NATIONAL GRID
WORK ORDER PROCESS

Last Updated: 4/9/24

Log-into National Grid

1. Webaccess Application Portal: https://webaccess.ngrid.com/
   a. Enter Username, Password
   b. First 4 digits of token and 6 digit number on your token
   c. For Smallworld
      - National Grid GIS folder
   1. For New England: NE Production Elec GIS
   2. For New York: NY Production Elec GIS
   d. For STORMS
      - Storms Folder
   1. Storms Icon
   2. Enter Username and Password

Help Desk

2. GIS Help Desk:
   a. Call: 1-877-373-1112 option 2, 4, 2 (7AM-4PM Monday through Friday).
   b. Email: gishelpdesk@us.ngrid.com
3. STORMS Help Desk:
   a. Call: 1-877-373-1112 option 2, 3, 1.
   b. Email: STORMSIschedulerProductionSupport@nationalgrid.com

Infonet Links

1. Construction standards manual:
   http://us3infonet/sites/eng_delivery_svcs/Pages/OHBook-Current.aspx
2. Procedures and support: http://us3infonet/sites/field_ops_eng/Pages/Doc_Index.aspx
3. RCC maps: http://ngrid-scc/RCC_MapDB/

Process Overview

1 Set up local folders and send GIS Design to GIS
2 GIS Updates, Pole Access and Tree Trimming Review
3 Address Real World Objects (if necessary) and Generate CUs
4 CU Review/Add/Remove
5 Add Description of Work and Annotation
6 Repeat steps 3-5 for each pole with electric make ready
7 Construction Sketches
8 Permitting (as needed)
9 Environmental and Forestry Reviews (as needed)

Many of the Work Order Related Documentation live here:
\\syrfile15\Projects\NationalGrid-Engineering\ProjectData\FieldData\Work Order Resources

(1) Work Order Setup and Local Folder

Note: Will be presenting based ln my workflow.

1. Open your dashboard in Helix and click blue application to open in Helix
2. Under the Detail Tab, Select the Design CSV, Final C-Form and Map and click Extract Button
3. Save to local directory where you store work order related files
4. If CSV hasn't been updated to Helix, check: \\syrfile15\Projects\NationalGrid-Engineering\ProjectData\FieldData\NGRID 3rd Party\Design Data Dump CSV
   - You can always email the designer for the CSV
5. Save copy of C-FORM Final with "_working" at end
   - This will be your working C-FORM
6. Open working C-FORM and add column between columns E and F
   - This is where we'll keep track of any notes related to pole
     - Notes I add include survey image numbers, GIS Edit tracking, Tree trimming needs/notes (anything that is helpful to you)
   - Once we're ready to submit the application to NGRID, we'll remove the extra column we added the notes to and save that as our new Final
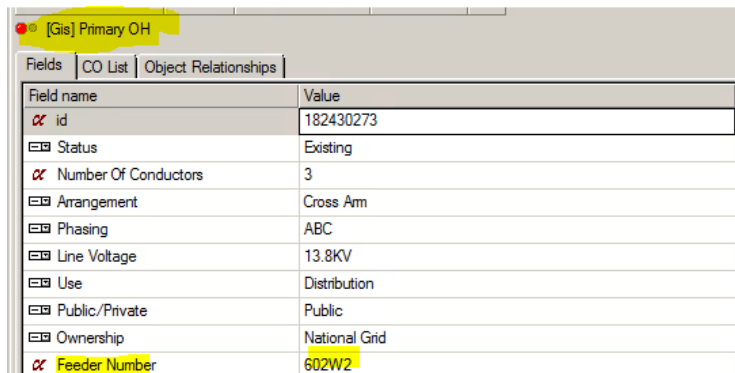
(2) Send GIS Design to GIS

Notes: We'll need to create a GIS Design in Smallworld to build a work order and create construction sketches. To kick off that process, we'll need to find the feeder number for an OH Primary GIS in our work area, update the Geographical tab in STORMs and send the GIS Design, from STORMs to GIS.

It's good practice to send the work request to GIS **before** beginning to review GIS updates. Depending on how busy the system is, it could take anywhere from 20 minutes to several hours for the conversion process to finish and the GIS Design to be ready to work in.
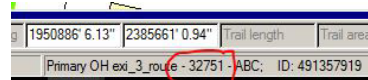
Determine Feeder Number for Overhead Primary

1. Click on a OH Primary from your work area and locate the 'Feeder Number' attribute on the Editor tab

   - The feeder number will also be displayed at the bottom of the main GIS window towards the center.

   - Feeder numbers may be a combination of number and letters

Update STORMs and Send GIS Design

2. In STORMS, note the District Number at the top left corner of the work request window
   o Includes the state abbreviation
3. Click the 'Geographical' tab
4. In the 'Suburb' field, find the district and feeder number combination, separated by a das
   o Example: 14-32J9
   o You can type to help narrow the results down
5. Copy + paste district number feeder number combination to 'Location ID' field
6. Click Save

7. From the 'Design' menu, select 'GIS'.
8. Click 'Yes' to convert into GIS Design

Confirm GIS Design Successfully sent from STORMs to GIS

9. Click References tab
10. If the 'GIS' box has an 'X', the GIS conversion process has successfully been started.

If an 'X' doesn't appear in the GIS Box
- Click the refresh button
- Verify that the 250R has been completed
    - The 250R is auto-completed during the Work Request creation process, after updating the Financial Tab
- Verify that the correct operating district is selected
    - Run an Electric Source Trace in Smallworld
    - NGRID | Electric |Source Trace
    - Drop a trail point on a primary conductor on your application
    - Hit Trace Out
- Clear trail and drop new trail near substation

    - Select, Where am I?

(3) GIS Updates and Work Order Prep

GIS Updates are an important first step in the Work Order process. The design behind the work order is based on field conditions observed through survey photos. Reviewing for GIS Updates allows us to confirm that GIS mirrors field conditions for the poles on the application and make changes as necessary.

Protip: While I'm reviewing GIS Updates for the Work Order, I'm also reviewing the description of work for accuracy, noting any tree trimming needs tied to the described work and pole access

What are we updating?
- **100%** of poles with Major Equipment
  - Reclosers, Voltage Regulators, Capacitors, Ratio Transformers, Switches
    - Regardless of whether the work is Make Ready or No Make Ready
    - Major Equipment poles should be identified by designer on e5/C-form in **bold**
- **100%** of poles with Electric Make Ready
  - Regardless of who is paying for work

40
(45)

- Any Pole Size updates identified on the E5 by the designer (MR or NMR)

Common things to look for...
Poles: Incorrect Height, Class, Foreign Pole # (may need to check CSV Actual/Estimate Heigh/Class)
Anchors/Guys: Anchors (missing or incorrectly displayed), down guys (missing or wrong position, system type), lead lengths (missing/wrong), sidewalk fixtures
Services: OH/UG designations, missing from field or incorrectly positioned
Risers: Missing (especially for UG services)
Span Guys: Missing/incorrect positions, system types
Secondary Conductors: Neutral or TPX? Beware of net cuts
XFMRs: Cutouts present? CSP/Conventional?
Major Equipment: On Correct pole? UNK Fuse Size

Do Not License Poles or Cancelled Poles don't require GIS Updates.

GIS Updates are made in a File Alternative
- File Alternatives are used to make **immediate** changes to GIS TOP
  - Once completed, they cannot be re-opened for additional updates

Creating a File Alternative
- From the 'File' menu, select 'New Project and Design'.
- Enter '[App Name]_FA' in the 'ID' field (ex. "COMCAST LE-12-701_FA").
- Click 'OK'.
- From the 'File' menu, select 'Change State' --> 'Proposed'

Finalizing GIS Updates in File Alternative
- Click the 'Save' button.
- From the 'File' menu, select 'Change State' --> 'Complete in GIS'.

- It can take a few minutes to a few hours for the file alternative to be merged/posted to 'Top'. You will receive a message in Smallworld when it's been completed.

(4) Preparing the Work Order

(4a) Open GIS Design and Pole Selection

Open GIS Design

1. From the 'File' menu in Smallworld, select 'Browse Design'.
    o Click the 'Clear Query Search Fields' button.
2. In the 'ID' field, enter district number-Year-work request number combination
    o Ex: 13-18-15969668
    o Click the 'Run Query' button.
        ▪ If the GIS Design is available
            • Right-click on GIS Design and select 'Take Ownership'.
        ▪ If there are no results, the GIS Design isn't ready
3. Once you've taken ownership of the GIS Design, right click on the GIS Design and select 'Change State' --> 'Proposed'
    o Click 'Yes'.
    o Click 'OK'.

Troubleshooting

   o If you receive a failure message
        o Go to a pole on the application
            o Using the trail line make 3 sides of a polygon and click "C" which will close the polygon
        o Re-try taking ownership of GIS Design

GIS Pole Selection

   o Copy the GIS ID of the first pole with electric make ready work from your working C-FORM
        o Under the Navigator tab in GIS, choose "pole from the Search mode dropdown"
   o Paste GISID from pole into Name field and click Run Query
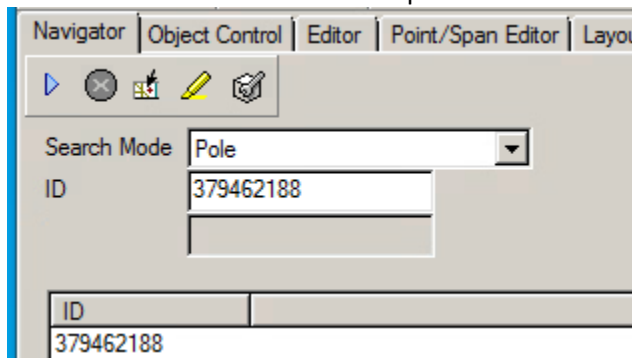
   o Select GISID from results, right-click Go to

(4b) Generate Cost Units for Real World Objects (RWO)

See the "**What are Real World Objects (RWOs)?**" section in this document for additional information on identifying RWOs along with several examples of auto-generated RWO related, cost units.

Important: If the first pole in your design doesn't have a RWO that needs to be replaced, removed or installed, skip ahead to section 4c, **"Manually Create a Work Point Flags"** section.

1. Identify any RWOs for first pole in design that need to be replaced, removed or installed
2. For each RWO found, modify the attributes under the Editor Tab as needed
   a. Don't click Update
   b. If Replacing an existing asset, choose Replace
      i. This will create two GIS objects in different Statuses

3. Once you've addressed all the RWO action items for first pole, click Point/Span Editor tab in Smallworld

4. Click Generate work records
5. Confirm that "Create New" is selected
   a. "Rebuild" will rebuild ALL the Work Points in your GIS Design
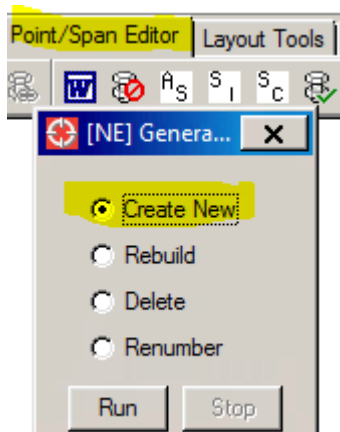
Smallworld will automatically generate Work Point flags and Cost Units within Object folders under the Point/Span Editor tab in Smallworld.

Skip ahead to the "**Review Cost Units**" section

(4c) Manually Create Work Point Flags

If the first pole in your design doesn't have a RWO that needs to be replaced, removed or installed, we'll need to manually create a work point flag to add Cost Units

1. Select the object (usually a pole) that the design point will go on.
2. Click the 'Point/Span Editor' tab.
3. Click the 'Create from selection' button . This will create the Work Point flag on the object.

4. Make sure the object is still selected.
5. Select the design point in the 'Point/Span Editor' window.
6. Click the 'Associate map selection via editor' button . This will open a separate 'Editor' window.
7. Click the 'CO List' tab.
8. Right-click anywhere in the window and select 'Add CO'. This will open the 'CO Selector' window.
9. Add CUs as necessary

Adding/Replacing/Removing CUs or Macros
1. In the 'Point/Span Editor' tab, double-click on the CU folder for the desired object. This will open a separate 'Editor' window.
2. Click the 'CO List' tab.
3. Add CU/MU:
    1. Right-click anywhere in the 'CO List' tab and select 'Add CO'.
   2. From the 'CO Selector' window, select the desired CU.
    i. When adding a CU, you can select the CU and click 'Apply' which will add the selected CU, but won't close the 'CO Selector' window or click 'OK' which will add the CU and close the window.
4. Replace CUs/MU:
    1. Right-click the CU to replace and select 'Replace CO'.
    2. From the 'CO Selector' window, select the desired CU.
    3. Click 'OK'.
5. To remove CUs/MU:
    1. Right-click the CU to remove and select 'Remove CO'.
    ii. If only one CU is in the object folder, removing it will also delete the folder.

ProTip: Save commonly used CUs to the favorites tab in the CO selector
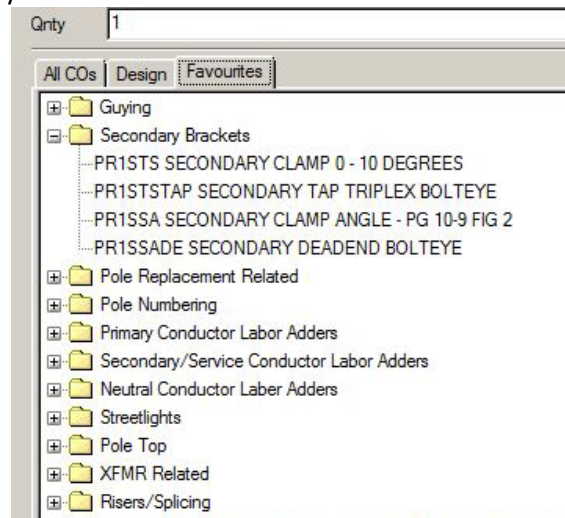
i.

(4d) Review Cost Units

Notes: See the "***What are Cost Units?***" section in this document for additional information on Cost Units

At this point, we should have already generated costs units for the RWOs for the first pole with electric make ready work.

- Your pole with work may have multiple Work Point flags with Cost Units to review
    - Not all GIS Objects will have a Work Point flag created
- For the replaced, installed or removed RWOs, Smallworld expects to see certain **Install** and **Remove** Cost Units, otherwise it will throw an error
- Sometimes, Smallworld will generate <UNDEFINED COST UNITS> if it's unable find a Cost Unit based on the attributes of the object

Protip: In order to stay organzied, I like to expand the relevent Work Point Flags (right-click Work Point Flag and click 'Expand') and then minimize the Object folders as I review the them.

1. Review auto-generated Cost Units for accuracy
2. Add Cost Units to account for remainder of work in the description of work
    a. See the **"Cost Units and Make Ready Examples"** section for additional information

(4e) Add Descriptions of Work to Smallworld

We use the GIS Object "Elec Construction Note" for our Description of Work text on the construction sketches. Set the Status of the "Elec Construction Note" to Install for our descriptions of work to appear blue on the Construction Sketches.

1. Drop a trail point when you would like the Description of Work to appear
    a. Don't get too hung up on sizing and where
    b. We'll review those things when we prepare the Construction Sketches
2. From Object Control, double click "Elec Construction Note"
    a. Set Status to Install
    b. Click three dots bext to Note Text to open a new window
3. Enter Description of Work in following format
    a. **Line 1:** Pole Number and Street Name, with Line Number in Parenthesis)
        i. P1 Main St (LI 1234)
    b. **Line 2+:** Copy and Paste Body of Description of Work from E5/C-FORM
        i. This is the electric make ready text that is being performed
        ii. Don't get too hung up on sizing or positioning of text
    c. **Line 3:** Tree Trimming or Brush Management
        i. Only if deemed necessary during the writing of work order
        ii. These would also be in bold on E5
    d. **Line 4:** Pole Access Information
        i. Depending on what was determined during writing of work order
        ii. Commonly Police Protection Required
    e. **Line 5:** Coordinates of Job Site
        i. Add to at least one pole per sheet, minimum
        ii. I like to add coordinates for all the poles with Digging Work

```
P93 Stony Hill Rd (LI 304)
ELCO set 40/2 pole
Replace 16-101 pole top and transfer spacer cable
Transfer secondary (10-102 Fig 7)
Attach secondary 72" from new pole top (28'/26'8")
Replace service to 547 Stony Hill Rd  (11-115)
Replace service to 551 Stony Hill Rd  (10-101 Fig 5)
Tree Trimming Required
Police Protection Required
42.129800, -72.458500
```

(5) Construction Sketch Creation

(5a) Setting Up Construction Sketches

Notes: Construction sketches consist of an Index page showing an overview of the project area along with individual pages showing the details of the prescribed work. There isn't a limit on the number of Work Points you can include on a page of the construction sketches. However, keep in mind that there are many required elements that also need to be shown on the pages (North Arrow, Legend, Work Descriptions etc). We try to limit the number of pages per index to 10.

Creating Plot Layout

1. Select first Work Flag from Point/Span Editor and click Go-To
2. Under the 'Plotting' tab, click the 'Add' button .
3. Expand the 'Plot Name' under 'Plot Layouts'
4. Select Page 1
5. Click the 'Edit Construction Plot' button under 'Results'.
6. Update the following:
   a. 'View Scale': "50".
   b. 'Display Style': "1:50".
7. Click the yellow 'Update' cylinder and close the 'Construction Plot Layout Map' window.
8. Reposition frame over design points as needed
   a. With Page 1 selected under the 'Plot Layouts', hover mouse over the square in map window
      i. The curser will turn into 4 arrows
      ii. Click and hold to slide to frame around as needed
         1. Be care to not move anything besides the frame

Need more than one page to cover work?
1. Under 'Design Parameters', verify 'View Scale' is "50" and 'Display Style' is "1:50".
2. Select the 'Plot Name' under 'Plot Layouts'.
3. Place a trail point on the map where you would like the next page centered on
4. Click the 'Construction Frames from Trail' button under 'Modify Frames'.
5. Reposition frame as needed
6. Clear Trail and repeat as needed (try to limit the number of pages per index to 10)

Need more than ten pages?
1. Stop adding frames
2. Select the just created Plot Name (1-10) and click the 'Add' button .

a. This creates a new Plot Name 11-20
3. Expand the new 'Plot Name' under 'Plot Layouts'
4. Select Page 11
5. Click the 'Edit Construction Plot' button ⬚ under 'Results'.
6. Update the following:
   a. 'View Scale': "50".
   b. 'Display Style': "1:50".
7. Click the yellow 'Update' cylinder and close the 'Construction Plot Layout Map' window.
8. Reposition frame over design points as needed
   a. With Page 11 selected under the 'Plot Layouts', hover mouse over the square in map window
   b. The curser will turn into 4 arrows
   c. Click and hold to slide to frame around as needed, being careful not to move anything else on the screen
9. Add additional frames as needed
   a. Place a trail point on the map where you would like the next page centered on
   b. Click the 'Construction Frames from Trail' button ⬚ under 'Modify Frames'.
   c. Reposition frame as needed
   d. Clear Trail and repeat as needed
      i. Try to limit the number of pages per index to 10

Update Plot Attributes
1. Select the 'Plot Name' under 'Plot Layouts'.
2. Click the 'Edit Construction Plot' button ⬚ under 'Results'.
3. Update the following:
   a. **Name**: This defaults as GIS Design Name with page range (1-10)
      i. Drop the page range if there's only one index
      ii. Keep/update the page range depending on how sheets within Construction Plot
   b. **Feeder Number: '**Feeder Number' attribute of primary in GIS within work area.
      ii. If more than one circuit in work area, use "Multiple".
   c. **'Job Title':** App name (ex. "SMI 9096-LA202-1").
   d. **'Tax District or Town Code':** 'Tax District/Town Code' attribute of pole in GIS within work area.
   e. **'Notes':** Feeds the Description section in the plot's footer (righthand side of page)
      i. Be aware that there is limited space here, including the City/State (4 lines total)
      ii. Enter city/town/municipality and state (from C-form/Exhibit 5).
      iii. Brief description of work (ex. "1 ELCO set pole replacement", "1 pole with primary/secondary/streetlight/guy work").
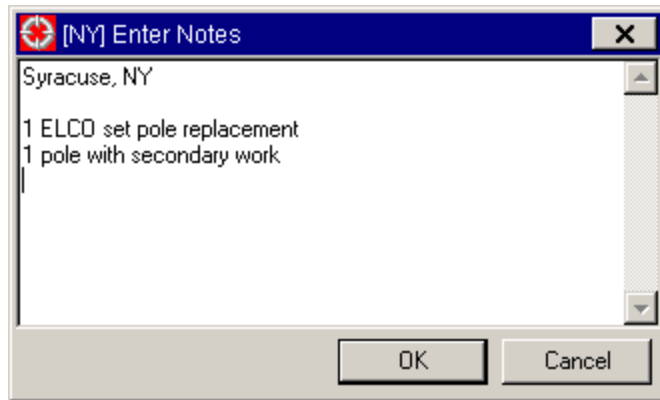
(5b) Creating Indexes for Construction Sketches

Notes: At least one Index is required for each set of construction sketches, regardless of the number of pages in the document

Create Index

1. Select the 'Plot Name' under 'Plot Layouts'.
2. Under the Results section, click Go-To
    a. Now we can see all the frames that make up the plot
3. Under 'Design Parameters', change 'Plot Type' to 'Index Map Electric'.
4. Click the 'Construction Create Index' button under 'Modify Frames' to create the index.
5. Expand the Plot Name
6. Select the Index Map (Page 0) and click Edit Construction Plot button under the Results section
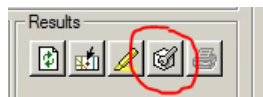
7. Update the following:
    a. View Scale': Values between "400" and "800" often work best, but you can increase these values as needed
    b. 'Display Style': "1:400".
8. The orange Index frame should encompass all your pages from the selected Plot Name

9. Repeat steps 1-7 for each of the Plot Name you have

Generate Construction Sketches

1. Select the 'Plot Name' under 'Plot Layouts' and click the 'Generate Maps' button ⬚.
2. Click Ok to the "Layout Document will be updated to reflect…" window that pops up
3. Click Ok to the "Mismatch found between number of frames…" window that pops up
4. Click the 'Review' button ⬚ under 'Construction Plots'. This will open the Layout Designer window.

