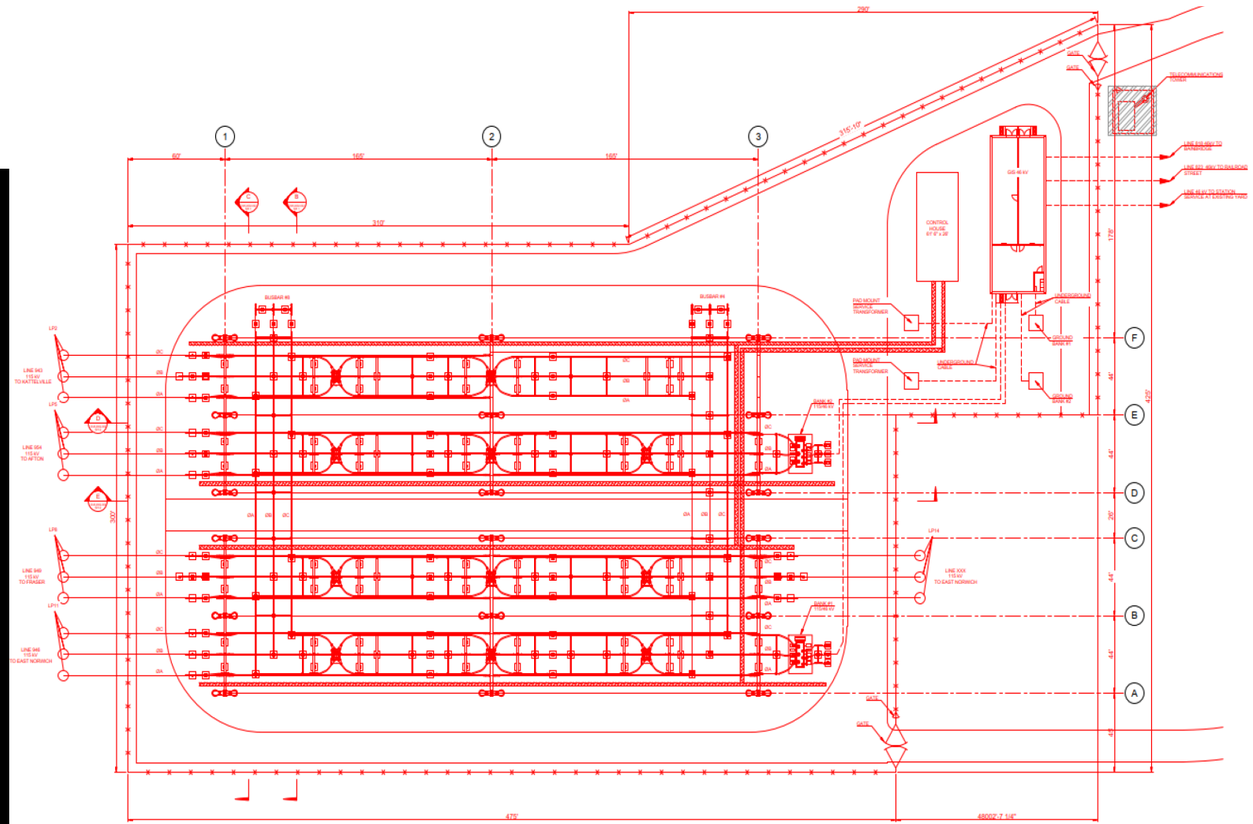
[redacted]



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Proposed Jennison Substation

- 46 kV
- 115 kV
- Proposed Project Scope
- (#) Equipment Summary ID

N

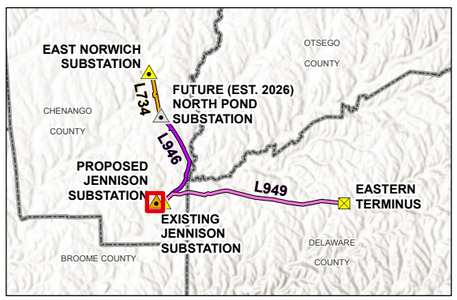

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Figure No.