(5c) Updating Construction Sketches

Notes: Construction Sketches are modified within the Layout Designer windows in Smallworld.

The Layout Designer window pops up when you click the 'Review' button ⬚ , under 'Construction Plots'

Index Page
1. Add a North Arrow
   a. Click the 'NGrid North Arrow' button ⬚ (bottom toolbar in Layout Window)
   b. Drag a box on map where you want to position the North Arrow
      i. The larger the box, the larger the North arrow
2. Add Contact Information Text Box
   a. Click the 'Text Box' button ⬚ (bottom toolbar in Layout Window)
   b. Left-click and drag to draw box.
   c. Select and right-click newly created 'Text Box', select 'Properties'
   d. Update as follows:
      i. Font Name': Bold
      i. 'Text size': Enter "5".
      ii. 'Horizontal alignment': 'Center'.
      iii. 'Vertical alignment': 'Top'.

      iv.   'Fill' --> 'Fill Color': Fill with white

      v.   'Outline' → 'Foreground color': Set to Black

      vi.   Resize box to fit text and reposition as desired.

      vii. 'Text'

          1.   Your Name, Osmose Utilities Services, Your Phone #

Alicia Hicks
Osmose Utilities Services
508-954-6926

If your construction sketches consist of multiple indexes, add extra lines describing which Index this Index is and which sheets it covers

Alicia Hicks
Osmose Utilities Services
508-954-6926

Index 1 of 2
Sheets 1-10
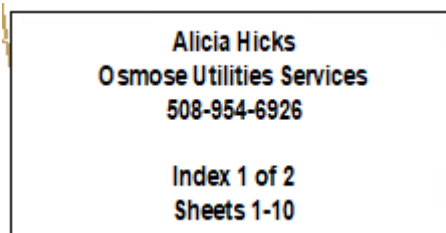
ProTip: Once you set up a text box with the desired properties, you can copy and paste it to other pages within your Plot (1-10, 11-20 etc), saving you the hassle of constantly updating Text Box properties (Work Description, Streets, Construction Sketch Notes, etc)

Construction Sketch Sheets
Page 1
1. Reposition Electric Construction Notes as needed
   a. Repositioning must be done in the main Design Window, not the Layout View

   b. Turn on insertion points to be able to easily select GIS annotation
   c. Expand Note Text and indent lines as needed to adjust how the description of work appears
2. Confirm Street Names are visible for streets with electric make ready work
   a. Use Electric Construction Note GIS Objects to add Street Names if missing or hard to see
   b. Include Line Number in the Street Names

3. Confirm Cross and Intersecting Street Names are visible
   a. Cross street and intersection references are used as a way of narrowing down the location of the job sites
   b. If the nearest cross street/intersection is off-sheet, use the >>> to point in the direction of where that cross street/intersection is located
4. Add a North Arrow
   a. Click the 'NGrid North Arrow' button (bottom toolbar in Layout Window)
   b. Drag box on map where you want to position the North Arrow
5. Add a Legend

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a. Click the 'NGrid Legend' button (bottom toolbar in Layout Window)
   b. Drag box on map where you want to position the Legend
   c. Expand Note Text and indent lines as needed to adjust how the description of work appears
      i. Main St (1234)
6. Add Tree Trimming Symbols
7. Leader Lines between description of work and pole with work

   Things not to include in the Work Description Box:
8. Notes that aren't related to the work being done on the pole
9. Delta/Wye, Junction Pole, XFR Pole, GIS ID etc
10. These types of notes may be helpful to you or the designer, but shouldn't be carried through onto Construction Sketches or final E5/C-form
11. Add an arrow from the description of work to the pole, by placing two trail points and clicking the 'Leader Line' button . The first trail point should be next to the description of work and the second next to the pole, so that that arrow is pointing towards the pole.
12. Set the 'Line weight' property to '1 px' for all leader lines.
    e. Add required annotation
       i. For PCOs, Cutouts, Feeder#/Voltage and Primary Wire Anno
       ii. See "Adding Annotation" sections below for more info
    f. Add the following (if needed)
       i. Tree Trimming Symbol next to poles with Tree Trimming (Not needed for External Work)
    g. Add text boxes for each of the following as necessary:
       i. Road names and line numbers (Main St 1234)
          1. Add if GIS road annotations are missing, obstructed or incorrect.
          2. If road is a state or county highway, include the road name and state/county number (ex. "Main St/NY-290 (3415").
          3. Line numbers are only required on streets with work
       ii. Cross Streets
          1. In all directions along streets with work
             a. Line numbers not required with Cross Streets
       iii. Tax district name and code, if work area is in more than one town.

          1. Tax Districts are usually designated by red line (image above)
             a. Drop and trail and use the Where am I? button to get Tax District name and code
          2. NE: Be aware that if you're digging work is in multiple towns, you may have to do complete a Notice of Excavation permit for each town
       iv. House numbers, if no GIS service point annotation is visible.
          1. Only one house number per map is needed.

2. "Coordination required between FiberTech and NGrid to lower comm below streetlight".

    v. For antenna apps

        1. Add note: "XX to place DAS antenna on PL XX on Whatever Street per OH Standards 17-109, see STORMS documents tab for typical installation"

        2. Add note on each page if there are multiple pages with antennas

3. Add a legend wherever space allows, by clicking the 'NGrid Legend' button .

    a. Setting the 'Display full bounds' property to 'No', will keep the legend's boundary around the legend's contents.

    b. You can add multiple columns to your legend if space is tight on your sketch

Adding Annotation and Other Construction Sketches Elements

Remember to save frequently (both the sketch and the main GIS window)

4. **Adding Annotation for PCOs**

    a. Must be done in the main window (not layout view)

    b. **How to add?**

        i. In the Editor tab, Select the [Gis] Pole with a Status of "Replace" (this is the new pole you're installing)

            1. Under Specials, select Add WO Anno

            2. Pole Height/Class and new poletop configuration (if there is one) will be shown in blue

        ii. In the Editor tab, Select the [Gis] Pole with a Status of "Replace Remove" (this is the pole you're replacing)

        iii. Under Specials, select Add WO Anno

            1. Pole Height/Class and new poletop configuration (if there is one) will be shown in red

            2. If company besides NGRID is removing pole, this will also show in the anno (ie Rm. By Tel)

    c. **When to add?**

        i. Remove and Install annotation is required for every PCO on your sketches

        ii. Will appear with Remove anno above Install anno

    d. See "Rotating/Moving Annotation and Labels" section for more info on how to rotate or move Annotation and Labels

5. **Adding Annotation for Cutouts**
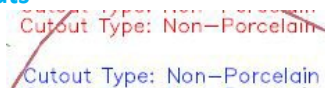
    a. Must be done in the main window (not layout view)

    b. Applies to replacing cutout body only; not required if just replacing fuselinks

c. Remove (red) and Install (blue) annotations added separately
d. **How to identify?**
  i. A XFR with an "S" lets you know that cutouts are present

e. **How to add?**
  i. In the Editor tab, Select the [Gis] OH Transformer Installation
    1. Drop a single Trail Point where you want the label to appear
    2. Select Install Wo Anno and click 'Create Geometry from Trail'
    3. Click Update
    4. Clear trail and repeat last three steps for Remove Wo Anno
f. **When to add?**
  i. Remove and Install annotation is required every time you replace a cutout body

6. **Adding Feeder Number Annotation and Line Voltage Anno Combo**

a. Must be done in the main window (not layout view)
b. Added as separate annotations
c. Both apply to primary conductors
d. Feeder numbers will usually display at the angle the primary conductor runs

e. Line Voltages usually display horizontally

f. **How to identify?**
  i. Easily identified by entering Select Mode and hovering your pointer over the primary conductor with Map Tooltips selected
  ii. Beware that Feeder#/Voltages may change from pole to pole
g. **How to add?**
  i. Select primary conductor along the stretch you want to label
  ii. Drop a single Trail Point where you want the label to appear
  iii. Editor Tab → Make sure [Gis] Primary OH is selected
    1. Select Feeder Number annotation and Click 'Create Geometry from Trail' (circled below)

    2. Click Update
    3. Clear Trail and repeat last four steps for Line Voltage Anno

h. **When to add?**
  i. One Feeder#/Voltage combo required per page, if…
    1. The primary conductor's Feeder#/Voltage is the same for all the conductors with work

  2. The Feeder#/Voltage for primary taps that are relevant to the work being done is the <u>same</u> as primary conductor with work
   a. Relevant: Primary tap for a PCO
   b. Not Relevant: Primary tap on a pole with a Streetlight Raise
 ii. Multiple Feeder#/Voltage combos required, per page, if...
  1. Feeder#/Voltages change along the corridors with work
  2. The Feeder#/Voltage for primary taps that are relevant to the work being done differs from the primary conductor with work
   a. Relevant: Primary tap for a PCO
   b. Not Relevant: Primary tap on a pole with a Streetlight Raise
 iii. Use your judgement.
  1. Would including a Feeder#/Voltage combo for the work on the pole be relevant to the end user of the construction sketch and the work they are performing on the pole?

i. See "Rotating/Moving Annotation and Labels" section for more info on how to rotate or move Annotation and Labels

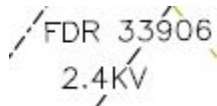7. **Adding Annotation for Primary Conductors**
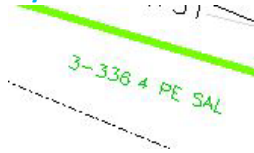
a. Must be done in the main window (not layout view)
b. Wire Annotations contains the following information (based on image above)
 i. '3-': Number of wires
 ii. 336 4': Wire Size
 iii. 'PE': Insulation Material (or 'B' for Bare/no insulation)
 iv. 'SAL': Type of wire
c. **How to identify?**
 i. Select the primary conductor along a stretch you want to know the wire
 ii. In the Editor tab, Select the [Gis] Primary OH
  1. Opens sub-window with primary conductor attributes
d. **How to add?**
 i. Select the primary conductor along a stretch you want to label
  1. In the Editor tab, Select the [Gis] Primary OH
   a. Select Wire Annotations and Create New Object (circled)

 ii. In the Wire Annotation (Primary OH) window that pops up
  1. Set Status to Existing
  2. Drop a Trail Point where you want the annotation to be placed
   a. Click Create Geometry from Trail
   b. Click Insert
e. **When to Add?**
 i. Only required when work is in the primary framing

f. See "Rotating/Moving Annotation and Labels" section for more info on how to rotate or move Annotation and Labels

8. **Rotating/Moving Annotation and Labels**
   a. Must be done in the main window (not layout view)
   b. Click Show Insertion Points ⊞ which add small squares next to annotations/labels that can be moved or rotated

   c. Select small square next to annotations/labels you want to move or rotate
      i. Click Move by Dragging
      ii. Click Move by Rotating

Save Construction Sketch

   d. In 'Layout Designer', click the 'Save' button.
   e. In Smallworld, click the 'Save' button.
   f. Turn off 'Toggle Work Point Visibility'
   g. 'Toggle Design Area Visibility' .

9. **Save to your Machine**
   a. Click the 'Print Construction Plot' button under 'Results'.
   b. Click 'Setup' and navigate to the V: drive.
      i. Change file name to:
         1. NE: 'WR[WR #]CS' (ex. "WR15996193CS").
         2. NY: Match how it appears in GIS (ex. "19-14-15995600").
      ii. Click 'Save'.
      iii. Click 'OK'.
   c. Open PDF and verify everything looks correct.
      i. Verify that you didn't leave your Design Points visible

10. **Save to NGrid Network**
    a. Click the 'Save Construction Plot as PDF' button under 'Results'.
    b. Verify the PDF was saved:
       i. From the 'File' menu, select 'Browse Designs'.
       ii. Click the 'Construction Plot PDF' tab and double-click the construction sketch to open.
    c. If you post a construction sketch and post it again with a different name
       i. You will need to contact GIS Helpdesk to get them to remove the sketch with the incorrect name
          1. They will need to know if you are working in NE/NY and the name of the design alternative (12-18-1234567)

18

Billable and Non-billable Work

Electric Make Ready work falls into two categories: Billable and Non-billable

Billable Work: Billable to the applicant
- **'Yes'** under the Bill to Applicant picklist on E5
- Also known as **'Added Service'** in Smallworld/STORMs

Non-billable Work: Not billable to the applicant (billable to NGRID)
- Sometimes referred to as PEC Work (Pre Existing Conditions)
- 'No' under the Bill to Applicant picklist on E5
- Also known as **'System Improvement'** in Smallworld/STORMs

- Billable and non-billable work can be written in the same Work Order
- Some poles will have a mix of billable and non-billable work

- Applications with both billable and non-billable electric make ready work will require separate Forestry Review estimates, separate police protection totals and will impact construction support costs (how Osmose bills NGRID for Writing the Work Order)

  - <mark>This will be covered in their respective section</mark>

Set Billing on CUs

Notes: We can set the billing on all the CUs/Macros in the GIS Design with one button, assign billing status on a work point folder level or even on an individual CU/Macros

Protip: I like to set the billing status after I've added all the Cost Units to the GIS Design. Most of the work on Work Order will be billable to the applicant, so I like to set all the CUs and Macros to Billable using the AS button. Then I will go back into the individual work point flags to reassign billing status on a work point folder or individual CU/Macro level. I usually mark the Work Points that are non-billable or have mixed billing on my E5, so it's easy to pinpoint which work points I need to check.

- Click the 'Point/Span Editor' tab.
- Click the 'Set all CU's and MA's (macros) to 'System Improvement' button ⬛ or
- 'Set all CU's and MA's to 'Added Service' button ⬛ or 'Set all CUs and MA's to 'Standard Cost' button ⬛ **(PTYA will be 'Added Service', most PEC will be 'System improvement")**
- Click the 'Save' button.

Set Billing for all CUs/Macros in GIS Design

Note: The ˢᴄ button will assign billing for all CUs/Macros to Standard Cost, which is the default billing assignment for CUs/Macros added to the GIS Design. This button is rarely used.

1. Click the 'Point/Span Editor' tab
   a. Click ᴬˢ to assign billing for **all** CUs/Macros to Added Service (Billable to applicant)
   b. Click ˢᵢ to assign billing for **all** CUs/Macros to System Improvement (not billable to applicant)

Set Billing for CUs Within a Single Design Point or Folder

2. Click the 'Point/Span Editor' tab.
3. Right-click the desired design point or folder and select:
   a. **Billable Work:** 'Set children to Added Service'
   b. **Non-billable Work:** 'Set children to System Improvement'
4. 'Set children to System Improvement' or 'Set children to Added Service'.
5. Click the 'Save' button.

Set Billing for Individual CUs

1. Click the 'Point/Span Editor' tab.
2. Right-click the desired CU and select
   a. **Billable Work:** 'Added Service'.
   b. **Non-billable Work**: System Improvement
3. Click the 'Save' button.

Special Conditions

Notes: Electric/Gas Transmission Lines, Railroad Crossings, Limited-Access Highway Crossings or Navigable Waterways are considered Special Conditions
   a. They should be clearly identified by the designer on the e5/C-form
   b. Some of these objects may not be visible in GIS (most Electric/Gas Transmission Lines aren't), so it's a good habit to have Google Maps open as well
2. Important to identify and be aware of any Special Conditions <u>before</u> getting too far into the Work Order
3. Some special conditions will determine whether the work order is Internal or External Construction, which impacts how much work is involved with writing the Work Order
4. What to do if you encounter a Special Condition on an application?
   a. Check with a veteran work order writer if you encounter any Special Conditions

Internal and External Work

5. NE – All Work is Considered Internal Construction

Funding Project Numbers
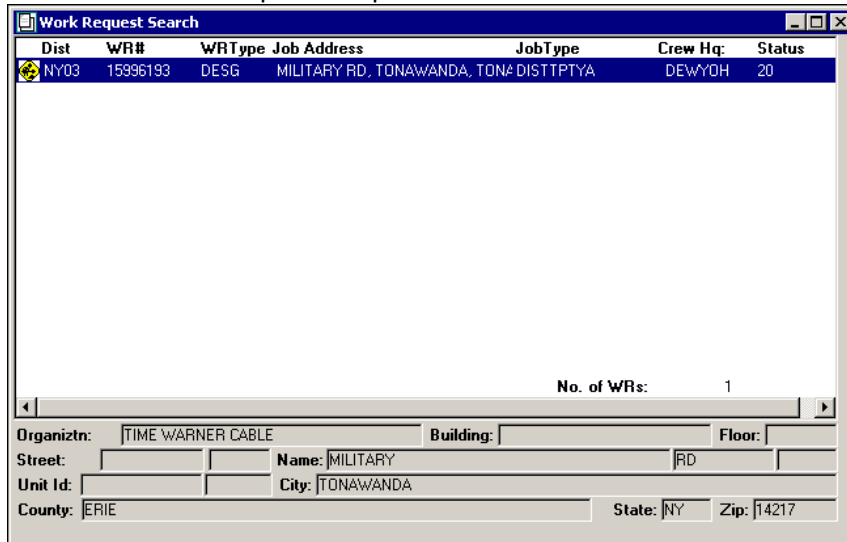
Notes: Contact veteran work order writer if you're Work Order contains a mix of billing

6. Doesn't matter whether the job is Internal/External
   a. No FP# required for external BAU
7. Funding Project Numbers aren't required on all work orders
8. It's important to make this determination prior to writing the work order
   a. Either applied to work orders before they reach Work Management (through Blanket Funding Project Numbers; ie Charter Work)
   b. Or applied to work orders already in Work Management, due to the estimate cost associated with completing the project
      i. NE: >= $100k likely requires a funding project
      ii. Contact a Veteran Work Order writer if you think you need to request a Funding Project Number for a Work Order that's already in Work Management
9. Use these figures to estimate the cost
   a. $10k/PCO (regardless of # of conductors and equipment)
   b. $1k/PMR (regardless of quantity or type of PMR)

Job Types and Opening Request in STORMS

1. Search for work request:

   a. Click the 'WR Find' button ![icon].
   b. In the 'Work Request Search' window:
      i. Enter the WR # in the 'WR #' field.
      ii. Click 'OK'.
      iii. Double-click work request to open.

      iv. Read 'Description' to verify you have the right work request.
2. Verify that the correct Job Type has been selected for the Work Order
   a. DISTTPSAD: Survey and Design Request
      i. This Job Type is used to process Work Orders with No Make Ready (NMR), in NY and NE
   b. DISTTPTYA: Capital work:

      i.   Replacing or installing poles, wires, cables, transformers or lightning arresters.
      ii.   Riser work that requires splicing in cable
      iii.   Any grounding or bonding work. This would include:
      iv.   All streetlight work
      v.   Jumpering Johnny balls
      vi.   Bonding wye guys to neutral
      vii.   Replacing and installing down grounds
      viii.   All NYSCMT Charter work will be DISTTPTYA, even if there are no capital items.
c.   DISTTPYAMO: Maintenance work
      i.   Raising, lowering or rearranging primary
          1.   If the only MR is removing a pole top pin and installing a crossarm pin, replacing the insulator and transferring the primary, this work in maintenance only (usually only done for antennas). This only applies to moving the center phase to a crossarm only. Moving a pin top out onto a P10B side arm is still capital **(Added 10/4/18)**
      ii.   Most secondary work:
          1.   Raising or lowering
          2.   Note: In ***New England ONLY***, raising or lowering a dead-end secondary will be capital work. The 'PR1SSADE' CU we use for the dead-end secondary hardware is a capital item in the New England GIS.
      iii.   Resagging
      iv.   Reducing drip loops
      v.   ***ONLY*** removing secondary
      vi.   Installing fiberglass insulators to guys
      vii.   Replacing or installing U-guard
      viii.   ***IMPORTANT***: If any item on the job is capital, create a DISTTPTYA WR. The majority does not rule.
d.   Preexisting Conditions Work (PEC)

      Notes: All NY PEC work requires the approval of Alex Hall. Contact Chris Werner (cwerner@osmose.com) or Steve Kimball (skimball@osmose.com) for any additional PEC questions you may have.
      i.   New York
          1.   Internal Jobs: PEC work can be put on the make ready WR.
          2.   External Jobs: PEC work must be put on a separate DASSETREPL/DMAINT-C Work Order
      ii.   New England
          1.   Since all New England work is Internal, PEC work is included in with the standard Make Ready Work
             a.   No Unique Job Type Required

Troubleshooting

Insert Transition Failure
Occurs when attempting to replace an object (usually poles). It's not clear why it happens. We'll need to retire the existing object, insert a new object in the same spot and update it with the attributes of the old object. This is all done within the GIS Design. Grabbing screenshots of the existing objects prior to retirement (including attachments, if poles) will be helpful

Smallworld

The insert transaction on dataset insert has failed.

OK
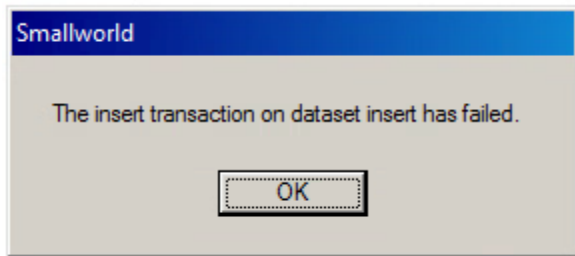
1. Take screenshots of attributes for object
   a. If pole, be sure to grab screenshots of existing attachments
2. Drop a trail point in the same position as the existing object to be retired
3. Set the Status of Existing Object to "Retired" and update
4. From Object Control, select Pole
5. Click Get Default Values
6. Update remaining attributes to mirror the object being retired and Insert Object
7. Change Status from Install to Existing
8. Send Estimates to STORMs to confirm connectivity

What are Real World Objects (RWOs)?

What are Real World Objects (RWOs)?
- GIS Objects that need to be physically **replaced**, **removed** or **installed** within a GIS Design
  - **Common RWOs**: Poles, Anchors, Anchored Down Guys, OH Services, Span Guys
  - **Replacing** existing objects or **installing** new objects are the most common actions.
  - **Removing** (permanently) is a far less common action
- Ties into annotation included on the construction sketches
  - Red = Removals
  - Blue = Installs

- Also impacts how GIS objects appear in our construction sketches
  - Red and Blue Objects – Replace

  - Red Objects – Remove

  - Blue Objects – Install

- o Allows for auto-generation of cost units related to the specific action
  - o **Example 1**: Replacing an OH Service will result in labor, material and connection related cost units, tied to the removal of existing OH Service and the Install of new OH Service

Service Labor/Material

Service Connections
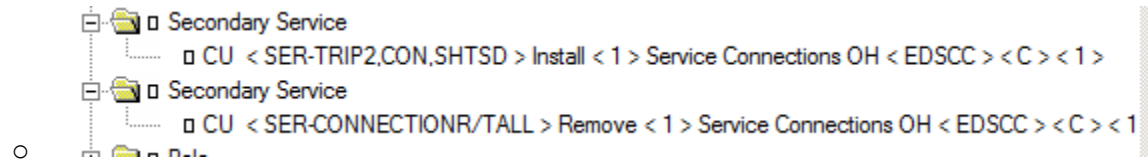
- o
  - o **Example 2**: A pole replacement will generate cost units tied to replacing the physical pole, along with replacing the existing poletop configuration and transferring the primary and secondary conductors from the old pole to new pole
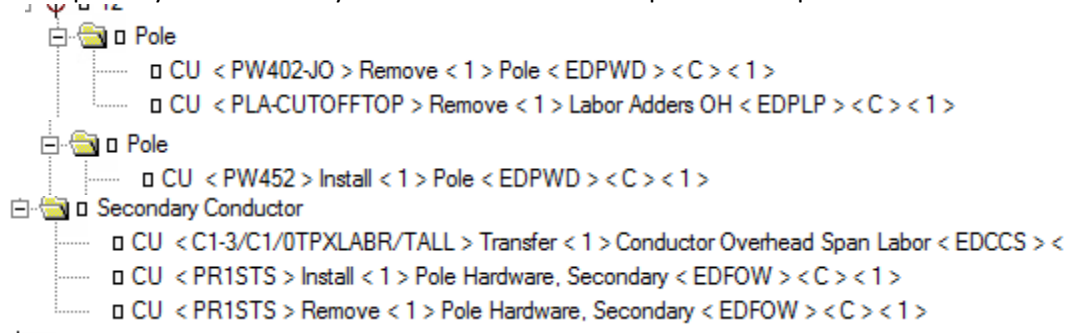
Example3:

- We replaced the pole, down guy and service Real World Objects
- We generated work records and 3 work point flags were automatically created, 1 for each service and 1 for the pole

Work Point Flags
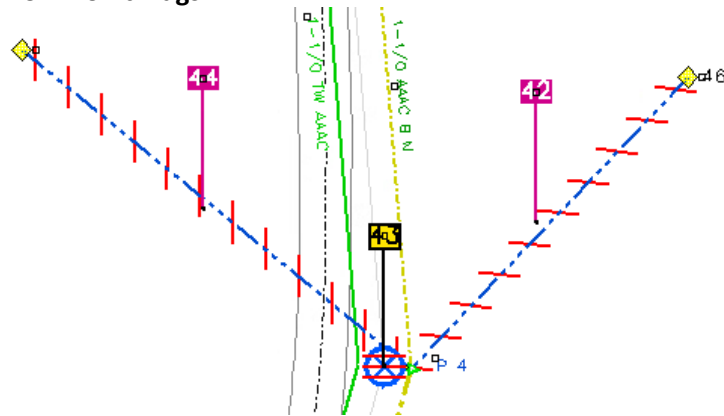
Corresponding Object folders and auto-generated Cost Unit/Macros

In addition to the replacements of the Pole, Primary Down Guy and two OH services, Object folders automatically generated for the Primary OH and Secondary Conductor objects

What are Cost Units?

Cost Units (CUs, Compatible Units, Cost Objects) are the building blocks of creating a Work Order in Smallworld. They store information about the materials and labor costs needed to perform the selected action (Install, Remove or Transfer). Macros (MUs) are a collection of multiple types/quantities of CUs combined into a single unit.

Most Used Types of CUs/MUs
- **Labor & Material** - Contains labor and materials to perform task
  - Poles, brackets, equipment etc.
- **Labor Only** - Contains just labor to perform task
  - Transferring primary, secondary, services etc.
- **Labor Adders -** Used when additional labor is required for a task due to specific condition
  - Usually begin with PLA
    - Same Hole Set, Cutoff Top, Sidewalk Cut

Labor and Material for PR1STS (secondary bracket)

Labor Only for C1-1/C1/0LABR/TALL (Primary/Neutral Transfer)

Labor Adder PLA-SAMEHOLE (used with pole replacements
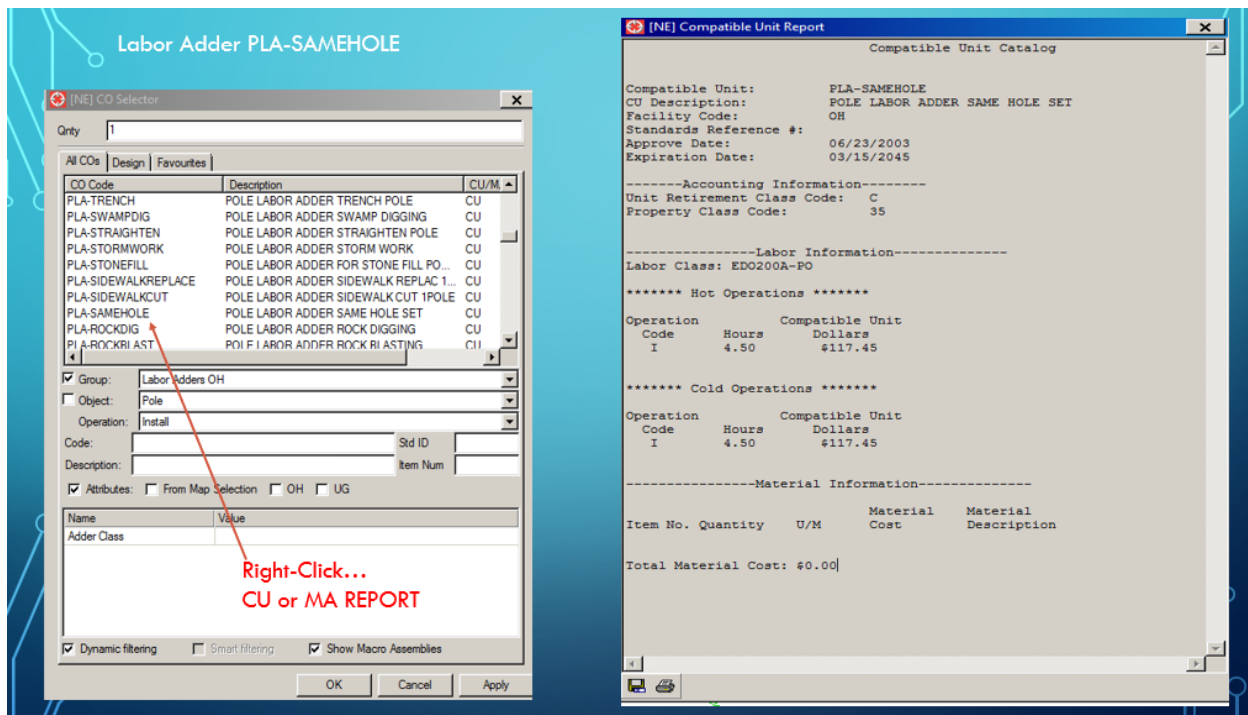
Once we've finished building our design in Smallworld, the labor and material cost estimates are sent to STORMs

STORMs Estimates button and resulting window

Costs can also be viewed by billing assignment via the Billable Cost Estimate Report

Billable Cost Estimate Report (accessible in STORMs)

national grid — Cost Estimate — Print Date: Jun 11, 2020 09:31

Design # 1

Work Request #: 28814407   Planner/Engineer: PATEAN   Assigned To: 3RDPTY_NE

Work Request Description: Third Party Attach Request - Dist OH/UG; VERIZON BOSEverett- Feeder 16W7 part 1

Customer Info

Customer Name: VERIZON/SAI   Contact Name: MARYELLEN PERROTTA

Customer Phone #:   Contact Phone: (603) 952-1964

Job Address: JEFFERSON AVE   Contact Address:
EVERETT MA, 02149

Labor	Standard Costs Hours	Standard Costs Cost ($)	System Improvement Hours	System Improvement Cost ($)	Added Service Hours	Added Service Cost ($)	Total Cost Hours	Total Cost Cost ($)
Install (Capital)	0	0	0.00	0.00	163.96	20,550.39	163.96	$20,550.39
Remove (Capital)	0	0	0.00	0.00	48.72	5,614.24	48.72	$5,614.24
Transfer (Capital)	0	0	0.00	0.00	0.00	0.00	0.00	$0.00
O & M	0	0	0.00	0.00	34.31	4,007.33	34.31	$4,007.33
Total Labor	0.00	$0.00	0.00	$0.00	246.99	$30,171.96	246.99	$30,171.96
Contractor Costs	0.00	$0.00	0.00	$0.00	0.00	$0.00	0.00	$0.00
Transportation		$0.00		$0.00		$2,519.90		$2,519.90
Material								
Pre-Capitalized Material		$0.00		$0.00		$0.00		$0.00
Other Materials		$0.00		$0.00		$3,746.03		$3,746.03
Total Materials		$0.00		$0.00		$3,746.03		$3,746.03
Additional Items								
Material		$0.00		$0.00		$0.00		$0.00
Pre-Capitalized Material		$0.00		$0.00		$0.00		$0.00
Contractor Invoice		$0.00		$0.00		$0.00		$0.00
Other		$0.00						$0.00
Total Additional Items		$0.00		$0.00		$0.00		$0.00
Joint Billing		$0.00		$0.00		($6,200.00)		($6,200.00)
Additional OH Costs		$0.00		$0.00		$0.00		$0.00
Credits		$0.00						$0.00
Total Net Cost		$0.00		$0.00		$30,237.89		$30,237.89
AFUDC		$0.00		$0.00		$0.00		$0.00
Total Estimate Cost		$0.00		$0.00		$30,237.89		$30,237.89

Company   Project   Work Order   Activity   Pct. of Total Hr

Cost Units and Make Ready Examples (Under CNSTRN)

Secondary Raises

Raising secondary involves installing a new secondary bracket, transferring the secondary conductor to the new bracket and then removing the old bracket. The standard reference in the description of work can be used to determine which secondary bracket CU to choose. Secondary could refer to multiplex conductors (duplex, triplex, quadplex), open wire secondary or neutral

Considerations when Raising Secondary

- Does it feed a streetlight or floodlight?
  - For streetlights, we may need to rewire the streetlight (depending on ownership)
  - Floodlights are NGRID owned/maintained
- Does it feed OH services?
  - The amount that secondary raises will dictate what to do with the OH services
    - OH Services are usually replaced with pole replacements
    - OH services are also replaced if secondary is raising 10" or more
      - How the service is fed (on-pole or in span) will impact this
        - 10" raise on pole is only a 5" raise in the middle of the span.
    - OH Services are Real World Objects

- Does it feeds service risers?
  - We'll need to make sure we have enough material to raise secondary

Secondary Conductors
When raising secondary, we need to account for the labor hours associated with moving the conductor.
For Triplex and Neutral conductors, we use Generic Transfer CUs to account for the labor.

C1-3/C1/0TPXLABR/TALL – 1/0 Triplex
C10AAACBRLAB – 1/0 Neutral
C1-1/C1/0LABR/TALL – Used as either 1/0 Neutral or 1/0 Primary
C1-3/C<1/0TPXLABR/TALL – Used for smaller than 1/0 TPX

Secondary Brackets
PR1STS: 10-100 Fig 1 (no angle)
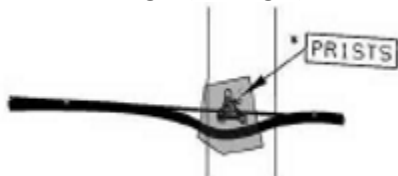
PR1STS: 10-100 Fig 2 (angles 1-10 degrees)
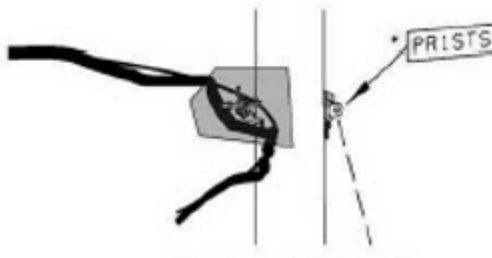
PR1STS-FIG2A: 10-100 Fig 2A; used with angles 11-50 degrees
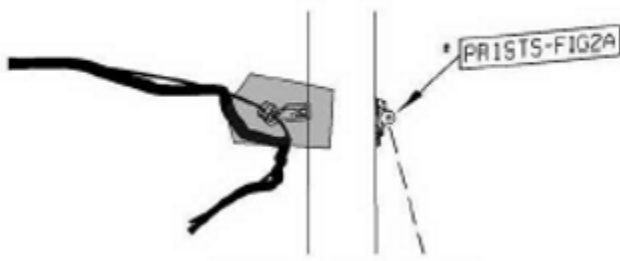
PR1SSA2: 10-100 Fig 3; used for corners, 61 degree and greater angles
- 1 CU covers both deadends of the corner
- 2 Add secondary transfer for each side of the corner
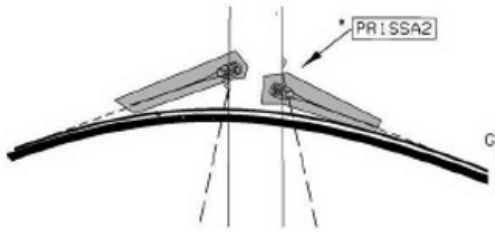
PR1SSADE: 10-101 Fig 5; used for dead ends
Back-to-back DE (DDE) will require a PR1SSADE for each side DE
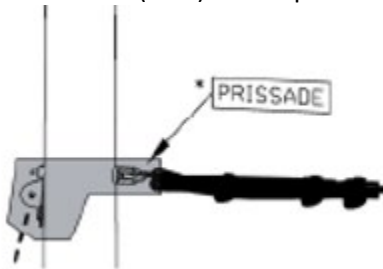
PR1STSTAP: 10-101 Fig 4; Junction poles where secondary taps off the main line
This CU only covers the tap portion, so you will also need to add CUs accounting for the thru portion, depending on the line angle (PR1STS, PR1STS-FIG2A OR PR1SSA2**)**
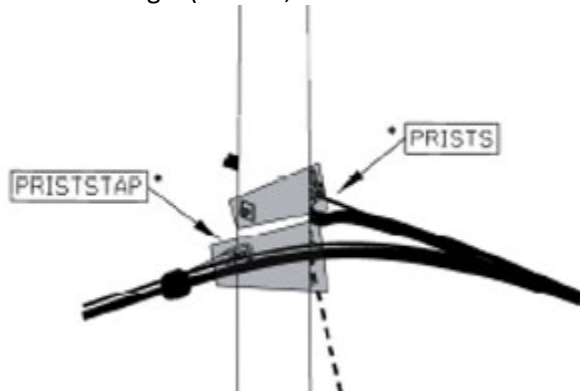
Basic Secondary Raise Examples

Raise secondary 8" to 24'4" (10-100 Fig 2A) resulting in 56" clearance to primary
Remove PR1STS-FIG2A (remove existing secondary bracket)
Install PR1STS-FIG2A (install new secondary bracket)
Transfer C1-3/C1/0TPXLABR/TALL (transfer triplex secondary from old bracket to new)

Raise DDE secondary 8" to 24'4" (10-101 Fig 5) resulting in 56" clearance to primary
Remove PR1SSADE x2
Install PR1SSADE x 2
Transfer C1-3/C1/0TPXLABR/TALL X2

Raise secondary and tap 8" 24'4" (10-101 Fig 4) resulting in 56" clearance to primary

(assuming thru secondary has little/no angle)
Remove PR1STSTAP
Install PR1STSTAP
Remove PR1STS
Install PR1STS
Transfer C1-3/C1/0TPXLABR/TALL X2 (assumes 10-101 Fig 4 tap is not a service)

Secondary Raises and Other Equipment Examples

Raising Secondary feeding NGRID Owned/Maintained Streetlight
Raise secondary 12" to 21'6" (10-100 Fig 2) resulting in 56" clearance to primary
Rewire streetlight per 19.4
Replace flex conduit (19-101) and bond bracket (19-110)

Remove PR1STS
Install PR1STS
Transfer C1-3/C1/0TPXLABR/TALL
Install LM3PBFC. (flex conduit and bond bracket)
Remove LM3PBFC. (flex conduit and bond bracket)
Install LRWXSLA (labor to rewire, includes 25' of wire)
Install CLTPS (reconnects light leads to secondary; add to Street Light Bracket folder)

Raising Secondary and Raising NGRID Owned/Maintained Streetlight
Assumes that NGRID owns/maintains streetlight, that it's less than 10' long and has a 10+ degree angle
Raise secondary 12" to 21'6" (10-101 Fig 4) resulting in 56" clearance to primary
Raise streetlight 15" to 19'4" and bond bracket (19-110)
Rewire streetlight per 19.4 and replace flex conduit (19-101)

Remove PR1STS
Install PR1STS
Remove PR1STSTAP
Install PR1STSTAP
Transfer C1-3/C1/0TPXLABR/TALL x2 (assumes 10-101 Fig 4 tap is not a service)
Install LM3PBFC. (flex conduit and bond bracket)
Remove LM3PBFC. (flex conduit and bond bracket)
Install LRWXSLA (labor to rewire, includes 25' of wire)
Install CLTPS (reconnects light leads to secondary; add to Street Light Bracket folder)
LB/A=<10FT_RM/TR_ALL

Raising DDE Secondary feeding Municipally Owned/Maintained Streetlight
Assumes there's DDE triplex/neutral secondary
Remove PR1SSADE x2
Install PR1SSADE x2
Transfer C1-3/C1/0TPXLABR/TALL (Triplex)
Transfer C10AAACBRLAB (Neutral)

Install CLTPS (the only CU needed when raising secondary feeding municipal streetlights (add to Street Light Bracket folder

Raising Secondary with mid-span service
The OH Service is a Real World Object, so we'll replace that first and auto-generate CUs. The SHORTSIDER (SHTSD) references denote that the service is on the same side of the road as the pole. LONGSIDER () references denote that the service is on the other side of the road from the pole.

Raise secondary 12" to 21'6" (10-100 Fig 2) resulting in 56" clearance to primary
Replace service to 1 Main St (11-115)

Install SER-TRIP2,RL,SHTSDLAB (Auto-Generated, Service Conductor Labor)
Install SER-TRIP2,RL,SHTSDMAT (Auto-Generated, Service Conductor Material)
Remove SER-SHORTSIDER/TALLLAB (Auto-Generated, Service Conductor Labor)
Remove SER-SHORTSIDER/TALLMAT (Auto-Generated, Service Conductor Material)
Install SER-TRIP2,CON,SHTSD (Auto-Generated, Service Connections*)
Remove SER-CONNECTIONR/TALL (Auto-Generated, Service Connections*)

*Service Connection CUs auto-generate based on how the service is linked to the pole in GIS. Not all replaced services will result in connection CUs

Raising Secondary with pole attached service
The OH Service is a Real World Object, so we'll replace that first and auto-generate CUs
Raise secondary 12" to 21'6" (10-100 Fig 2) resulting in 56" clearance to primary
Replace service to 1 Main St (10-101 Fig 5)

Install SER-TRIP2,RL,SHTSDLAB (Auto-Generated, Service Conductor Labor)
Install SER-TRIP2,RL,SHTSDMAT (Auto-Generated, Service Conductor Material)
Remove SER-SHORTSIDER/TALLLAB (Auto-Generated, Service Conductor Labor)
Remove SER-SHORTSIDER/TALLMAT (Auto-Generated, Service Conductor Material)
Install SER-TRIP2,CON,SHTSD (Auto-Generated, Service Connections*)
Remove SER-CONNECTIONR/TALL (Auto-Generated, Service Connections*)

*Service Connection CUs auto-generate based on how the service is linked to the pole in GIS. Not all replaced services will result in connection CUs

Remove PR1STS
Install PR1STS
Transfer C1-3/C1/0TPXLABR/TALL
Remove PR1SSADE
Install PR1SSADE

Raising Secondary feeding Service Riser
Assumes that there is enough material to raise secondary
Raise secondary 12" to 21'6" (10-100 Fig 1) resulting in 56" clearance to primary
Install 12" of U-guard to extend UG service riser to 23'2" (18-109)
Foam seal raised riser per 18.6

Remove PR1STS
Install PR1STS
Transfer C1-3/C1/0TPXLABR/TALL
Install RRGSUK11F (5' of 4" u-gard)
CUF10 (must be added to riser folder)

Raising Secondary feeding Service Riser, Additional Material Needed
Assumes additional riser leads material is needed to accomplish the secondary raise. The material (conductor) is considered truck stock and is not required to be added (unless directed by NGRID to do so).

To add additional material, splices (cuts) will need to be made on an individual wire basis (Triplex consists of 3 wires, 1 neutral wire and 2 hot wires, so 3 separate splices).

We're required to tag new cables when we splice in cable. Cable Tags identify what the UG cables feed, identifies ownership of the UG cable and address # being powered by the cables. Cable tags come in two sizes (6 and 10 characters) and should be selected depending on the number of position needed.