E-4-5

Title

Proposed Jennison Substation Electrical One-Line Diagram and Site Plan

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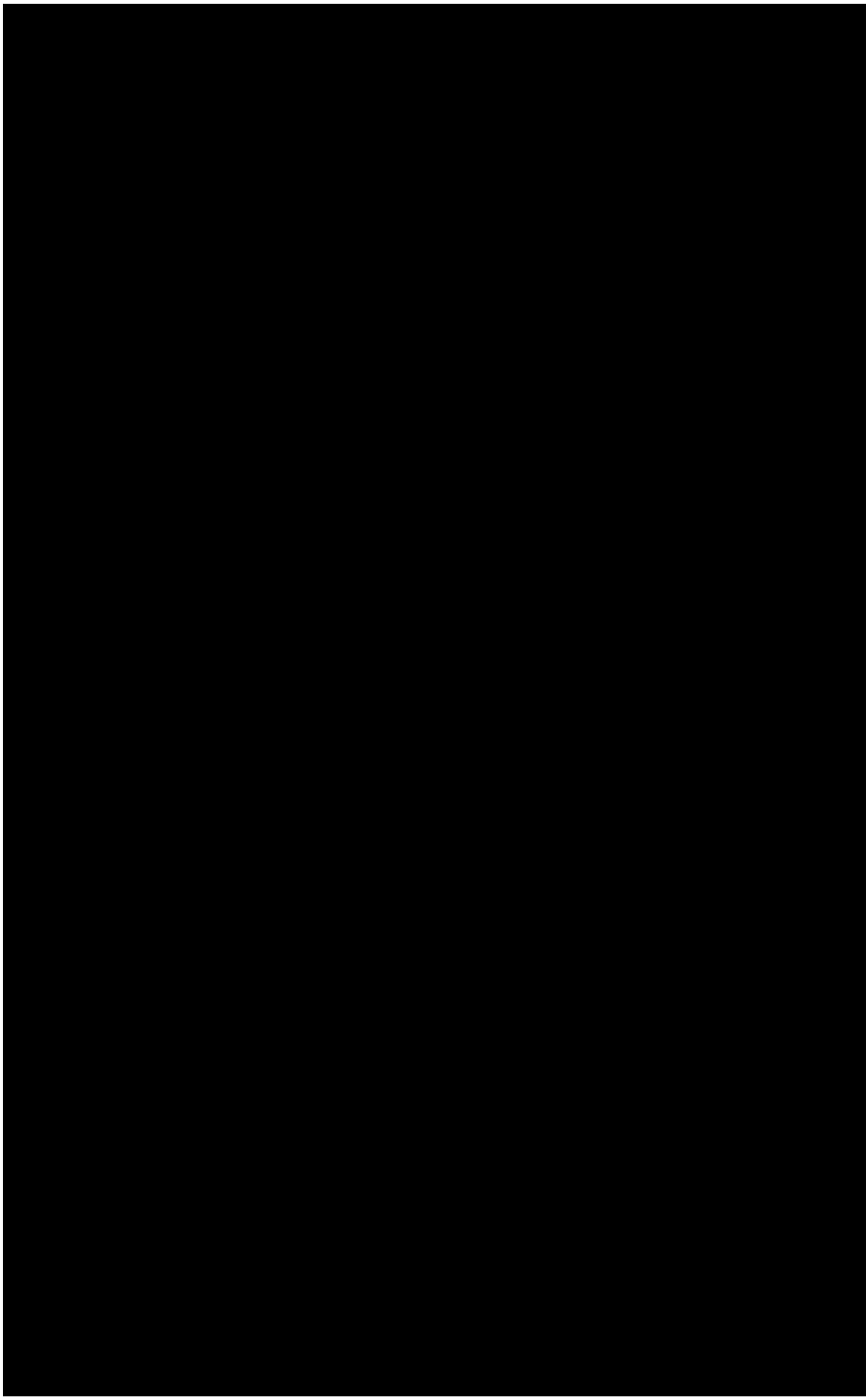
Jennison Transmission Solution Project

Attachment E-4-A

SIS Correspondence



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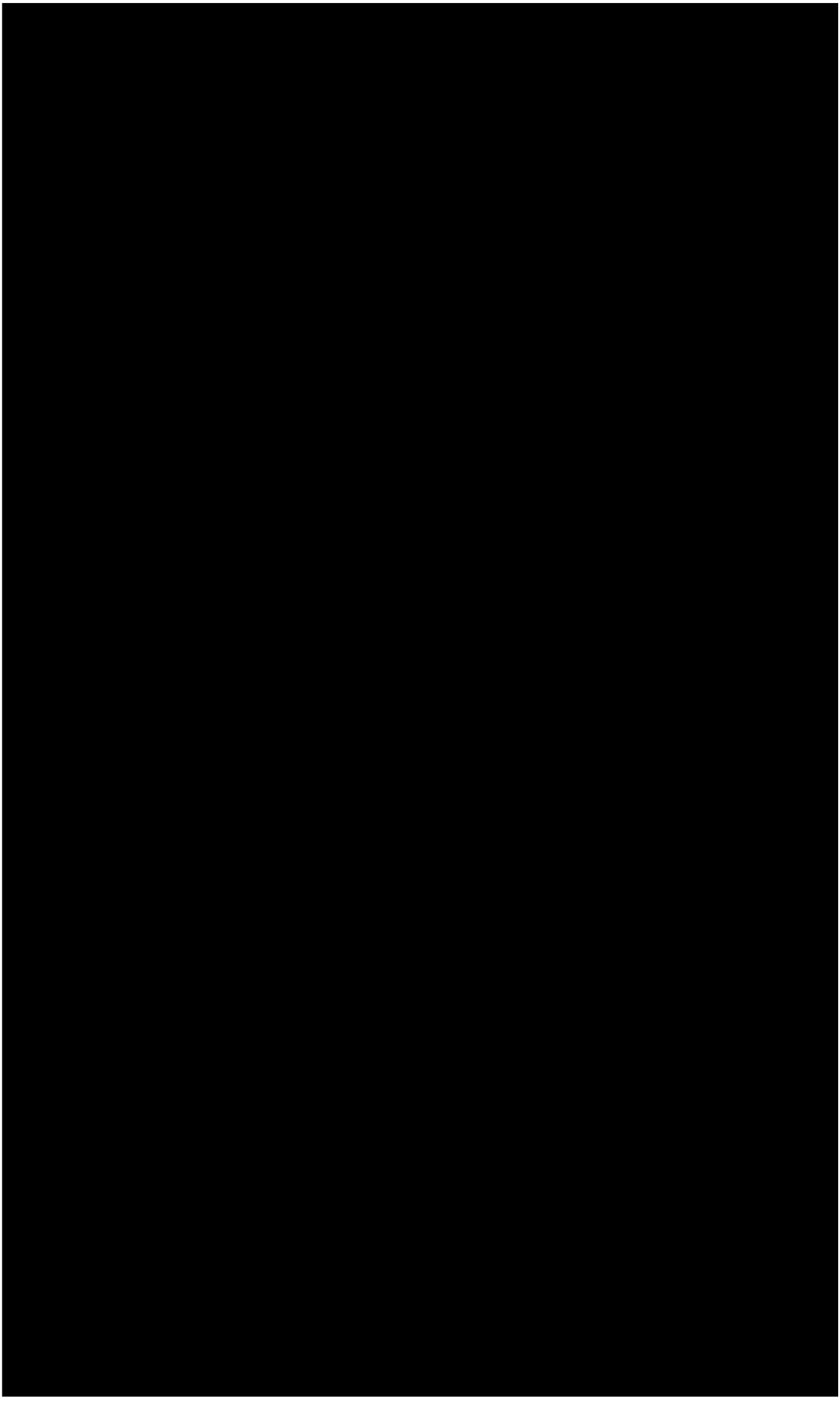