35.16.20   Secondary Cables

    A.   Company Owned Cable:

        The label identifies Company owned 600 V secondary cable. The dash followed by a number, e.g. 15, identifies the transformer / manhole / handhole that the cable goes t
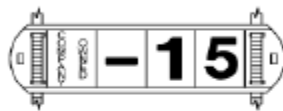
Figure 6
Identification Tags

    B.   Customer Owned Service Cable:

        The label identifies the customer owned 600 V service cable. The number, e.g. 155, identifies the customer's building or apartment number.

Figure 7
Identification Tags

Raise secondary 12" to 21'6" (10-100 Fig 4) resulting in 56" clearance to primary
Splice in cable per 18.8.30 and install 12" of U-guard to extend UG service riser to 21'6" (18-109)
Tag new cables per 18.2.20
Foam seal raised riser per 18.6

Remove PR1STS

Install PR1STS
Remove PR1STSTAP
Install PR1STSTAP
Transfer C1-3/C1/0TPXLABR/TALL x2
Install C1CSP (splice for neutral leg of triplex)
Install CS26D x2 (splice for (2) hot legs of triplex)

Cable Tagging CUs
CCTN (6 character)
CUP21PCUSTOMEROWNED
CUP21N# (replace # with desired number)

Anchors and Guy Wires
Anchors and Down Guys are Real World Objects in GIS. Down Guy child objects live within the Anchor parent object. Anchors will either be Sole Owned (by NGRID) or Joint Owned with TELCO. Power Down Guys are owned by NGRID. Anchor Ownership is important only if we need to replace the existing anchor. JO Anchor replacements require specific CUs to denote who is responsible for the Install or Removal actions of the existing anchor and allows for Exchange of Notice (EON) documentation to be populated in STORMs.
Down guy designations are based on which zone the down guy is attached to the pole (Primary or Secondary) and the system type of Primary (Wye/Delta). Down guys are Real World Objects and live within the Anchor and Guy GIS Object. There are also Sidewalk Guys (aka Strut Guys)

Replace Down Guys
*Autogenerated CUs after RWO replacement
Replace primary down guy (3-105 Fig 1)
Replace secondary down guy (3-118)

Remove GUY-DOWNR/TALL (in its own Anchored Guy Wire folder)
Remove GUY-DOWNR/TALL (in its own Anchored Guy Wire folder)
Install GUY-3-105,12.5MDWNG/TI95B (in its own Anchored Guy Wire folder)
Install GUY-3-118,12.5MDWNGSECYP (in its own Anchored Guy Wire folder)

Replace Anchor and Down Guy
Autogenerated CUs after RWO replacement. Assuming existing anchor is a JO anchor
Replace existing anchor with 10" helix TTA (3-102)
Replace primary down guy (3-105 Fig 1)
Replace secondary down guy (3-118)

Remove GUY-DOWNR/TALL (in its own Anchored Guy Wire folder)
Remove GUY-DOWNR/TALL (in its own Anchored Guy Wire folder)
Install ANC-3-102,10HEL,84ROD
Remove JO Anchor
Install GUY-3-105,12.5MDWNG/TI95B (in its own Anchored Guy Wire folder)
Install GUY-3-118,12.5MDWNGSECYP (in its own Anchored Guy Wire folder)

Pole Replacements
Poles are Real World Objects. Replacing a pole kicks off a series of actions that need to be accounted for in the Work Order. The construction crews set a new pole and install a new primary framing setup. Then the existing conductors will need to be transferred from the old pole to the new pole. The type of equipment on the pole (XFMRs, cutouts, guying etc) will dictate what action needs to be taken.

Real World Objects replaced with Pole Replacements
- OH services
- NGRID Owned Poles
- Existing power down guys
- Existing power risers
- Power Span Guys

Real World Objects Replaced with Pole Replacements (as needed)
- Anchors
- XFMR Protecting Cutouts (Porcelain only)
- Line Cutouts (Porcelain only)
- Lightning Arresters
- UG Primary (primary riser replacements)

Review DOW and address Real World Objects as needed
Generate Work Records

Protip: In order to stay organzied, I like to expand the relevent Work Point Flags (right-click Work Point Flag and click 'Expand') and then minimize the Object folders as I review the them.

OH Services
Confirm that auto-generated secondary service folders populated with no undefined CUs

Each replaced service will have it's own Work Point Flag

Connection CUs (if generated) will populate under the Work Point Flag associated with pole

If there are no undefined CUs, minimize these folder

Pole Removal Folder
1. Expand Pole Folder with pole removal CU
2. Confirm correct pole removal CU is selected
   a. If replacing a JO pole, the pole removal CU needs to have the -JO at the end
   b. If replacing a SO pole, the pole removal doesn't need the -JO at end
3. Add PLA-CUTOFFTOP Cost Unit to the Pole Removal folder (add with every PCO)
4. Mininmize Pole Removal folder

Pole Install Folder
1. Expand Pole Folder with pole install CU
2. Confirm correct pole install CU is selected
   a. 99% of the time this will be the CU **without** the -JO
   b. Telco Set Poles (using -JO) are only found in ½ of Nantucket
3. Add PLA-SAMEHOLE (added for every pole install)
4. Add stenciling and numbers
   a. PWRW (White reflector)
   b. PP20A (NG Tag)
   c. PNWP (Labor associated with adding pole numbers)
   d. P21A2# (replace # with desired stencil number)
      i. Multiple number stencil may be needed
      ii. Increase quantity of stencil CU to add multiples of number
      iii. P21A3- (this is used for a dash)
5. Mininmize Pole Removal folder

Primary OH Folder
Auto-populates with pole replacements. Includes primary conductor transfer CUs based on GIS and poletop framing based on the primary arrangement and line angles in GIS. Pole top configurations populate as Macros and may include CL at the end, which indicates the precense of insulated primary conductors. Spacer Cable messenger usually populates in a separate OH Primary folder

1. Expand Primary OH folder
2. Confirm generated Macros match DOW and survey photos
3. If you need to update the generated macros and they have "CL" at the end, be sure that the newly choosen Macros also have "CL" at the end
4. Sometimes you may need to add multiple macros to account for the poletop configuration
5. Confirm generated primary conductor transfers populate and that the quantities are correct, based on the poletop configuration
   a. Deadend poletop configurations will need transfers for conductors on both sides of the X-Arm
   b. There may be multiple primary conductor sizes at primary junctions

XFMRs and Pole Replacements
An OH Transformer Installation folder auto-generates with pole replacements. XFMRs usually auto-generate Macros, depending on the attributes found in GIS. The macro contains CUs for the transferring the XFMR itself, labor associated with mounting the XFMR, transferring the grounding vertical and transfer CUs for the cutout, cutout bracket and fuselinks (if applicable). We'll need to review and modify the auto-generated CUs/Macros, as some items need to be changed to replacements rather than transfers.

1. Expand OH Transformer Installation folder
2. Is there a XMFR Macro? (usually starts with @)
    a. No? – See the Choosing an XFMR macro section for help choosing a XFMR Macro
    b. Yes? - Select Macro, right click and Split MA to CUs, which will allow us to modify the CUs within
3. Review/modify resulting CUs
    a. Confirm the Transformer CU (Transfer)
        i. Depends on auto-generated or user selected XFMR Macro
    b. Confirm there's a Transfer Transformer Mount (Transfer)
        i. Depends on System Type (Wye/Delta) and XFMR size
    c. Ground Verticals will always be replaced
        i. CU depends on System Type (Wye/Delta)
        ii. Add Grounding Verticle Install and Remove CUs
        iii. Remove Ground Vertical Transfer
    d. XFMR Protecting Cutouts (if applicable)
        i. We need to account for Cutouts Brackets, Cutout Bodies and Cutout Fuselinks
            1. Cutout Brackets are always replaced
                a. CUs vary depending on how the cutout bracket is attached (on X-Arm or on pole)
                b. Fiberglass X-Arms require fiberglass specifgic version
                c. Add Install and Remove versions
                    i. Increase quantities as needed
            2. Fuselinks are always replaced
                a. Add Install and Remove versions
                    i. Increase quantities as needed
            3. Cutout bodies
                a. Transferred if non-porcelain (polymer)
                    i. Confirm Cutout Body Transfer CU present
                        1. CC15KS1 (Transfer)
                            a. Increase quantities as needed
                b. Replaced if porcelain
                    i. Replaced as Real World Objects
                        1. Cutout body replacements will auto-generate folders replacing the bodies and fuselinks

Choosing an XFMR Macro

Conventional XFMRs (CONV) have external cutouts; Completely Self Protected XFMRs (CSPs)
1. Expand the OH Transformer Installation object
2. Double-click Transformer Unit to access attributes
3. Note the Size and Primary Code (first 3 numbers of primary code)
   a. Grab a screenshot if needed
4. Double-click OH Transformer Installation folder to open object attributes
5. Select CO List tab to add CU
6. Add XFMR size followed by KVA in the Description filter In CO Selector window
   a. Ie: 25KVA
7. Click CO Code column in CO selector window to change Ascending/Descending Order
8. Scroll to find a XFMR macro with the XFMR size and primary code combination needed
9. If XFMR has cutouts, choose a XFMR Macro with CONV in the description
10. If XFMR doesn't have cutouts, choose a XFMR Macro with CSP in the description
11. Select desired Macro and add to OH Transformer Installation Object
12. Select Macro, right click and Split MA to CUs, which will allow us to modify the CUs within

Ground vertical will always be replaced
Cutout Brackets and Fuselinks for XFMR protecting cutouts (pole mounted or on crossarm) will always be replaced

Pole and X-Arm attached XFMR cutout brackets and XFMR cutout fuselinks will always be replaced. Down Ground/Rod will also always be replaced. Cutout Bodies are transferred (if non-porcelain) or replaced if porcelain). Lightning Arresters that aren't tank mounted should be replaced (older XFMR styles may not have tank mounted arresters).

Helpful Make Ready Information
11. In the 'CO Selector' window, add values to the filters to help narrow down CU choices.
12. Never have more than one design point on the same object.
13. **Pole Replacement Related**
    a. PW403 vs PW403-JO: Any CU with the -JO suffix means that TELCO will do the work
    b. Double the X-arm when the primary crosses roads or there are span over 300'
14. **Customer Service Risers**
    a. Internal Construction
        i. Extending/Adding Additional U-gard – performed by NGRID
        ii. If any splicing is required – applicant's responsibility
        iii. Transferring Riser – applicant's responsibility
    b. External Construction
        i. All customer service riser work will be performed by the contractor
            1. Applicant not responsible for any work
15. **Secondary/Primary Risers**
    a. Internal Construction – All Work performed by NGRID
    b. External Construction – All Work performed by contractor
16. **Resagging Secondary**

a. When we have multiple sections of secondary to re-sag, we don't need to deadend the secondary and each pole
    i. Instead, we can deadend only at each end
b. Make sure the C1CRESAGSEC CU quantity matches the number of sections to be re-spanned

17. **Replacing Services**
    a. **NE**
        i. Material should always be AL with PE covering; Neutral Size/Type OK to leave N/A (if blank or unknown)
            1. #4 services get upgraded to #2 when being replaced
        ii. Services get replaced with PCOs
            1. Anytime the secondary is raising such that the service tap is raising greater than 12", then the service should be replaced
            2. Transferring a secondary 5' on a pole means the service is raising 2.5', if it's exactly in the middle of the span; use your judgement,
            3. If service tap is 3'-5' from the pole and the net raise is >1' then it's likely that the service tap needs to be replaced, especially if its #4 TPX
            4. When there are more than four customers on a single service (multi-family/apt building, service can be upgraded to 1/0 if needed
        iii. Consider replacing a service if lowering 24"+
            1. Remember that service spans are typically non-tensioned, so they will sag considerably
    b. **NY**
        i. We don't replace services in NY; they are transferred and will be extended/spliced as needed

18. **Customer Owned Streetlights**
    a. Check the Ownership of the streetlight before moving forward with Make Ready Streetlight work, especially with NE Work
        i. Not as common an occurrence in NY, but does exist in some places
    b. NGRIDs responsibility on customer owned streetlights is limited to bulb and photo-control in most cases
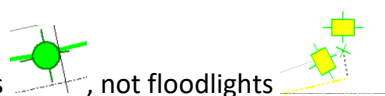
        i. This applies only to Streetlights , not floodlights
        ii. **Determining Streetlight Ownership**
            1. Lists "Customer" in the Ownership field in the streetlight's attributes
            2. An account number present in the streetlight's attributes is another indication that Streetlight is customer owned
            3. For a town by town ownership listing, refer to: Work Order Resources\Process Documents\NE Company Owned St Light City-Town Listing July 2016.xls
    c. Any other work related to the customer owned streetlight will require a note added to the description of work on the C-form ONLY!
            1. **These notes shouldn't carry through onto the construction sketches**
                a. Example1: "Town of Brockton to replace flex conduit and bond to neutral per CS 19-101,"
                b. Example2: "City of Providence to raise streetlight 12" to XY'Z (19-110) and replace flex conduit and bond to neutral (19-101)"

Send Estimate to STORMS

1. From the 'Analyse' menu, select 'Send Estimate to STORMs'.
2. In STORMS, click the 'Tracking' button ⬚ and look for 'Job Estimate Produced' under the 'Change' column. This means the estimates were successfully sent. Estimates may take a few minutes to complete.
3. The 350R with an updated-on date of the date you sent estimates to Storms tells you that it was successfully submitted to storms
    a. Sometimes may take 5-10 mins to make it through; refresh as needed

Police Protection (NE Only)

19. Police protection is required for poles along
    a. The general rule of thumb is if the parked truck doing the required work will affect traffic, call for police protection (if questionable, err on side of caution and include)
20. Police Protection may also be required if your work involves spans that cross roadways.
21. We need to provide separate totals for billable and non-billable police protection

Determine Total Labor Hours

22. A
23. If all make ready poles require police protection and all have the same type of billing:
    a. Send estimates to STORMS by following the 'Send Estimate to STORMS' section.
    b. In STORMS, click the 'Estimate' button ⬚. Total labor hours are the 'Direct Hours' number under 'WR Labor'
    c. Round up to the nearest hour and enter the total into the WM Calculator's Police Protection

| Police Protection: | 0 |

Add Amount to Work Management Costs

24. Billable Police protection will be added as a 'TPAG' remark in STORMS, as part of the work management costs. Refer to the work management calculator.
25. Non-billable Police Protection is not reported.

Tree Trimming/Forestry Review

We request a Forestry Reviews for applications with Tree Trimming needs
If application has poles that are billable and non-billable or mixed billing poles, request separate estimates for the billable and non-billable work

26. **When to request Tree Trimming/Brush Clearing?**

a. Ask yourself "Will we need to perform tree trimming/brush clearing for the work to be completed?
b. Reference the Forestry Construction Standards.pdf to see the clearances needed between the poles, electric lines and equipment and nearby vegetation
    i. \\syrfile15\projects\NationalGrid-Engineering\ProjectData\FieldData\Work Order Resources\TreeTrimming
c. Consider existing conditions and what conditions will be like with the proposed changes to the pole and conductors
    i. Raising a secondary 2' will result in a 1' raise in the midspan which will result in the raised secondary touching tree branches and secondary service tap feeding 3 Main St to touch tree branches
    ii. Replacing a 45' pole with a 50' pole may result in primary conductors touching tree branches
d. Brush Clearing isn't considered Tree Trimming
    i. Don't include Brush Clearing work in the Forestry Review request
    ii. Brush Clearing can be accomplished by the crew performing the work
    iii. Don't include the Tree Trimming Symbol for Brush Clearing on the construction sketches
    iv. Add "Brush Clearing Required" in bold on the E5/C-form
e. Reference the Survey photos first (since they are probably going to be the most recent visual of field conditions), then Google/Bing StreetView, Satellite and Bird's Eye Views
    i. Be aware that the images you're referencing may have been taken during leaf-off months
27. **How to request Tree Trimming?**
    i. Request a Forestry Review
28. **Forestry Review (NE/Internal NY)**
a. No need to wait on the 278R approval to request a Forestry Review
    i. In STORMS, add requirement '236' (Forestry Review) by clicking the 'Add Optional Requirements' button.
    ii. The '236' will automatically be assigned to a Forestry Supervisor, though we should confirm that it's assigned to the correct individual.
        1. Reference the Forestry Contacts lists found here: \\syrfile15\projects\NationalGrid-Engineering\ProjectData\FieldData\Work Order Resources\TreeTrimming
    iii. Send an email requesting a forestry review to the assigned Forestry Supervisor
        1. Send Construction Sketches
        2. If application has poles that are billable and non-billable or mixed billing poles, request separate estimates for the billable and non-billable work
    iv. When the arborist completes their review, they will usually reply to your email and leave a VEGM remark in STORMS with total costs.
        1. If the arborist doesn't leave a remark, add one under the remark type "VEGM" that outlines:
            a. Who provided the estimate? When? What the estimate is?
        2. Verify that the 236R has been completed
            a. If not, complete the 236R
        3. Add an additional item(s)
            a. See Add Additional Items to a GIS Design for Tree Trimming

29. **Add Additional Items to a GIS Design for Tree Trimming**
    a. You don't need to add additional items for external work.
    b. You will need to add separate additional items to billable and non-billable work
    c. Adding an additional item without the Est. Cost filled in will result in problems Design Completing the GIS Design
    d. Find Real World object that was replaced/installed (use a pole if available) from the list of design points.
        i. Always use the Install CU folders when adding additional items
        ii. Left-click on the object's install folder, then right-click and select 'Additional Item'.
        iii. Click the 'Point/Span Editor' tab.
        iv. 'CO code': "Tree Trimming"
        v. Description':
            1. "Tree Trimming": If all the same billing.
            2. "Billable Tree Trimming" or "Non-Billable Tree Trimming": If a mixture of billing.
        vi. 'Est. cost':
            1. Enter amount received from Forestry.
                a. We no longer add 10% in NY to the estimates added through additional items
        vii. Tree Trimming:
            1. 'Quantity': Always '1.00'.
            2. 'Type Addl Item':
                a. Billable tree trimming: 'Vegetation – Added Service' ('BV' in STORMS).
                b. Non-billable tree trimming: 'Vegetation – System Improvement' ('VG' in STORMS).
        viii. 'Usage Code' and 'Asset Type' should be left blank.
        ix. Click 'Insert' and Save
        x. Send Estimates to STORMS
            1. Verify requirement '637' was automatically created after adding the 'Additional Item'.
                a. The '637' is triggered by an additional item with an 'Additional Item Type' of 'BV' or 'VG'.
                b. 637 will automatically assign to the responsible party

Accessing the Pole (Roadside, Off Road and Rear Lot) 6/20/25

We call for Police Protection for Make Ready Work in New England, depending on how the crews will be accessing the job site. Police Protection is calculated based on the labor hour estimates associated with the work (through adding CUs/Macros in Smallworld). Labor hours are calculated once STORMs receives the estimates from Smallworld.

- **Roadside Work** - truck can park on or partially on the road and using the 15' reach of its arm/bucket, access the pole
    o Simply add "**Police Protection Required**" to DOW on construction sketches
    o No extra CUs required

- **Off Road Work** - pole accessible by truck and using the 15' reach of its arm/bucket, but requires truck to go off-road, possibly across grass, fields etc or private property (with permission)
  - xi. Add "**Off Road Work**" in **Bold** to the E5/C-form and construction sketch
  - xii. Off Road Work may require police protection if the work involves conductors crossing a roadway
- **Rear Lot Work** - pole not accessible by truck and it's 15' arm/bucket. Area may be heavily wooded with trees/brush, wetlands, steep grade, blocked by fences/guardrails, unable to drive across grass and fields, may require climbing the pole or using an ATV to access the location.
  - o If you wouldn't drive your own car or a 4-wheel drive vehicle there, its likely Rear Lot
    - xiii. Add Rear Lot Labor Adder CUs as needed

57	PLA-REARLOT55UNDER	POLE LABOR ADDER REAR LOT 55' & UNDER	Labor Adders OH	I/R	Pole replacement (55' is pole height)
58	PLA-FRAME	POLE LABOR ADDER FRAME POLE	Labor Adders OH	I/R	Pole top replacement
59	CLARTCS	COND LBR ADDER R/LOT TRANSFR 1CONDT SPAN	Labor Adders OH	T	Conductor transfer
70	CLARICS	COND LBR ADDER R/LOT INST 1 CONDT SPAN	Labor Adders OH	I	Conductor installation (can be used for span guy install (JC 9/2/21
71	CLARRCS	COND LBR ADDER R/LOT TRANSFR 1CONDT SPAN	Labor Adders OH	R/T	Conductor transfer/removal
72	TSULARL	TRANSF SIN UNIT LBR ADDER R/LOT CONST	Labor Adders OH	T	1PH XFMR transfer
73	TCMLARL	TRANSFS CLSTR MOUNT LBR ADDER R/LOT	Labor Adders OH	T	3PH XFMR transfer
74	LSLRL	STREET LIGHT REAR LOT LABOR ADDER	Labor Adders OH	I	Streetlight work
75	ALA-REARLOT	ANCHOR LABOR ADDER REAR LOT	Labor Adders OH	I/R	Anchor/down guy work

  - xiv. Add "**Rear Lot Work**" in **Bold** to the E5/C-form and construction sketch
  - xv. Rear Lot Work may require police protection if the work involves conductors crossing a roadway

Reports and Permits

Customer Outage List   revised 7/15/24

Certain types of electric Make Ready work requires an outage to perform the work. Commercial customers usually require advanced notice of an electricity outage. There are also costs associated with a commercial outage that are captured during NGRID's work order review process. We'll use the CSS Data embedded within the Service Point/Premise GIS objects to determine which customers need to be included on the list.

When do you need to prepare a Customer Outage List?

- **All Customers (Commercial and Residential)**
  1. Primary Riser Make Ready
     - Includes the replacement of risers, cutout bodies and fuselinks or splicing in cable
- **Commerical Customer Only**
  1. Secondary & Service Replacements
  2. Work Requiring Splicing (any UG, primary, and secondary)
  3. XFMR Related Fuselink Replacements
  4. Transformer replacements

Note: Line cutout body & fuse link replacement (1ph & 3ph) – require no outages, crews can install a jumper to keep lines energize

How to determine if a customer is residential or commercial?