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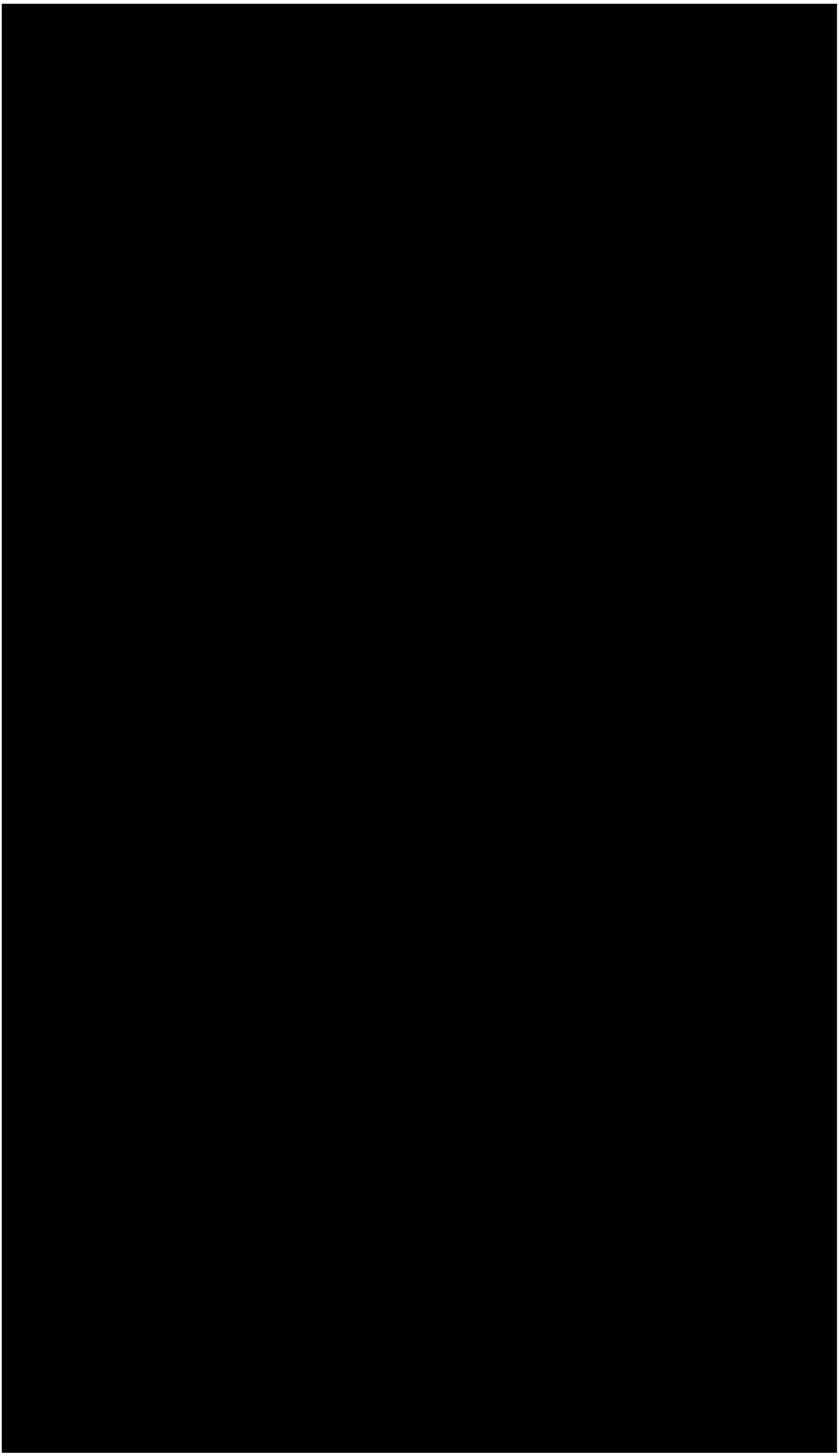