We need to check the CSS Data's attribute "res_com" which denotes whether the customer is residential (R) or commercial (C). We're not concerned with customers that don't have a res_com designation. There are a few different ways of accessing the CSS Data.

- **XFMR Customer Details:** Use when replacing a XFMR protecting fuselink or if replacing a service being fed from the XFMR. Best used for a quick overview of what customers are impacted by the proposed work. There is an option to export results, but exported results do not include all the information needed in the customer outage list (doesn't contain full addresses)
  1. Select the OH Transformer Installation
  2. Under the Editor tab, Select Specials and Customer Detail
  3. In the Customer Details window, choose a period from within the same year that you are writing the job
- **Directional Traces:** Provides the most detailed customer information that needs to be included in the outage list, including full addresses. Use to extract customer information from service replacements (or splicing) or UG Primary splicing

  1. Drop a Trail Point on object you want to trace out
  2. Click NGRID – Electric – Directional Trace
  3. Check Down Stream and press the green play button
  4. Results will display on the bottom of window
     - Select one or all customers, right-click and Export to Excel
       - Excel will open as a new window on the VDI drive window
- **By Service Point:** Use for a quick check to determine res_com. There's no ability to export.
  1. Select Service Point in GIS
  2. Click premises to expand associated premises
  3. Double click premise
  4. Under Specials, click CSS Data
  5. Scroll to find the res_com attribute

Assembling the Customer Outage List
  1. Review each page of the construction sketches for outage items and use the methods outlined above to extract customer information to be included on the outage list
  2. Create a local excel file with the extracted customer information
  3. Organize outage list by pole with a brief desc of work requiring

P20 Pleasant St - Replace service					
		32825900	154	PLEASANT ST	19552758
P6 Pleasant St - Replace fuselink					
		4.05E+08	0	PLEASANT ST	
		15921200	2	PLEASANT PL	HSE
		2.81E+08	47	PLEASANT ST	
		6.54E+08	55	PLEASANT ST	76326714
		7.79E+08	64	PLEASANT ST	
P18 South St - Replace service					
		9.04E+08	160	SOUTH ST	

EoN - Exchange of Notice (NE Only) – rev 12/5/22

1. An EON is required for joint owned installations/replacements/removals of poles, anchors and push braces.
   a. Organized by street
   b. Push Braces are accounted for as poles on the EON
2. The Final EON document consists of four PDFs (2 for Electric and 2 for Telephone)
   a. **Exchange of Notice - Page 1 PDF**: Electric General info showing the number of poles/anchors by street, the types of work and a blank area for a sketch
      i. There will be one sheet for each street with work on EON
      ii. I will refer to this page in this process doc as 'Electric General'
   b. **Exchange of Notice – Page 2 PDF**: Electric cost responsibility by-pole breakdown
      i. Assets organized by street with work on EON
      ii. I will refer to this page in this process doc as 'Electric Cost'
   c. **Exchange of Notice TELCO Rqst – P1 PDF**: Telephone General info showing the number of poles/anchors by street, the types of work and a blank area for a sketch
      i. There will be one sheet for each street with work on EON
      ii. I will refer to this page in this process doc as 'Telephone General'
   d. **Exchange of Notice TELCO Rqst – P2 PDF:** Telco cost responsibility by-pole breakdown
      i. Assets organized by street with work on EON
      ii. I will refer to this page in this process doc as 'Telephone Cost'

3. **Getting Started**
   a. Apply filters on the e5 showing the Joint Owned PCOs, Anchors and Pushbrace Installations/Replacements/Removals
      i. These are the items that should show up in the EON
   b. **IMPORTANT:** In the GIS Design, confirm these objects have the correct 'Set By'
      i. Objects Ins/Rem by TEL would have a 'Set by' attribute of "Telephone"
      ii. Objects Ins/Rem by ELCO would have a 'Set by' attribute of "Electric"
   c. **IMPORTANT**: In the GIS Design, confirm that you've chosen the correct Install and Remove CUs for these objects
      i. -JO CU Installs/Removes are installed/removed by TEL
         1. CUs without "-JO" at end of indicate ELCO is installing/removing
   d. **REMEMBER** to re-send Estimates to STORMs if you made ANY changes to CUs or 'Set By' attributes **BEFORE** creating the EON

4. **Creating the EON**
   a. In STORMS, open work request.
   b. From the 'File' menu, select 'Properties' -- > 'Reports'.
      1. Right-click '**Exchange of Notice - Page 1** and select 'Modify'.
      2. Click the 'Print' button 🖨, Click 'Printer'.
      3. Select 'ScanSoft PDF Create! On Ne00:' and click 'OK', the 'OK'
      4. Save file to V: drive.
   c. Repeat these steps for **'Exchange of Notice - Page 2', 'Exchng of Notice TELCO Rqst - Pg 1'** and **'Exchng of Notice TELCO Rqst - Pg 2'**
   d. Combine all the PDFs into a single PDF called EON_WORKING.PDF

CONFIRM the correct number of poles, anchors and push braces are present on the two By-Pole cost breakdown PDFs.

      e. If you're missing something, go back into your GIS design to double check the assigned "Set By' and selected CUs

5   What am I looking at?

Exchange of Notice - Page 1 PDF (Electric General)

      a. **BY CO REP:** Auto-populates as the name associated with USERID 270R is assigned to

      b. **Column V:** Auto-populated count of assets that fall into each category

          i. Pole Replacements are Item 4

          ii. Anchor Replacements are Item 7

      c. **Street/Route #:** Street and Line # work is associated with

      d. **Voltage**: Primary Voltage of poles with work; Use 'Sec' if there isn't primary

      e. **Reason for Work:** Third Party Clearance

Form 605A (1-93)
Dec 06, 2022 16:32
Legacy No:

TELEPHONE COMPANY
JOINT OWNERSHIP -------- EXCHANGE OF NOTICE

(RETURN WITHIN 14 DAYS FOR ITEMS 1 TO 7_12)
(RETURN UPON COMPLETION OF WORK OR ITEM 8 TO 11 INC.)

REVISION # : 0
REVISION DATE : 12/02/2022
REQUIRED BY DATE : _____

TO : VERIZON   LOCATION : _____   JOB/NOTICE# : 30661957
          COMPANY   ELECTRIC
FOR CO. Rep : _____   ORDER # : _____   JOB/NOTICE# : _____
                                                      TELEPHONE   TELEPHONE

FROM : Massachusetts Electric Company   LOCATION : _____   DATE : 12/5/22
BY CO REP : Hicks, Alicia   MUNICIPALITY : MA WARWICK   TOWN CODE : 0304

V	ITEM	NATURE OF NOTICE OR REQUEST	V	ITEM	NATURE OF NOTICE OR REQUEST
	1	APPLICATION TO PURCHASE INTEREST		7	NOTICE TO INSTALL/REPLACE JO ANCHOR
	2	APPLICATION TO SELL INTEREST		8	NOTICE OF NON-STANDARD CONDITIONS
	3	NOTICE OF INTENT TO ERECT NEW POLES		9	NOTICE TO CUSTODIAN OF POLE IN NEED OF REPLACEMENT
1	4	NOTICE OF INTENT TO REPLACE JO POLES		10	REQUEST TO TRANSFER
	5	NOTICE OF INTENT TO RELOCATE JO POLES		11	POLE REINFORCEMENT
	6	NOTICE OF INTENT TO ABANDON POLES		12	OTHER AS DETAILED BELOW

GIVE LOCATION AND DESCRIPTION OF ITEM(S) CHECKED

EXCHANGE : _____   STREET : ROYALSTON RD   ROUTE # : 0024

SKETCH

VOLTAGE :   REASON FOR WORK :

RECEIVED BY : _____   DATE : _____
AGREED TO BY : _____   DATE : _____   _____
                                                                                    COMPANY
REFUSED BY : _____
DATE RETURNED : _____   DATE RECEIVED : _____

What am I looking at? (continued)

Exchange of Notice TELCO Rqst – P1 PDF (Telephone General)
    f.   Identifiable by "Request for Telephone Company Work" in page header
    g.   Has all the same fields highlighted in the above Electric General screenshot
          i.   Column V DOESN'T auto-populate a count of assets

Form 605A (1-93)
Dec 06, 2022 16:46
Legacy No:

TELEPHONE COMPANY
JOINT OWNERSHIP -------- EXCHANGE OF NOTICE
-------- *Request for Telephone Company Work* --------
(RETURN WITHIN 14 DAYS FOR ITEMS 1 TO 7_12)
(RETURN UPON COMPLETION OF WORK OR ITEM 8 TO 11 INC.)

REVISION # : _____
REVISION DATE : 12/02/2022
REQUIRED BY DATE :

Exchange of Notice – Page 2 PDF (Electric Cost)
    h.   Identifiable as having auto-populated values under Proposed Plant section

i. **Nature of Work Code:** Type of Work
    i. **Pole Replacements/Installs:** A
    ii. **Anchor Replacements/Installs: G**
j. **Telco Company Pole Number:** Populates if pole in GIS has a Foreign Pole #
    i. We can manually update this in the PDF Editor with TEL Pole # or as "NT" if there is no known TEL pole #
    ii. **TEL PAY:** We change this to 0 in PDF Editor if work is Billable to Applicant
        1. If PEC Pole Work, leave value as 1240
        2. If PEC Anchor Work, check with Veteran Work order writer

NATURE OF WORK CODE

A = INSTALL MUTUAL HEIGHT   E = REMOVE
B = INSTALL EXCESS HEIGHT   F = DAMAGED POLE
C = INITIAL INTEREST   G = INSTALL ANCHOR
D = REMAINING INTEREST   H = BOND TEL CABLE W/CHARGE
                             I = BOND TEL CABLE W/O CHARGE

REVISION # : 0
TEL. PROJ # : _____
TEL. NOTICE NO : _____
TEL. ORDER NO : _____

REVISION DATE : 12/02/2022
ROUTE # : 0007
JOB # : 30661957
ELEC. PROJ. # : 05-C091311-10030661957

STREET: GALE RD

POLE NUMBER			W O R K C O D E	O W N E R S H I P	EXISTING PLANT									PRIVATE PROPERTY	PROPOSED PLANT							
TELCO COMPANY	POWER COMPANY	GPS (LAT, LONG)			L E N G T H	C L A S S	W T O R O E D A T M E N T	ANCHOR QTY	ANCHOR SIZE	Y P EL AA R C E D	BILLING TEL PAY	BILLING ELEC PAY	C H E C K	WHEN POLE ARE ON PRIVATE PROPERTY SHOW PROPERTY OWNERS NAME	L E N G T H	C L A S S	W T O R O E D A T M E N T	ANCHOR QTY	ANCHOR SIZE	BILLING TEL PAY	BILLING ELEC PAY	C H E C K
1	2		3	4	5	6	7	8	8A	9	10	11	12	13	14	15	16	17	17A	18	19	20
	PL 13-0	-72.302040, 42.658424	A	50%											45	3	SP			1240		

What am I looking at? (continued)

Exchange of Notice TELCO Rqst – P2 PDF (Telephone Cost)
k. Identifiable by having auto-populated values under Existing Plant section
    i. Nature of Work Code will be "E"
    ii. TEL PAY will be 0 if work is Billable to Applicant
        1. If PEC pole work, replace 0 with 1240
        2. If PEC Anchor work, check with a Veteran Work Order writer

Dec 05, 2022 16:02

NATURE OF WORK CODE

A = INSTALL MUTUAL HEIGHT   E = REMOVE
B = INSTALL EXCESS HEIGHT   F = DAMAGED POLE
C = INITIAL INTEREST   G = INSTALL ANCHOR
D = REMAINING INTEREST   H = BOND TEL CABLE W/CHARGE
   I = BOND TEL CABLE W/O CHARGE

REVISION # : 0
TEL. PROJ # : _____
TEL. NOTICE NO : _____
TEL. ORDER NO : _____

REVISION DATE : 12/02/2022
ROUTE # : 0049
JOB # : 30661957
ELEC. PROJ # : 05-C091311-10030661957

TEL   ELEC

STREET : SMITH RD

POLE NUMBER		GPS (LAT, LONG)	W O R K C O D E	O W N E R S H I P	EXISTING PLANT							BILLING		C H E C K	PRIVATE PROPERTY WHEN POLE ARE ON PRIVATE PROPERTY SHOW PROPERTY OWNERS NAME	PROPOSED PLANT						BILLING		C H E C K
TELCO COMPANY	POWER COMPANY				L E N G T H	C L A S S	W T O R O E D A T M E N T	ANCHOR		Y P E L A A R C E D		TEL PAY	ELEC PAY			L E N G T H	C L A S S	W T O R O E D A T M E N T	ANCHOR		TEL PAY	ELEC PAY	
								Q T Y	S I Z E										Q T Y	S I Z E			
1	2		3	4	5	6	7	8	8A	9	10	11	12	13	14	15	16	17	17A	18	19	20
0002	PL 2-0	-72.316116, 42.718319	E	50%	35	4	SP			1976	0												

6 Creating Sketches for EON

a. We'll create a single sketch for all the work on a specific street in the EON
   i. I use Bing Maps, which easily allowed me to label the coordinates to what I choose and allows me to add/display multiple pole locations on the map

b. We'll use the sketch we create for a specific street on both the Electric and Telephone General sheets (**Exchange of Notice - Page 1** PDF and **Exchange of Notice TELCO Rqst – P1** PDF)

c. In Bing Maps
   i. Paste coordinates into search box and hit enter
      1. Drops a pin with the approximate address
   ii. Click here:

   iii.
      1. Add a nickname
         a. I use 'P# STREET NAME' as my nickname
      2. When finished, click Add
   iv. Repeat for the other locations with work on this street that we're referencing on the Electric/Telephone General sheets
   v. Once we've added the other locations with work we're showing on the EON for the street, use the Snip Tool/Snag It tool to save a screenshot
      1. Save Screenshot as Streetname
   vi. Repeat these previous steps for each street with work shown on the EON

7 Modifying Sketches for EON

a. I use Paint to add text to the sketches I just created, which saves me from adding text in the PDF Editor
   i. Add Footer to Sketch
      1. Add a textbox at bottom of sketch
         a. I use between 10-14 size font, bold

51

Voltage: 4.16KV   Reason for Work: 3rd Pty Clearance   Fred Griffin 508-223-2556

2. Enter Voltage(s) of primary for poles being referenced
   a. If there isn't Primary, say Sec
3. Enter: Reason for Work: 3rd Party Clearance
4. Enter: Fred Griffin: 508-223-2556 (if MA)
   a. Your name and phone number if RI

ii. Add North Arrow to Sketch
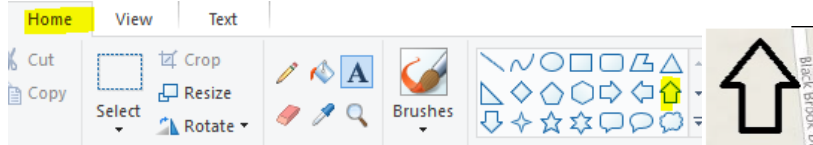
iii. Add Sketch Title Box
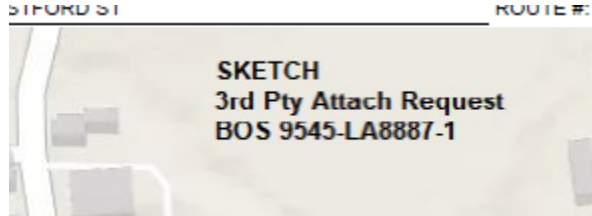
1. Add a textbox at top-right of sketch
   a. I use between 10-14 size font, bold
2. Enter "SKETCH"
3. Enter "3rd Pty Attach Request"
4. Enter Application Name

Final Sketch

Voltage: 4.16KV   Reason for Work: 3rd Pty Clearance   Fred Griffin 508-223-2556

8 **Modifying the EON**
   a. Open EON_WORKING.PDF in a PDF Editor (I used Adobe Acrobat DC)
      i. I like to view the document with Page Thumbnails on the left-hand side, that way I can organize the pages so the electric/telephone general and electric/telephone cost sheets are together, by street
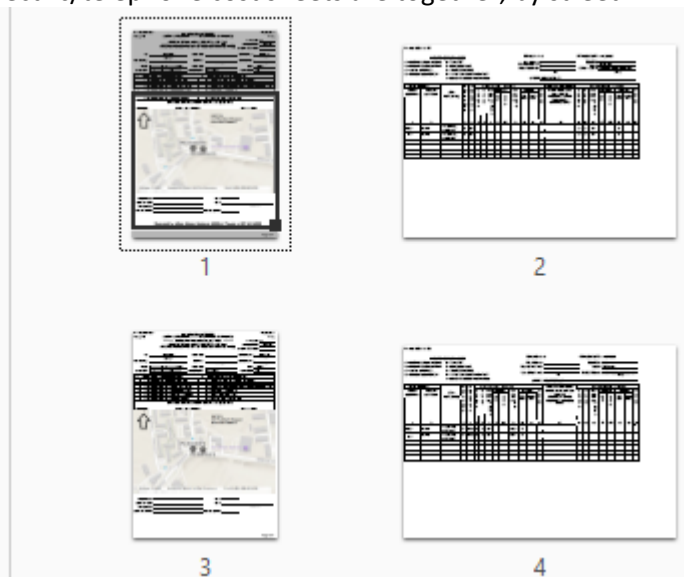
   b. Select Edit PDF from the Toolbar on the right side of PDF
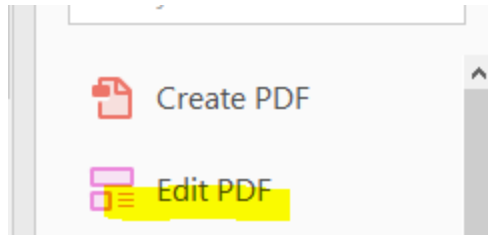
Opens this:
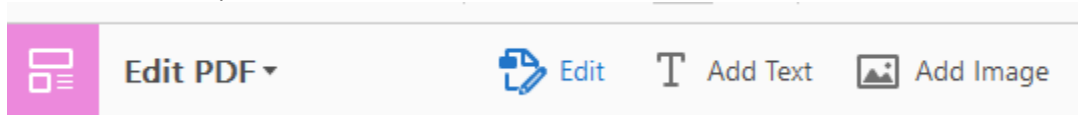
c. Select **Add Text** and click in the white space at the bottom of the first sheet of the EON_WORKING.PDF
   i. Enter: Prepared by [your name] – Osmose Utilities Services, [your phone number]
      1. You can change the font size and text box size
d. Select **Add Image** to search for the sketches we created for each street with work
   i. Resize the sketch to fit within the sketch area on the Electric and Telephone General pages
      1. I like to add all the sketches at the same time
e. Select **Edit** to make all the text on in the PDF Editable
   i. On the **Telephone General** sheets
      1. Update Column V with the total # assets that fall into each category
   a. These values auto-populate on the Electric General Sheets, but must be manually updated on the Telephone General Sheets
            i. Pole Replacements are Item 4
            ii. Anchor Replacements are Item 7
   ii. On the **Electric Costs** sheets
       In **NE**, a single Work Order can have both Billable and Non-Billable (PEC) work
      1. If work is **Billable** to Applicant
         a. Zero out costs under the Proposed Plant section, under TEL Pay
      2. If work is **Non-Billable** to Applicant
         a. D**on't** zero out costs for Non-billable pole replacements
            i. Leave as 1240
         b. Check with Veteran Work Order Writer about Non-billable anchor replacement costs
   iii. On the **Telephone Costs** sheets
        In **NE**, a single Work Order can have both Billable and Non-Billable (PEC) work
      1. If work is **Billable** to Applicant
         a. Confirm costs are zero in Existing Plant section, under TEL Pay
      2. If work is **Non-Billable** to Applicant
         a. Update Non-billable pole replacement costs to 1240
         b. Check with Veteran Work Order Writer about non-billable anchor replacement costs

f. Update any blank Telco Pole Numbers to the TEL # or NT, if Tel Number is not known

g. Once finished, double check the following:

    i. Sketches are added to correct Electric/Telephone General sheets

9 Finalizing the EoN

a. Update any blank Telco Pole Numbers to the TEL # or NT, if Tel Number is not known

b. Double check your work

c. Save working EON as EON_WR#.PDF

d. In STORMS, click the 'Requirements' tab.

    i. Click the 'Add Optional Requirements' button.

        1. For telco set poles, add requirement '440'. (Nantucket Only)

        2. For NGrid set poles, add requirement '840'.

        3. Once the EoN has been uploaded to STORMS, assign the '440' or '840' to 'WS_TELCO'.

Dig Safe   Updated: 5/22/18

The Dig Safe Capture form has both NE and NY sections; though we're only responsible for filling out the blue (NY & NE) and green (NE) sections (see column N in form). Dig Safes are required for digging electric make ready work and most commonly include:

1. NGrid set pole installations/replacements
2. NGrid set anchor installations/replacements
3. Ground rod installations/replacements
4. Push Brace installations/replacements

A Dig Safe needs to be completed for each unique set of cross streets and for each pole not contiguous. A maximum of three poles can be on one Dig Safe.

Filling out the Dig Safe

1. Update Work Request # to the WO#
2. 'Department (performing work)':

    i. Use the Crew Hq code found here in STORMS:

3. Add State, County and Municipality

a. County can be extracted from GIS or STORMs

4. Add coordinates if one pole is described in Dig Safe
5. Add "Multiple; see below" if multiple poles are described in Dig Safe
6. Update Cross Streets for the job site
7. 'Method of Premark':

a. Pole Replacement or Push Brace Replacement Only

    i. Check Painted White

b. For Anchor Installs or replacements or down ground & rod install or replacement only:

    1. NE/NY: Check 'Staked'.

c. For poles and anchors

    i. Check Painted White and Staked

8. 'Type of Premark'

    ii. Check 'Simple' and 'Check if Simple Premarks need to be initially applied during site precheck'.