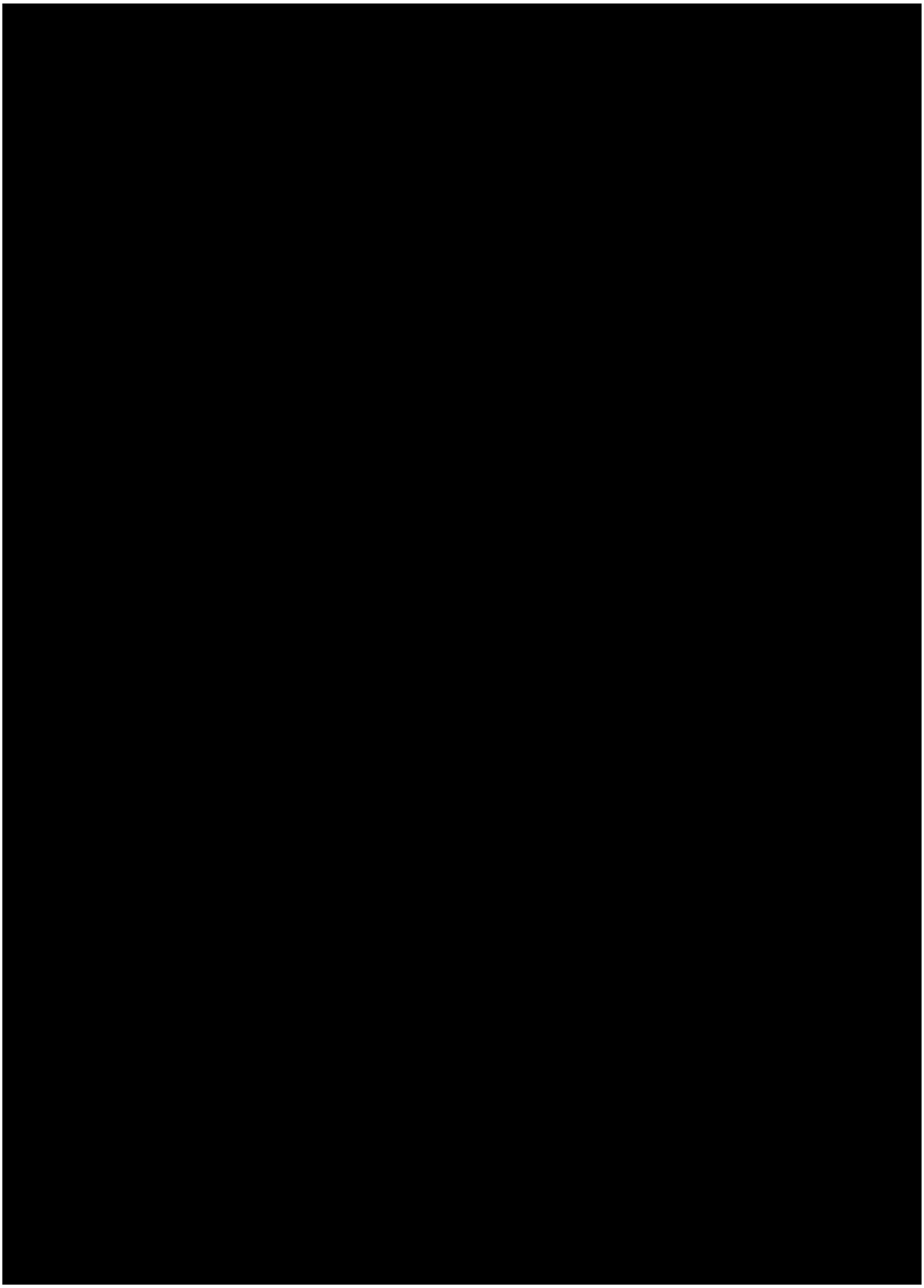

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