9. Design Investigator (field contact)
    i. Add your name and phonme number
10. Scroll down to green section of the Dig Safe form to update the Nature/Description of Work section
    a. Include the Pole #, Name of Street pole is on, coordinates and brief description of digging work
    b. Note side of road work is on and relation to nearby addresses
11. Add additional poles if consecutive (max 3) and has the same set of cross streets

Nature/Description of Work: (include side of road where working, pole #'s as well as identifiable distances...)
P7 Mill St (42.333333, -71.541972) - Replace existing anchor, no change in lead length. Pole is on the West side of the road, behind 405 Maple St

12. Check 500' for buffer distance from nearest road centerline, intersection or coordinates

Municipal "Water" and "Sewer" Notifications
This section determines if we need to provide a Notice of Excavation (NOE) document for each Dig Safe capture form we updated. We reference the 'NoE_Town by Town Water & Sewer Contact List' excel file found in the DS,NOE folder under Work Order Resources. The excel file includes contact information for the town's Water and Sewer departments (if applicable) along with notes on how to handle the NOE.

Towns identified as Dig Safe Members don't require a Notice of Excavation
Towns without Water or Sewer don't require a Notice of Excavation
        Some towns have one and not the other

        o   If Town is identified as a Dig Safe Member (Water or Sewer)
            ▪   Check N/A
            ▪   For 'Notes', enter "Dig Safe Member"
            ▪   **An NOE is not required**
        o   If Town doesn't have Water or Sewer
            ▪   Check N/A
            ▪   For Notes, enter "No Water" or "No Sewer"
            ▪   **An NOE is not required**

        o   If the town has Sewer and Water, but isn't a Dig Safe Member
            ▪   Check appropriate boxes
                •   **Call**: If water/sewer requests call
                    o   Add applicable Contact Info and Phone Numbers
                    o   Use Nature/Description of Work section if more space is needed
                •   Fax Form: If water/sewer requests NOE to be faxed
                    o   Fax Form (Dig Safe or NOE)
            1.
            2.   If a NoE is not required:
                a.   Check 'N/A'.
            3.   If a NoE is required:
                a.   Check 'Call' or 'Fax Form (NOE)'.

b.   For 'Notes', enter the contact info.
13. 'Municipal "Sewer" Notification' (NE only): Same as above.
14. Name file, 'DigSafe_[WR #]'.

Notice of Excavation -NoE (NE Only)   Updated 2/25/21

1. To determine if a NoE is required, open the NoE town spreadsheet.
    a. Refer to \Work Order Resources\DS,NOE\ Dig Safe -Notice of Excavation Contacts by Town
        Summary.xls
    b. Find your town and look under the 'Special Instructions' column. If it does not say 'DIG SAFE
        MEMBER', 'Not Required' or other instructions indicating otherwise, a NoE will be required.
2. A separate NoE needs to be completed for each Dig Safe.
    a. Use contact info from the NoE town spreadsheet for 'Telephone Number', 'Fax Number' and
        'email'.
    b. 'Date Submitted', 'Date Pre-marked' and 'Dig Safe #': Leave blank.
    c. 'Method of Pre-mark'
        i.   For poles only:
             1. NE/NY: Check 'Painted'.
        ii. For anchors only:
             1. NE/NY: Check 'Staked'.
        iii. For poles and anchors:
             1. NE/NY: Check 'Staked & Painted'.
    a. For the 'SKETCH' box, insert a screenshot from Smallworld or Google Maps of the work area.
        i.   Include the pole locations and their cross streets.
3. Name file, 'NoE_[WR #]'.

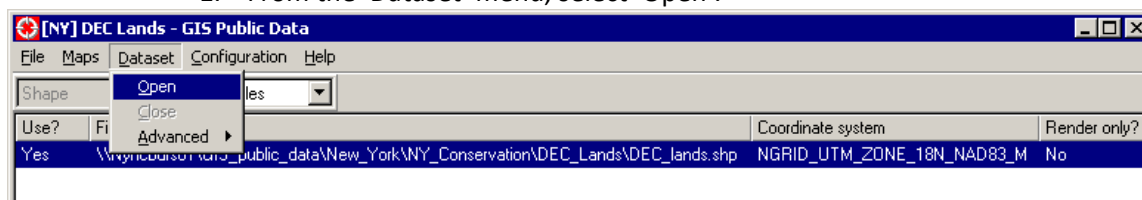## Environmental Checklist   Updated 12/28/23

15. The Environmental Checklist is used as a way of identifying situations that may require
    NGRID's Environmental group to obtain Environmental Permitting to perform the work in
    Work Order
16. Depending on the answers to the checklist questions, we'll need to request an
    Environmental Review.
    a. See the **Environmental Review Request section** below for more information on
        requesting an Environmental Review
17. We are required to fill out the Environmental Checklist for poles with Digging Work
    a. Digging Work consists of the installation, removal or replacement of:
        i.   Poles, Anchors, Push Braces, Down Ground/Rods
18. Use the 'Notes and Comments' section of the Environmental Checklist to note which pole
    locations meet the criteria of the question

19. **TIP:** For applications with multiple poles worth of work to review against the Environmental checklist, I like to mark the poles with digging work in our CSV (add a new column and mark **X** on the poles with digging work, in the row with the coordinates), import that subset of poles into Google Maps (My Maps if you have a Gmail Account), which I find makes reviewing these simpler.

20. Several questions ask that you check GIS Public Data through Smallworld
   a. To access GIS Public Data
      i. In Smallworld from the 'NGRID' menu, select 'GIS Public Data'
      ii. From the 'File' menu, select 'Open'.
      iii. Locate the desired .cfg file and click 'Open'.
      iv. In the main window, select the file.
         1. From the 'Dataset' menu, select 'Open'.

[NY] DEC Lands - GIS Public Data		_ □ X

| File | Maps | Dataset | Configuration | Help |

Shape	Open	les	▼
	Close		
Use?	Fi	Advanced ▶		Coordinate system	Render only?
Yes	\\nyncburson\\gis_public_data\New_York\NY_Conservation\DEC_Lands\DEC_lands.shp	NGRID_UTM_ZONE_18N_NAD83_M	No

MA Checklist   Updated May 2025

Fill out the top of the Environmental Checklist as follows:

Project Name: Enter Application Name
W/O or W/R No: Add Make Ready Work Order #
Associated W/O or W/R No.'s: Leave blank
Location: Enter City/Town Name
Estimated Start Date: Six months from the day you are filling out the checklist
Person Completing Checklist: Enter Work Order Writer's Name
Date: Enter the Date you are filling out checklist
Scope of Project: Count of poles with relevant digging work (ie: 4 pole replacements, 1 anchor replacement, no change in lead length, 5 down ground replacements, 1 pushbrace replacement)

For Question 1, we **use the MassMapper Interactive Mapper from MassGIS**
      21. https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html:
          a. Click '**Physical Resources**' --> '**Hydrography Water Features**':
              i. Select '**DEP Wetlands**' and click open each of the DEP Wetlands layers.
          b. Click '**Regulated Areas**':
              i. Select '**Fema Flood Data'** and click open each of the available layers

'**Q1**': Check 'Yes', if there are any bodies of water, indications of wetlands or floodplains within 100' of digging work or if there is a river/stream located within 200' of digging work

Questions 1a-1e are only required if you checked "Yes" for Question 1

'**Q1a**': Check No
'**Q1b**': Almost always 'No'.
      22. Unless your work is in a wetland and requires swamp mats for accessing the job site
'**Q1c'**: Check 'No'.
'**Q1d': C**heck 'No', unless extensive tree trimming is required related to your poles with digging work
       TIP: I've always found this question confusing, so I usually check 'Yes' if any of the poles with
       digging work also need tree trimming work.
'**Q1e':** Check 'Yes', if City/Town is identified as having local wetlands, stormwater and soil erosion
bylaws.
      23. Use the Wetland and Stormwater By-laws excel file found in the Environmental folder under
         Work Order Resources, Search by City/Town

Question 2 can be skipped if work is on or within 10 feet of the edge of a paved roadway

For Question 2, we **use the MassMapper Interactive Mapper from MassGIS**
      24. https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html:
          a. Click '**Conservation / Recreation**' --> '**Natural Heritage Data**':
              i. Right-click '**NHESP Priority Habitats of Rare Species**' and 'Add layer'
              ii. Check 'Yes' if pole falls in Rare Species polygon
              iii. Else, check 'No'

To answer Question 3, we'll use Smallworld's Environmentally_Contaminated_Sites' layer (always visible by default) to determine if there are any contaminated sites near proposed digging sites and if so, the Energy and Environmental Affairs (EEA) Data Portal to determine the status of the site

Potentially Contaminated Site in Smallworld

25. If your digging sites are within, adjacent to or near a contaminated site polygon (representing a 50' buffer), click on the polygon and copy the RTN number
   a. Head to the EEA website: https://eeaonline.eea.state.ma.us/portal#!/home
      i. Click Search Data dropdown and Waste Site Cleanup
      ii. Paste the RTN # under Release Tracking Number and click 'Search'
      iii. Click View Map
         1. For Question 3, Check 'Yes' if site is Open (Red Point) or Closed with Use Limitations (Green Point)
         2. For Question 3, Check 'No' if site is Closed (Blue Point)

To answer Question 4, we use the Massachusetts Cultural Resource Information System Maps website
- https://maps.mhc-macris.net/ (link on Environmental Checklist works as well)
   o Add City/Town name and click search
      iv. Use Address to further pinpoint project area, if necessary
26. Check 'Yes' If digging location is within historical districts or near historical properties, landmarks, historical cemeteries etc.
   a. Note your findings in the Notes and Comments section of the Environmental Checklist

'Q5': Check 'No' unless:
27. Replacing or splicing in cable with risers suspected to contain asbestos
28. Replacing black PCB contaminated XFMRs.
29. Replacing gray XFMRs with set dates older than 1979

'**Q6'**: Check 'Yes' if replacing existing poles or installing new poles

To answer Question 6a, we need to add the Environmental_Shallow_Wells layer, available through the GIS Public Data, in Smallworld

30. Accessing Shallow Wells GIS Public Data
   a. In Smallworld from the 'NGRID' menu, select 'GIS Public Data'
   b. From the 'File' menu, select 'Open'.
   c. Double-click the!Environmental_Shallow_Wells folder
   d. Select the Environmental Shallow Wells .CFG file and click Open
   e. In the GIS Public Data window, click Dataset and Open
   f. After hourglass symbol goes away, confirm environmental_shallow_well layer is listed under Object Control at the very bottom
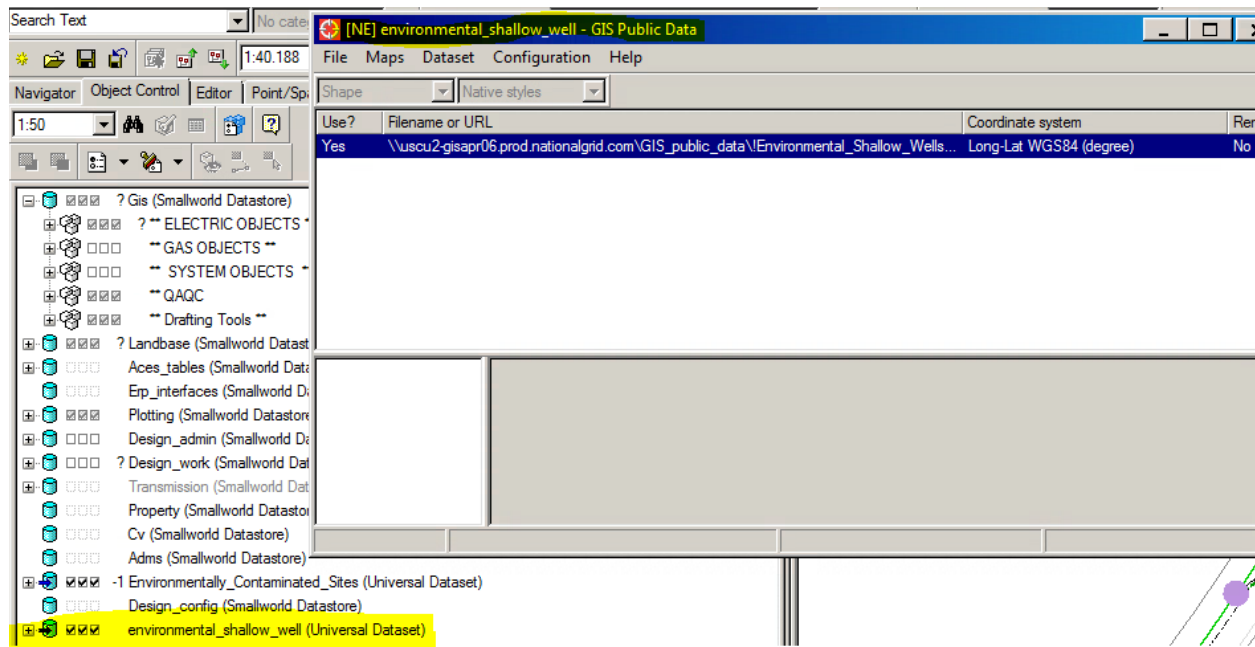
Environmental Shallow Wells in Smallworld
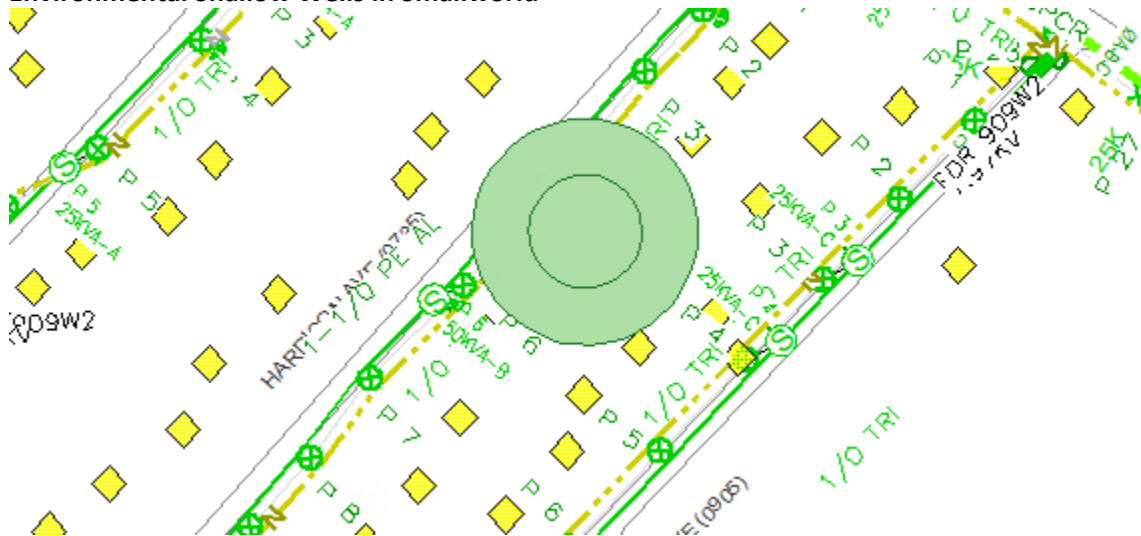
'Q6a': Check Yes if replacing existing pole or installing new pole within 50' of known shallow well

      31. Each circle represents a 50' buffer from the known shallow well

'**Q7**': Check 'No'

'**Q8**': Check 'No' and skip questions 8a, 8b, 8c and 8d

Remember to use the 'Notes and Comments' section of the Environmental Checklist to note which pole locations meet the criteria of the relevant questions

      32. Name file, 'EnvChecklist_[WR #].pdf'.

Environmental Review Request   Updated MAY 2025

33. If you marked any one of Questions 1-5, 7 and 8 as 'Yes', we'll need to request an Environmental Review
34. If you marked **BOTH** Question 6 and 6a as 'Yes', we'll need to request an Environmental Review
35. Check for the latest version of the EnvironmentalContacts_ByTown excel file, located in the Environmental folder under Work Order Resources
    a. Search by Town Name to find the Name, STORMS ID and Email address of the environmental team member we need to request an environmental review from
36. In STORMS, add requirement '468' (Secure Environmental Permit)
    a. Can be added through Add Optional Requirements button
37. Assign 468R to the environmental contact who covers the town you are working in
    a. Set Status to Required
    b. Confirm Add to Work Queue check box is checked
38. Email the environnemental contact, CC NG Design and Jacob
    a. Attach completed Environmental Checklist and finalized construction sketches to email

State Highway Permit   Updated 6/22/20

Note: Once MassDOT Permits are requested from the Osmose Permitting Team, it will take 1-2 weeks to receive the MassDOT related costs that need to be accounted for on the Work Management Calculator. You DO NOT need to wait to receive the MassDOT related costs in order submit the application to NGRID.

- A MassDOT permit is required for any electric make ready work (both digging and non-digging work) within the ROW of state maintained roads.
  - To determine if a road is state maintained, use the MassDOT Road Inventory website https://gis.massdot.state.ma.us/statehighwaylayouts/
    - If road is highlighted green, a permit will be required.
      i. We don't have to worry about the other listed jurisdictions
- Request the completion and submittal of permit application VIA Smartsheet submittal form: https://app.smartsheet.com/b/form/a5c43200303a471baf0c6558c8e281d5
- Fill out form and Attach the following items:
  i. Spreadsheet containing pole information for permit (control click 1st link to download or use the 2nd link to navigate to the folder that contains the spreadsheet)
     1. file:///\\syrfile15\Projects\NationalGrid-Engineering\ProjectData\FieldData\Work Order Resources\HighwayPermits\MA\!MADOT PERMIT REQUEST-APPNAMEHERE.xlsx
     2. file:///\\syrfile15\Projects\NationalGrid-Engineering\ProjectData\FieldData\Work Order Resources\HighwayPermits\MA
  ii. C-Form
  iii. Construction Sketch

- Add requirement '436' (Secure State Permit) in STORMS and assign to Liam Farrell (FARREL)
    - Clicking the 'Add Optional Requirements' button to manually add the requirement

- Within the next 1-2 weeks, you'll receive an auto-generated notification from Smartsheet with the MassDOT Permit Support costs, along with MassDOT Permit Fees that will need to be accounted for in your work management calculator
    - The **MassDOT Permit Support (DOT Admin Fee)** covers the # of hours the permitting team requires to prepare the traffic management plans and other documents
    - The **MassDOT Fees (DOT Permit Fee)** is typically a flat fee covering the application fee for the permit

	A	B	C	D	E	F
23	**Massachusetts**		**Note:** In MA, ANTENNA PLA charge is invoiced upfront by NGRID, so it doesn't need to be included on the ANTENNA Construction Support Cost			
24	*MA - Add as a 'TPAG' Remark in STORMS*				Please Charge the applicant the additional following costs:	
25	Pole Replacements:	0	$0.00	$0.00		
26	Other Power Make Ready:	0	$0.00	$0.00		
27	Pole Loading Analysis (DIST):	0	$0.00	$0.00	$0.00	Construction Support Fee = $.00
28	Premarks :	0	$0.00	$0.00		
29	Redesign Time ($97.16/hr):	0	$0.00	$0.00		
30	Administrative Fee:	0	$0.00	$0.00	$0.00	Admin Fee = $.00
31	Police Protection (MA Only):	0	$0.00	$0.00	$0.00	Police Detail Fee = $.00
32	MassDOT Permit Support ($97.16/hr):	0	$0.00	$0.00	$0.00	DOT Admin Fee = $.00
33	MassDOT Fees (Rate Cost $):	$0.00	$0.00	$0.00	$0.00	DOT Permit Fee = $.00

Remarks Maintenance

Remark Type: TPAG   **Entered By:** TORRET   **On:** 11/22/2024 08:42:55 AM

Please charge the applicant the additional following costs:
Construction Support Fee =
Admin Fee =
Police Detail Fee =
DOT Admin Fee =
DOT Permit Fee =

Easements   Updated: 2/4/19

NE

- An easement is required for new NGrid set pole and anchor installations on private property.
    - Use OLIVER, https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html to help determine if private or town property.

- You're going to need to provide four documents
    - Easement Sketch
    - Easement Mortgage (if applicable)
    - Easement Deed
    - Easement Form

- **Easement Sketch (updated 10/21/22)**
    - Review the Easement Sketch example:
        - Work Order Resources\Easements\NE\Examples\EasementSketchWR#30633874
    - Using the example sketch for guidance, create a basic Easement Sketch in Smallworld
        - Reference EasementSketches_MinRequirements.xlsx for latest minimum requirements (as of 8/2022)
        - Review Easement Sketch plot for 09-22-30633874 (NE) for formatting

- o Reach out to Alicia Hicks for additional information
- **Easement Mortgage and Easement Deed**
    - http://www.masslandrecords.com/
        - o Choose which registry district your project is in
        - o Select Search by Name
        - o Enter Business/Last Name, First Name on the top bar and search
        - o Review results for the property's address
            1. You can sort by the Street # field on the left
            2. Find the most recent mortgage listing for your address
                a. Note the Book and Page numbers associated with this listing
                    i. They will be needed on the Easement form
                b. Click on record to view details and Print Document

                c.
                d. You may have to click the "here" in the small window that pops up, in the line "Lastly, you may click here"
                e. Download document locally
            3. Repeat steps 2a-2d the most recent deed listing
- **Easement Form**
    - Review the Easement Form example: Work Order Resources\Easements\NE\Examples\74 Princeton St, Gardner - Easement Form.pdf
        - o Using the example for guidance, fill out the Easement editable form
            1. Use Oliver http://maps.massgis.state.ma.us/map_ol/oliver.php to determine the property's owner information
            2. I used Google to obtain a phone number of the customer
        - o Fill in owner's deed Book and Page numbers (the ones you noted in the Easement Mortgage and Easement Deed section
        - o At the bottom of Page 2, if property is mortgaged, click 'YES' and enter the required information taken from the Mortgage listing you downloaded
            1. You should have noted the Book and Page numbers in the Easement Mortgage and Deed section
- In STORMS, manually add requirement '434' (Secure ROW / Easement)
    - Check Work Order Resources\Easements\NE\Copy of NE Real Estate Reps by Towns.xls to determine who to assign the 434R to

## Pole Petition (NE Only)   Rev 4/9/24

See the Town Pole Petition folder under Work Order Resources for the editable petition form, petition sketch examples and specific instructions for some of the towns

- Pole petitions are required for new NGrid set pole installs on town property or in the public ROW.
  - o Anchor installations do not require pole petitions
- Use MassGIS to help determine if the pole install is in the public ROW or on private or town property.
  - o https://maps.massgis.digital.mass.gov/MassMapper/MassMapper.html
- We fill out a Permit Request Form and create a Pole Petition Sketch
  - o Petition sketch can be created in Smallworld as a separate layout from the rest of the construction sketches
    - ▪ Reach out to Alicia Hicks for assist.
- Some towns require abutters mailing lists:
  - o Abington, Brockton, Hanover, Nantucket, Quincy, Randolph, , Scituate, Stoughton (abutters,& labels), Weymouth, Hingham, Cohasset, West Bridgewater, Uxbridge, Swansea, Milford, Seekonk, Easton, Rockland, Weymouth
- Other towns have special instructions:
  - o Beverly, Salem, Wenham, Hamilton, Essex, Topsfield
- Add 435R
  - o Assign to local clerk from \\syrfile15\projects\NationalGrid-Engineering\ProjectData\FieldData\Work Order Resources\Town Pole Petition\NGRID-Clerk Return Address for Permits March 2021.xlsx

Final Tasks

Verify Correct Billing in STORMS

39. Check only required on design points with non-billable work
    a. From the 'Design' menu, select 'Specification'.
        i. Right-click on each design point, and select 'Modify CUs'.
        ii. Non-Billable Work: 'P' or 'N'
        iii. Billable Work: 'Y'
        iv. System Improvement Work (PEC) will show up as 'P'
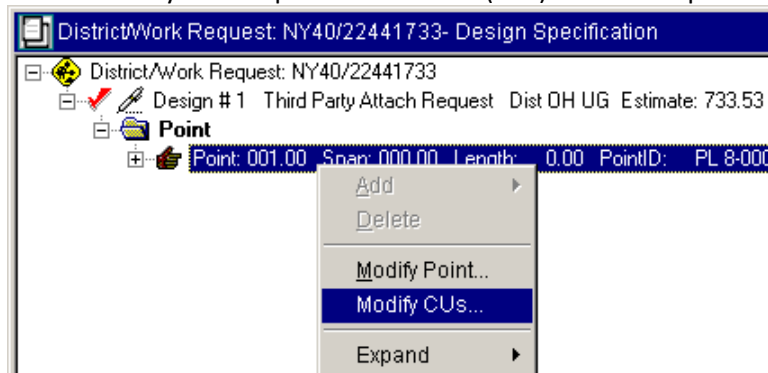
Verify C-form/Exhibit 5

- Verify there are no issues with the C-form/Exhibit 5.
    - b. For NY, verify the DISTTPTYA, DISTTPYAMO or DASSETREPL WR # was added to the Exhibit 5.
    - c. Verify the 'No. Of Poles', 'SO' and 'JO' counts are correct. This tallies the number of poles NGRID is licensing the applicant to attach to
        - i. 'Do Not License', Canceled and Customer Owned poles should not be included in the pole counts.
        - ii. NMR Do Count
    - d. Verify the description of work matches between the C-form/Exhibit 5 and the construction sketch.
    - e. Verify that the Licensee Agreement No. (attachee code) is present and accurate
        - i. Use Reference the Attachee Code Master lists to verify the attachee code
            1. Located here: \Work Order Resources\Process Documents
                - a. NY Attachee Code Master List.xls
                - b. NE Attachee Code Master List.xls
                - c. Charter Codes: CharterNYAttacheeCodes.txt
            2. If you are unsure of the code or can't find it on the master lists, email the state/town along with your request to:
                - a. For NE - Chuck Kosinski (Charles.Kosinski@nationalgrid.com)
                - b. For NY - Derek LeClair (Derek.LeClair@nationalgrid.com)

Work Management Costs

- Use the Work Management Calculator to determine Work Management Costs, which varies by where the work is located and whether its Internal or External
    - f. Calculator located here: FieldData\Work Order Resources\Process Documents
    - g. Work management costs are required for billable work only.
        - i. Poles with mixed billing should be counted as Billable Work
    - h. Calculations and cost reporting methods vary by where the work is located and whether its Internal/External
        - **i. New England**
            1. Costs will be added as three 'TPAG' remarks in STORMS
                - a. Construction Support, Administrative Fees and Police Protection
            2. Use the remarks templates from the Work Management Calculator when entering remarks in STORMS
                - a. Remarks in Storms cannot be edited/deleted, so be sure your totals are accurate prior to adding remarks
                    - i. If your application requires a MassDOT permit, don't add the Construction Support TPAG remark in STORMs UNTIL AFTER YOU GET INFORMATION FROM MASSDOT PERMIT HOURS TO BILL
            3. Enter the # of Pole Replacements
                - a. Use filters on C-form
            4. Enter the # of poles with Other Power Make Ready (Primary, Secondary, Streetlight or Guy Work)
                - a. Use filters on C-form
            5. Pole Loading Analysis: Enter the # of poles with PLAs performed

    a. See MRE Tracker, Ocalc Required field = 'YES'
   6. Premarks: Enter the # of locations/poles that require Premarks
    a. For example, if you have a one PCO with two anchor replacements, account for one Premark on the WM Calculator for that location, regardless of the number of premark actions required at the location
    b. Premarks are required for Installs/Replacements and Removal Only of Poles, NGRID Anchors, Down Grounds/Rods and Pushbraces
   7. MassDOT Permit (James Shea will give you this number when you request permit): Total hours to complete MassDOT application and Visio sketch
   8. ReDesign Time: Enter Hours if Work Order is Rework
    a. **Remember** to add an hourly task to TTP with the total number of hours and brief description
     i. How? – Open Application in TTP | Activities | Hourly Tasks
   9. Police Protection: $$ amount determined in Police Protection section

Complete GIS Design

1. For GIS designs, once you are finished making changes to the design alternative:
  a. In GIS, from the 'File' menu, select 'Change State' --> 'Design Complete'.
   i. Click 'Yes'.
    1. If you get an error that 'Data changes were detected outside bounds of Construction Plot pages…' or 'The following PDF files may be out of date…', just click 'Continue Transition' as long as your sure changes made since the construction sketch was last saved do not affect it.
   ii. Click 'OK'.

Attach Documents in STORMS

Notes: Be sure to set the file sizes of your documents to 1
1. In STORMS, click the 'Document' tab.
2. Right-click on or under the top section ('Work Request #…') and select 'Add'.
3. Add documents below as necessary:
  a. C-form/Exhibit 5:
   i. Desc: "C-form for [App Name] Make Ready Required".
   ii. Type:
    1. NE: OTHER
   iii. Save as: [App #]_Final.xls
  b. Construction Sketch:
   i. Desc: Construction Sketch
   ii. Type: SKETCHES
   iii. Save as:
    1. NE: WR[WR #]CS.pdf
  c. Tree Trimming:
   i. Desc: Tree Trimming
   ii. Type: Other

iii. Save as: TreeTrimming_[WR #].
  d. Customer Outage List:
        i. Desc: Customer Outage List
        ii. Type: OTHER
        iii. Save as: CustomerOutageList_[WR #].xls
  e. EoN (Exchange of Notice):
        i. Desc: Number of pages (ex. "2 pages")
        ii. Type: 605_EON
        iii. Save as: EoN_[WR #].pdf
        iv. Remember to add the correct Requirements (Add Optional) in STORMS and assign
            to WS_TELCO
                1. 440R for telco set poles
                2. 840R for NGrid set poles
  f. Dig Safe:
        i. Desc: Dig Safe
        ii. Type: DIGSAFE
        iii. Save as: DigSafe_[WR #].xls
        iv. Remember to 645R
  g. NoE (Notice of Excavation):
        i. Desc: NoE
        ii. Type: DIGSAFE
        iii. Save as: NoE_[WR #].xls
  h. Environmental Checklist:
        i. Desc: Environmental Checklist
        ii. Type: ENVCHECK
        iii. Save as: EnvChecklist_[WR #].pdf
  i. Environmental Site Plan:
        i. Desc: Environmental Site Plan
        ii. Type: SKETCHES
        iii. Save as: EnvSitePlan_[WR #].pdf
  j. MassDOT Highway Permit:
        i. Desc: MassDOT Highway Permit
        ii. Type: Other
        iii. Save as: MassDOT_Permit_[WR #].pdf
  k. FAA Spreadsheet:
        i. Desc: FAA Spreadsheet
        ii. Type: Other
        iii. Save as: FAA_Spreadsheet_[WR #].pdf
        iv. Remember to manually add the 437 'Secure Permit/FAA Study'
                1. If no hazard (does not exceed notice criteria), set to complete
  l. FAA Aeronautical Study:
        i. Desc: FAA Aeronautical Study
        ii. Type: Other
        iii. Save as: FAA_AeroStudy_[WR #].pdf
  m. Easement:
        i. Desc: Easement
        ii. Type: Easement
        iii. Save as: Easement_[WR #].pdf

        n. Pole Petition:
            i. Desc: Pole Petition
           ii. Type: Other
          iii. Save as: PolePetition_[WR #].pdf

Update MRE Tracker

- Search by SAD WR#
- Use Bulk Field Changes for large numbers of poles
- Billable/Non-Billable poles are both counted in the MRE Tracker
- Cancelled Poles that had Work Management performed will still be counted
- 'MRE Required':
  - Select appropriate work type for each make ready pole.
    - PCO – Pole Change Out
    - MR – Power Make Ready (any work besides PCO)
- 'GIS Edit Rqrd?':
  - Check box for poles that required GIS edits.
- 'WM_MRE_TYPE'
  Right click on pole, Select "WM_Cost_Final" , updated "MRE _TYPE":
  - Pole Change Outs to "PCO_INTERNAL" = NE or Internal NY district
    - "PCO_EXTERNAL" = External NY district
  - Power Make Ready = "POWER_MAKEREADY"
- 'DISTTPTYA_WR', 'DASSETREPL_WR', 'DISTTPYAMO_WR':
  - Populate the WR # in the appropriate job type field.
- Set 'Status' of each pole to 'Application Complete'.
  - Select poles in app.
    - Select poles found on your E5
    - Don't include cancelled poles that didn't have Work Management performed
  - From the 'Workflow' menu, select 'Work Management Complete…'.

Verify Requirements in STORMS   Revised 4/9/24

- 145, 155, 215, 250, 251 'Complete'
- 252
  - **In MA,** we verify the status of the 252R in the corresponding SAD WR#
    - If the SAD WR#'s 252R remains 'Required' or 'Partial', assign the 252R on the Make Ready WR# to 3RDPTY_NE (TAG)
    - If the SAD WR#'s 252R is 'Complete', mark the 252R on the Make Ready WR# as
- 253 (Trigger Order of Long Lead Time Items)
  - Confirm its present and completed
    - Sometimes STORMs doesn't allow us to complete the 253R because the Required By date is set in the past. This usually occurs when the 253R wasn't completed when it was originally added. We can still submit the Work Order with the 253R in Required status, if necessary

- o To add, right-click and manually add 253
  1. Set the description to 'Trigger Order of Long Lead Time Items'
  2. Set to Complete
  3. Assign to Self
- 255 (Environmental Checklist Complete):
  - If an Environmental Checklist was required, set to 'Complete'.
  - If an Environmental Checklist was not required, set to 'Not Required'.
- 267 (Enter 3rd Party Attachment Locations):
  - NE: 'Bypass' and assign the 267R to Teddy Torrez (TORRET)
  - NY Distribution: 'Complete'
    - o If pole attachments could not be added, set to 'Bypassed' and assign to self
    - o Try to identify overlapping work doing the pole sets and add notes to the Comments
    - o In submittal email, explain why you were unable to complete the 267R
  - NY Sub-Transmission:
    - o Confirm assigned to Steve Kimball (SKIMBALL)
- 270 (Design Complete): Assign to yourself
  - If GIS design, it will 'Complete' automatically once you change the state of the design alternative to 'Design Complete'.
  - This can take a while to complete. Verify the '270' has completed before submitting app to NGrid. This cannot be forced to complete.
  - If this takes longer than 30 mins, check for Interface Errors
    - o In STORMS, click Help | Interface Errors
    - o Add your MR WR# and search
- 277 (Associated Make Ready WR Has Been Create):
  - NE: Verify that this has been created on the related SAD WR# and that it's been assigned to '3RDPTY_NE'
  - NY: Verify that this has been created on the related PTYA WR# and that it's been assigned to '3RDPTY_NY'
- 278 (Design Approval): 'Required'
  - NE: Assign to Robert Coulter (COULTR)
  - NY01-10: Assign to Jason Brueggeman (BRUEGJ)
  - NY (NY11+): Assign to Alex Hall (HALLA)
- 283 (Review Project Dates and Order Materials)
  - Confirm its present and completed
    - o Sometimes STORMs doesn't allow us to complete the 283R because the Required By date is set in the past. This usually occurs when the 283R wasn't completed when it was originally added. We can still submit the Work Order with the 283R in Required status, if necessary
    - o To add, right-click and manually add 253
      1. Set the description to 'Review Project Dates and Order Materials
      2. Set to Complete
      3. Assign to Self
- 299 (Design Warnings):
  - Verify that this requirement isn't present
  - If it's present, it needs to be cleared up before submitting application to Grid
- 350 (Design Facilities Collected): 'Complete'.
  - This should autocomplete. Do not manually complete.

- 481 (Post Construction Payment Due): 'Not Required'
- <mark>645 (Dig Safe Permit Required Post Scheduling)</mark>
- 655 (Outage Coordination):
    - Only add if you created a Customer Outage List
        - Add Optional Requirement
- 712 (Temporary License): 'Not Required'
- 713 (Post Construction Inspection Complete): 'Not Required'
-
- 840/440 (Pole Set: Ngrid JO Set or Pole Set: TelCo)
    - Add Optional Requirement
        - For telco set poles, add requirement '440'. (Nantucket Only)
            1. Assign to: "WS_TELCO"
        - For NGrid set poles, add requirement '840'.
            1. Assign to: "WS_TELCO"

Associated Parties   Rev 4/9/24

- Check Associated Parties tab for an entry
- If there isn't an entry, add one:
    - Right-click in white space and click 'Add'
        - Entity Type: TP
        - Proposal No. 600
        - Notes: Your Name
        - Description: Osmose
        - Name: Enter a period symbol
    - All other fields can be left blank

Update Helix   Rev 4/9/24

- Applies to both billable/nonbillable work. Don't double count poles
- Under 'Custom Fields', verify the accuracy of the following items:
    - 'Actual Number of Poles Licensed'
    - 'Number of 'OCalc Poles'
        - o This is the number of poles that a Pole Loading Analysis was completed on
        - o Count # of poles in MRE with Ocalc Required set to True
    - 'Construction Assignment':
        - o 'National Grid Crews' if an internal Work Order
    - Number of Poles:
        - o Verify Total 'Poles With Work', 'Pole Replacements', 'Primary Moves', 'Secondary Moves', 'SL Move' and 'Guying' 'are accurate
            1. Don't double count poles
    - 'Expense Type' field:
        - o 'O & M': DISTTPYAMO WRs.
        - o 'Capital': DISTTPTYA WRs.
- From the 'Workflow' menu, select 'Work Order Written' or Work Order QC Required".
- From the 'Workflow' menu, select 'Reassign' and assign to:
    - MA: Robert Coulter
    - NY (NY11+): Alex Hall.
    - NY01-NY10: Jason Brueggeman
- Click 'Apply' to save.

Send Email   Rev 4/9/24

- **No need to CC nmnetele@nationalgrid.com on these emails any more**
- Send email indicating app is complete.
    - For MA, send to Robert.Coulter@nationalgrid.com.

- ○ 'CC' NGDesign@osmose.com.
- ○ Subject Line
  1. Make Ready Work
     a. Subject: "Application [Enter Application Name Here] (WR# XXXXXXXX-MR WORK) ready for review
        i. Example: Application Verizon Quincy_MA_SC09 - 383453 (WR# 23920492-MR WORK) ready for review
  2. No Make Ready Work
     a. Subject: "Application [Enter Application Name Here] (WR# XXXXXXXX-NO MR WORK) ready for review
        i. Example: Application Verizon Quincy_MA_SC09 - 383453 (WR# 23920492-NO MR WORK) ready for review
- ○ Attach the C-form and construction sketch.
- ○ Body of Email:
  1. "Please review the attached documents that are ready for Design Approval. This Work Order, [Enter Make Ready or No Make Ready] WR# XXXXXXXX, was completed by [Enter Your Name]."
- ○ PLAs do not need to be mentioned in the submission email for NE

- For NY INTERNAL CONSTRUCTION (NY11+), send to Alex.Hall@nationalgrid.com.
  - ○ 'CC' nmnytele@nationalgrid.com and NGDesign@osmose.com.
  - ○ Subject Line
    1. Internal Construction
       a. Subject: "Application [Enter Application Name Here] (WRXXXXXXXX-MR WORK ready for review – INTERNAL CONSTRUCTION)"
          i. Example: Application - FLF - 58008 (WR25209040 - MR WORK ready for review - INTERNAL CONSTRUCTION)
    2. No Make Ready Work
       a. Subject: "Application [Enter Application Name Here] (WR# XXXXXXXX-NO MR WORK ready for review by Alex Hall
          i. Example: Tectonic -443605 (WR# 25392649- NO MR WORK) ready for review by Alex Hall
  - ○ Attach the Exhibit 5 and construction sketch.
  - ○ Body of Email:
    1. "Please review the attached documents that are ready for Design Approval. This Work Order, [Enter Make Ready or No Make Ready] WR# XXXXXXXX, was completed by [Enter Your Name]."
    2. Regarding PLAs in NY, indicate the following:
       a. NMR applications with PLAs performed
          i. Please have TAG charge the applicant $XX.XX for Pole Loading Analysis costs associated with this application.
       b. MR applications with PLAs performed
          i. Additional billing items for PLA costs reported on B-2
       c. MR/NMR applications without PLAs performed in NY
          i. No PLAs were performed. No additional billing items to report.
- b. For NY (NY01-NY10); DOESN'T REQUIRE EMAIL SUBMISSION; Only send email to Jason Brueggeman if there's something reasonably complex or requires additional explanation.

Object Replacements/Installations

What to Replace/Install

Non-Pole Replacements

1. Arresters:
    a. Replace if work requires them to be moved.
    b. Install arresters anytime replacement work is required that calls for them. For example, if replacing a switch, install arresters on the adjacent poles if necessary.
2. Replace convenience outlets, if raising or lowering secondary.
3. Fuses:
    a. Replace if work requires them to be moved.
        i. For NE, replace potted porcelain fuses even if they are not being moved.
    b. Install fuses, if raising or lowering CSP XFMRs.
4. Guys:
    a. Replace down guys if work requires them to be raised or lowered.
    b. Replace span guys if raising/lowering would require additional length and/or they require bringing brought up to spec.
5. Replace service wires, if there appears to not be enough slack to support the raise.
    a. For NY, do not replace. Just indicate in description of work that splices need to be added to extend the service.

Pole Replacements

1. Arresters:
    a. Replace if work requires them to be moved.
    b. Install arresters anytime replacement work is required that calls for them. For example, if replacing a switch, install arresters on the adjacent poles if necessary.
2. Replace convenience outlets.
3. Replace fuses.
4. Replace guys.
5. Replace risers.
6. Replace service.
    a. For NY, do not replace. Just indicate in the description of work that splices need to be added to extend the service.
7. Switches.
    a. Transfer switches at first. Grid Ops will determine if they should be replaced or not.
8. Transformers:
    a. For NE:
        i. Replace only if they are rusty or the black PCB contaminated ones.
        ii. Install fuses for CSP XFMRs.
    b. For NY:
        i. Do not replace rusty or the black PCB contaminated XFMRs, unless instructed to do so by the NGrid engineer.
        ii. Install fuses for CSP XFMRs.
        iii. If PEC work, replace CSP XFMR with conventional.

How to Replace/Install

Arrester

1. To install:
   a. Place a trail point at the insertion of the pole and another out at the desired angle.
   b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Lightning Arrester'.
   c. Click the 'Get Default Values' button .
   d. Update attributes as necessary.
   e. Click the 'Insert with Geometry' button .
2. To replace:
   a. Select 'Lightning Arrestor' to be replaced and click the 'Editor' tab.
   b. Update attributes as necessary.
   c. Click the 'Replace' button .
3. Attributes:
   a. 'Voltage Rating': Use page 5 of the 'Tables.pdf', to determine proper rating to use.
4. Notes:
   a. Arresters are needed for (reference 13.6.30 and 13.6.40 for specifics):
      i. Fused junctions.
      ii. Primary end of line.
      iii. Primary risers.
      iv. Switches, on the adjacent source and load poles, unless there are already arresters installed on all phase conductors within 300ft of the switch.
      v. Line reclosers and sectionalizers.
      vi. Conductors, when going from:
         1. Bare to anything other than bare.
            a. 'Weatherproof' (WP) conductors are considered bare for this requirement.
         2. Tree wire to anything other than tree wire.
         3. Spacer cable to open wire.

Capacitor/Regulators

1. Do not replace, just transfer.
2. Attributes:
   a. For capacitors, use page 4 of the 'Tables.pdf' to determine proper fuse size to use. For example, if you have three 300KVAR units, use the '900/300' column.
3. Notes:
   a. A 3PH capacitor should always have at least three units. If there's only one unit, add two more units using the same attributes as the existing one.
   b. Capacitor related risers won't show up as riser objects in GIS; no need to add them

Down Guy

1. To install:
   a. Place a trail point at the insertion of the pole and another out at the desired angle.
   b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Anchor and Guy'.
   c. Click the 'Get Default Values' button .

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d. Update attributes as necessary.

e. Click the 'Insert with Geometry' button .

f. Select the 'Anchored Guy Wires' field.

    i. Click the 'Create New Object' button .

    ii. Click the 'Get Default Values' button .

    iii. Update attributes as necessary.

    iv. Click the 'Insert with Geometry' button .

2. To replace:

a. Select 'Anchor and Guy' being replaced and click the 'Editor' tab.

b. Select the 'Anchored Guy Wires' field.

c. Double-click the guy wires located at the bottom of the 'Editor' tab.

    i. Update attributes as necessary.

    ii. Click the 'Replace' button .

3. Attributes (Anchor and Guy):

a. 'Ownership':

    i. 'National Grid': If a Grid only anchor.

    ii. 'National Grid - Telephone': If anchor is shared with telco.

b. 'Anchored Lead Length': Check to see if the lead length was collected in the CSV file. If not, use the default value of 20'.

4. Attributes (Anchored Guy Wires):

a. 'Wire Size':

    i. '13M': Single guy wire, no fiberglass insulators.

    ii. '12.5MF': Single guy wire, has fiberglass insulators.

    iii. '26M': Double guy wires, no fiberglass insulators.

    iv. '25MF': Double guy wires, has fiberglass insulators.

b. 'Position': Based on whether circuit is wye or delta and the pole space it's supporting.

    i. To determine if a circuit is wye or delta:

        1. Use page 1 of the 'Tables.pdf', to determine if circuit voltage is wye and/or delta.

        2. Find a single phase primary, fuse or XFMR near the pole. If the 'Phasing' value has two phases (ex. 'AB'), circuit is delta (if GIS is up-to-date).

        3. Determine from the pole images and/or Google Streetview.

c. 'Ownership': 'National Grid'.

d. 'Wire Quantity': '1'.

Fuse

1. To install:

a. Place a trail point on the primary around 20ft to 50ft from insertion of pole, on the appropriate side.

b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Cutout Installation'.

c. Click the 'Get Default Values' button .

d. Click the 'Insert with Geometry' button .

    i. If you get a message saying "LA may be required", just click 'OK'. It's just a reminder that a lightning arrester may be needed.

e. Select the 'Cutout Units' field.

      i.   Click the 'Create New Object' button .

     ii.   Click the 'Get Default Values' button .

    iii.   Update attributes as necessary.

    iv.   Click the 'Insert with Geometry' button .

2. To replace:
   a. Select 'Cutout Installation' to be replaced and click the 'Editor' tab.
   b. Click the 'Replace' button .
      i. If you get a message saying "LA may be required", just click 'OK'. It's just a reminder that a lightning arrester may be needed.
   c. Select the 'Cutout Units' field.
      i. Click the 'Create New Object' button .
      ii. Click the 'Get Default Values' button .
      iii. Update attributes as necessary.
      iv. Click the 'Insert with Geometry' button .
      v. Set 'Status' to 'Replace' and click the 'Update' button .
   d. Set 'Status' of the 'Replace Remove' cutout installation units to 'Replace Remove'.
3. Attributes (cutout units):
   a. 'Body Size':
      i. '100': 'Fuse Size' <= '100'.
      ii. '200': 'Fuse Size' > '100'.
   b. 'Fuse Type': 'K Link'.
      i. For NE, use 'T Link' only in the following towns:
         1. Abington, Avon, Bridgewater, Brockton, Cohasset, Easton, Halifax, Hanover, Hanson, Norwell, Pembroke, Rockland, Situate and Whitman.
      ii. For NY, use 'T Link' only if the surrounding fuses are 'T Link'.
   c. 'Fuse Size':
      i. XFMR and capacitor fusing:
         1. Use appropriate chart in the 'Tables.pdf' to determine proper fuse size to use.
            a. Pages 2 & 3 for XFMRs and page 4 for capacitors.
      ii. Use existing fuse size for all other fusing.
   d. 'Cutout Type': 'Non-Porcelain'.
   e. 'Voltage Class': '15kV'.

Pole

1. To install:
   a. Place a trail point where you would like the pole located.
   b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Pole'.
   c. Click the 'Get Default Values' button .
   d. Update attributes as necessary.
   e. Click the 'Insert with Geometry' button .
2. To replace:
   a. Select 'Pole' to be replaced and click the 'Editor' tab.
   b. Update attributes as necessary.
   c. Click the 'Replace' button .
      i. For NE, a pop-up window will ask, 'Who is Removing the Old Pole?'

1. For 'SO' poles and Grid set JO poles in Nantucket, select 'Electric'.
2. For 'JO' poles, and VZ set JO poles in Nantucket, select 'Telephone'.
      ii. For 'SO' poles in NY, the 'Foreign Pole Ownership' window will open:
            1. Select 'National Grid'.
      iii. For 'JO' poles in NY, the 'Joint Pole Proposal' window will open:
            1. 'Action is Required Due to the Need of':
                  a. Found in Exhibit 5.
            2. 'Who is Removing the Old Pole':
                  a. If pole is 'SO', select 'Electric'.
                  b. If pole is 'JO', select 'Telephone'.
            3. 'Who is Setting the New Pole':
                  a. Found in Exhibit 5.
3. Attributes:
      a. 'Height': Found in C-form/Exhibit 5.
      b. 'Class': Found in C-form/Exhibit 5.
      c. 'Ownership Code':
            i. For NY, change 'Ownership Code' from '700' series to '500' series code (if necessary). For example:
                  1. If existing pole is '726', change new pole to '526'.
                  2. If existing pole is '709', change new pole to '502'.
      d. 'Excess Height': Found in C-form/Exhibit 5.
            i. '5E' (Grid pays for extra 5').
                  1. Displayed as 50/45.
            ii. '5T' (telco pays for extra 5').
                  1. Displayed as 45/50.
      e. 'Set By': The company setting the pole. Found in C-form/Exhibit 5.
            i. If telco is responsible for removing the old pole, set the 'Replace Remove' pole to 'Telephone'.
4. Create pole anno:
      a. Select the 'Replace' pole and click the 'Editor' tab.
      b. Click the drop-down arrow next to 'Specials'.
            i. Select 'Add WO Anno'.
      c. Select the 'Replace Remove' pole and click the 'Editor' tab.
      d. Click the drop-down arrow next to 'Specials'.
            i. Select 'Add WO Anno'.
      e. Position anno next to pole, avoiding overstrike.
5. Notes:
      a. Pole set depths:
            i. 35' pole top: 29'
            ii. 40' pole top: 34'
            iii. 45' pole top: 38'6"
            iv. 50' pole top: 43'
            v. 55' pole top: 47'6"

Primary Riser

1. Preliminary steps:
      • Determine ownership of primary riser:

  i. Check the 'Ownership' attribute of the UG primary. If it's set to 'Customer', we would only be concerned with the fuses. The rest of the primary riser would be the responsibility of the customer.

- Determine if UG primary is in conduit or is direct buried:
  - i. Check the 'Arrangement' attribute of the UG primary.
- Determine replacement method (reference 18-5, section 18.8 for specifics):
  - i. If UG primary is in conduit and size is #2 or smaller (18.8.10):
    1. Splice on pole.
  - ii. If UG primary is in conduit and size is greater than #2 (18.8.10):
    1. Replace UG primary from the first existing access point away from the pole (padmounted switchgear, handhole/manhole, pull box, etc.)
  - iii. If UG primary is direct buried:
    1. Billable work (18.8.20 A):
       a. Direct bury the splices.
    2. More expensive, non-billable work alternative (18.8.20 B):
       a. Install hand hole or use a 30" X 60" fiberglass pull box.
          - i. A fiberglass pull box is a less expensive option to installing a hand hole.
          - ii. Check the pole's surroundings in the direction the UG primary goes. Verify there's room to install a handhole or pull box.
       b. Direct bury the splices if there's no room to install a handhole or pull box.
  - iv. Notes:
    1. For direct buried UG primary, a steel sweep and riser pipe are required. Assume sweep does not exist, if you cannot verify for sure it's there.

2. Install handhole (if necessary):
   - Show UG primary actual route:
     - i. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and 'Primary UG'.
     - ii. Check the leftmost box of 'Actual Route', to show the actual route of the UG primary.
   - Place a trail point on the actual route of the UG primary, around 10ft to 20ft from insertion of pole.
   - From the 'Object Control' tab, double-click 'Handhole'.
   - Click the 'Get Default Values' button .
   - Update attributes:
     - i. 'Material': 'Precast Concrete'.
     - ii. 'Size': 'Rectangular - other'.
     - iii. 'Secondary Connectors': 'Unknown'.
     - iv. 'Tax District/Town Code': Use same value as pole.
     - v. 'Line Number/Route Code': Use same value as pole.
     - vi. 'Handhole Number/Suffix': Use same value as pole.
     - vii. 'Ownership': 'National Grid'.
   - Click the 'Insert with Geometry' button .

3. Install pull box (if necessary):
   - Show UG primary actual route:
     - i. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and 'Primary UG'.

  ii. Check the leftmost box of 'Actual Route', to show the actual route of the UG primary.

- Place a trail point on the actual route of the UG primary, around 10ft to 20ft from insertion of pole.
- From the 'Object Control' tab, double-click 'Manhole'.
- Click the 'Get Default Values' button .
- Update attributes:
  - i. 'Tax District/Town Code': Use same value as pole.
  - ii. 'Line Number/Route Code': Use same value as pole.
  - iii. 'Manhole Number': Use same value as pole.
  - iv. 'Length': '5.000'.
  - v. 'Width': '3.000'.
  - vi. 'Height': '3.000'.
  - vii. 'Material': 'Fiberglass'.
  - viii. 'Type': 'Pull/Splice Box'.
- Click the 'Insert with Geometry' button .

4. Split UG primary (if replacement method requires a splice):
   - For Internal PCOs with primary risers
     - i. Show UG primary actual route:
       1. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and 'Primary UG'.
       2. Check the leftmost box of 'Actual Route', to show the actual route of the UG primary.
     - ii. Add reference points:
       1. Place a trail point on the UG primary actual route downstream of the fuse (if possible).
       2. From the 'Object Control' tab, double-click 'Reference Point'.
       3. Click the 'Get Default Values' button .
       4. Update attributes:
          a. 'Tax District/Town Code': Use same value as pole.
          b. 'Line Number/Route Code': Use same value as pole.
          c. 'Type': 'Reference Point'.
          d. 'Reference Point Number': "1" or "2".
          e. 'Description': "Splice in cable".
       5. Click the 'Insert with Geometry' button .
       6. Set 'Status' to 'Existing' and click the 'Update' button .
       7. Determine how many feet of cable is required for the splice and add a second reference point that many feet downstream of the first reference point.
          a. Splice on pole: ~Pole top height.
          b. Direct burying splices: ~Pole top height + 5ft.
          c. Installing hand hole/pull box: ~Pole top height + 10ft.
   - Split UG primary:
     - i. Place a trail point at the insertion of the first reference point and another on the UG primary, keeping the trail point perpendicular to the UG primary.
     - ii. Select the UG primary and click the 'Editor' tab.
     - iii. Click the drop-down arrow next to 'Specials'.

1. Select 'Split'
    iv. Repeat above steps for second reference point.
5. Replace UG primary:
- For UG primary work:
  i. Select 'Primary UG' to be replaced (segment that was split if splice was required) and click the 'Editor' tab.
  ii. Click the 'Replace' button .
  iii. Select the 'UG Primary Wires' field.
  1. Click the 'Create New Object' button .
  2. Click the 'Get Default Values' button .
  3. Update the following attributes:
     a. 'Size': Same as existing UG primary.
     b. 'Kind': 'SAL' or 'SCU'.
     c. 'Type':
     d. 1PH: '1-1/C'.
     e. 3PH: '3-1/C' (only one UG primary wire needed).
  2. 'Insulation': 'EPR'.
  ii. Click the 'Insert with Geometry' button .
  iv. The 'Status' attribute values should be as follows:
  v. 'Replace' UG primary:
  1. Parent: 'Replace'.
  2. Child: 'Install'.
  vi. 'Replace Remove' UG primary:
  1. Parent: 'Replace Remove'.
  2. Child: 'Replace Remove'.
6. Replace primary riser:
- For PCOs with primary risers
  i. Select 'Riser' to be replaced and click the 'Editor' tab.
  ii. Update the following attributes:
  1. 'Use': 'Primary'.
  2. 'Type': 'Conduit' or 'U-guard'.
  3. 'Material': 'Steel', 'Plastic' or 'Unknown'.
  4. 'Size': Diameter of conduit/U-guard.
- Click the 'Replace' button .

Push Brace

1. To install:
   a. Place a trail point at the insertion of the pole and another out at the desired angle.
   b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Push Brace'.
   c. Click the 'Get Default Values' button .
   d. Update attributes as necessary.
   e. Click the 'Insert with Geometry' button .
2. To replace:
   a. Select 'Push Brace' to be replaced and click the 'Editor' tab.
   b. Update attributes as necessary.

c. Click the 'Replace' button .
3. Attributes.
    a. 'Class' and 'Height':
        i. When replacing, use a pole 5ft shorter and same class as the pole it's supporting. If existing push brace and the pole it's supporting are the same height, keep them the same height when replacing.
    b. 'Push Brace Number': Number of pole it's supporting.
    c. 'Push Brace Suffix': "89".

Secondary/Neutral Conductor

1. To install:
    a. Place a trail point at the insertion of the pole where the secondary/neutral begins and another at the insertion of the pole where the secondary/neutral ends.
    b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Secondary Conductor'.
    c. Click the 'Get Default Values' button .
    d. Update attributes as necessary.
    e. Click the 'Insert with Geometry' button .
    f. Reposition secondary/neutral as necessary.
2. To replace:
    a. Select 'Secondary Conductor' to be replaced and click the 'Editor' tab.
    b. Update attributes as necessary.
    c. Click the 'Replace' button .
3. Attributes:
    a. 'Secondary Size':
        i. Secondary: Select desired size.
        ii. Neutral: 'N/A'.
    b. 'Secondary Material':
        i. Secondary: 'AL'.
        ii. Neutral: 'N/A'.
    c. 'Insulation':
        i. Secondary: 'PE'.
        ii. Neutral: 'B'.
    d. 'Neutral Size':
        i. Secondary: 'N/A'.
        ii. Neutral: Select desired size.
    e. 'Neutral Material':
        i. Secondary: 'N/A'.
        ii. Neutral: 'AAAC'.
    f. 'Voltage':
        i. Secondary: Select desired voltage.
        ii. Neutral: 'N/A'.

Service Conductor

1. To install:
    a. Place a trail point on the secondary at the desired location and another at the insertion of the service point.

b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Secondary Service'.
c. Click the 'Get Default Values' button .
d. Update attributes as necessary.
e. Click the 'Insert with Geometry' button .
2. To replace:
a. Select 'Secondary Service' to be replaced and click the 'Editor' tab.
b. Update attributes as necessary.
c. Click the 'Replace' button .
3. Attributes:
a. 'Secondary Size':
i. Triplex:
1. '2': Feeds one premise.
2. '1/0': Feeds two or more premises.
ii. Quadruplex:
1. '1/0': If existing size is '1/0' or smaller.
2. '336': If existing size is '4/0' or larger.
b. 'Secondary Material': 'AL'.
c. 'Insulation': 'PE'.
d. 'Neutral Size': 'N/A'.
e. 'Neutral Material': 'N/A'.
f. 'Voltage': Select desired voltage.

Service Riser
1. To install:
a. Place a trail point at the insertion of the pole and another out at the desired angle.
b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Riser'.
c. Click the 'Get Default Values' button .
d. Update attributes as necessary.
e. Click the 'Insert with Geometry' button .
2. To replace:
a. Select 'Riser' to be replaced and click the 'Editor' tab.
b. Update attributes as necessary.
c. Click the 'Replace' button .
3. Attributes:
a. 'Use': 'Customer Service'.
b. 'Type': 'Conduit' or 'U-guard'.
c. 'Material': 'Steel', 'Plastic' or 'Unknown'.
d. 'Size': Diameter of conduit/U-guard.
4. To determine the correct CUs:
a. Using the 'Compatible Unit Viewer' filter for the 'Service Connections UG to OH' group:
i. 'Phase':
1. 'Single Phase': Triplex fed from a 1PH XFMR.
2. 'Three Phase': Quadruplex fed from a 3PH XFMR bank.
ii. 'UG Service Amps':
1. '200':
a. 1PH 2in U-guard.

b.   3PH 4in U-guard.
                           2.   '400':
                                    a.   1PH 4in U-guard.
                                    b.   3PH 5in U-guard.
                           3.   '800':
                                    a.   3PH 5in U-guard.
                 iii.   'OH Connection':
                           1.   'secondary': Riser fed from secondary.
                           2.   'transformer': Riser fed directly from XFMR.

Span Guy

1.   To install:
     a.   Place a trail point at the insertion of the pole where the span guy begins and another at the
          insertion of the pole where the span guy ends.
     b.   From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Guy Wire'.
     c.   Click the 'Get Default Values' button .
     d.   Update attributes as necessary.
     e.   Click the 'Insert with Geometry' button .
2.   To replace:
     a.   Select 'Guy Wire' being replaced and click the 'Editor' tab.
     b.   Update attributes as necessary.
     c.   Click the 'Replace' button .
3.   Attributes:
     a.   'Size':
              i.   '13M': Single guy wire.
             ii.   '26M': Double guy wire.
     b.   'Position': Pole space it's supporting.
     c.   'Guy Type':
              i.   'Pole': 3-115 guys.
             ii.   'Span': 3-107 and 3-108 guys.
     d.   'Wire Quantity': '1'.
     e.   'Ownership': 'National Grid'.

Streetlight

1.   To install:
     a.   Place a trail point at the insertion of the pole and another out at the desired angle.
     b.   From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click
          'Luminaire'.
     c.   Click the 'Get Default Values' button .
     d.   Update attributes as necessary.
     e.   Click the 'Insert with Geometry' button .
2.   Attributes:
     a.   'Luminaire Style', 'Luminaire Type', 'Use', 'Lamp Type', 'Lamp Size' and 'Ballast Type'.
              i.   Check nearby streetlights that look similar for help determining proper values to
                   use.
             ii.   If there are no nearby streetlights that look similar, update what you can based on
                   the pole images and use the default values for the rest.

b. 'Ownership': Use the ownership of a nearby streetlight. Streetlights tend to be either all NGrid owned or all customer owned within a specific area.

c. 'Luminaire Number': Use '1' if unknown.

Switch

1. To install:
   a. Place a trail point on the primary around 20ft to 50ft from insertion of pole, on the appropriate side.
   b. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'Switch Installation'.
   c. Click the 'Get Default Values' button .
   d. Click the 'Insert with Geometry' button .
   e. Select the 'Switch Units' field.
      i. Click the 'Create New Object' button .
      ii. Click the 'Get Default Values' button .
      iii. Update attributes as necessary.
      iv. Click the 'Insert with Geometry' button .
2. To replace:
   a. Select 'Switch Installation' to be replaced and click the 'Editor' tab.
   b. Click the 'Replace' button .
   c. Select the 'Switch Units' field.
      i. Click the 'Create New Object' button .
      ii. Click the 'Get Default Values' button .
      iii. Update attributes as necessary.
      iv. Click the 'Insert with Geometry' button .
      v. Set 'Status' to 'Replace' and click the 'Update' button .
   d. Set 'Status' of the 'Replace Remove' switch installation units to 'Replace Remove'.
3. Attributes (switch units):
   a. 'Body Size': '600'.
   b. 'Blade Size': '600'.

Transformer

1. To install:
   a. Before installing XFMR, replace 'Cutout Units'.
   b. Place a trail point on the primary around 20ft to 50ft from insertion of pole, on the appropriate side.
   c. From the 'Object Control' tab, expand 'Gis', 'ELECTRIC OBJECTS' and double-click 'OH Transformer Installation'.
   d. Click the 'Get Default Values' button .
   e. Click the 'Insert with Geometry' button .
   f. Select the 'transformer_units' field.
      i. Click the 'Create New Object' button .
      ii. Click the 'Get Default Values' button .
      iii. Update attributes as necessary.
      iv. Click the 'Insert with Geometry' button .

2. To replace:
    a. Before replacing XFMR, replace 'Cutout Units'.
    b. Select 'OH Transformer Installation' to be replaced and click the 'Editor' tab.
    c. Click the 'Replace' button .
    d. Select the 'transformer_units' field.
        i. Click the 'Create New Object' button .
        ii. Click the 'Get Default Values' button .
        iii. Update attributes as necessary.
        iv. Click the 'Insert with Geometry' button .
        v. Set 'Status' to 'Replace' and click the 'Update' button .
    e. Set 'Status' of the 'Replace Remove' transformer installation units to 'Replace Remove'.
3. Attributes (transformer units):
    a. 'Type Code': '10 - OH Conventional - OA'.
    b. 'Size': Keep the same for replacements.
    c. 'Primary Code': Use pages 6 & 7 of the 'Tables.pdf' to determine proper code to use.
        i. If there are multiple codes to choose from, check codes of nearby XFMRs to help narrow down the choices.
    d. 'Secondary Code': Use pages 6 & 7 of the 'Tables.pdf' to determine proper code to use.
        i. If there are multiple codes to choose from, check codes of nearby XFMRs to help narrow down the choices.
    e. 'Phase': Keep the same for replacements.
    f. 'Tap Code': '00 -- None'.
    g. 'Fuse Code': '00 -- None'.
4. Install transformer connection:
    a. Place a trail point at the insertion of the XFMR and another on the secondary it's feeding, keeping the trail point perpendicular to the secondary.
    b. Select the secondary and click the 'Editor' tab.
    c. Click the drop-down arrow next to 'Specials'.
        i. Select 'Connect Transformer'.