ALDOT Link-Node Project
QAQC Webmap User’s Guide

http://alnl.caps.ua.edu/

A Step-by-Step Process

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Introduction
In order to confirm to FHWA standards for Highway Performance Monitoring, ALDOT has created an Enterprise GIS system (eGIS) which includes a routable roadway network. Historic crashes are recorded with two linear referencing methods, route-milepost on state routes, and link-node on local roads. In order to preserve the link-node roadway data (Link-Node Linear Reference Method) in the new eGIS framework, a methodology to transfer the Linear Referencing Method was developed.

QAQC Background
All eGIS routes and nodes are showing on the webmap with PDF link and node IDs. PDF link labels appear in blue, PDF node labels in black. Red routes indicate the route has not been checked and approved. Once a route or a portion of a route has been checked, it will be highlighted green (Figure 1). In the PDF maps, the links and nodes have IDs (PDF NodeID and PDF LinkID).

Figure 1 Checked and unchecked data on the webmap
The PDF maps are editor’s reference which have the correct IDs. However, the links and nodes IDs showing on the webmap can have errors. The QAQC webmap is used to compare the links and nodes with the links and nodes in the PDF maps to ensure they match up and have the correct IDs. Anything on the webmap that is incorrect can be edited and saved or assigned a specific problem code or specific comments. On the
webmap, a button ‘PDF’ opens a hyperlink to the corresponding PDF map for the area being checked.

**QAQC Procedures**

1. Go to the Alabama Node Link Editor at [http://alnl.caps.ua.edu/](http://alnl.caps.ua.edu/)

2. Type your initials to start editing (Figure 2)

   ![Login](image)

   Figure 2 Type editor’s initials

3. At the bottom left corner, select the appropriate county to work in (i.e. Tuscaloosa) (Figure 3)

   ![County select](image)

   Figure 3 County section for QAQC

4. Routes and nodes only display when zoomed inside a county. Links show up first, nodes and labels appear when zoomed in closer.

5. To select a portion of a route, click on a beginning node (Figure 4). You will then be prompted to make a second selection, or choose the blue or yellow route. If the blue or yellow route is the desired selection, click that option. If a custom selection is desired, manually click a second time on the desired node. Each link in between the selected nodes will be selected and displayed (Figure 5).

   Each link will be displayed individually, and the From and To nodes for each link will also be displayed. The LinkIDs and NodeIDs can be compared to the PDF maps and edited if necessary. If all LinkIDs and NodeIDs are correct, and no problems need to be assigned, click “Accept all”. The LinkIDs and NodeIDs can be changed manually in the boxes, and this change will update the Link & Node transfer tables.
6. To pull up the PDF maps, click the PDF button (Figure 6) in the top right of the screen (not all areas will be hyperlinked to the appropriate PDF map). Be sure to be zoomed in on the area of the desired PDF. A new website tab will be opened with the PDF map which can be dragged to a separate screen for side-by-side comparison.
For the areas that do not open the PDF by clicking the button, pull up the link node PDF maps by going to the main page:

If multiple PDFs are available, a drop down list will appear to the left of the PDF button. Select the desired PDF from the list (MAIN PAGE OR COUNTY POLYGONS IS ALWAYS YOUR FIRST CHOICE).

Figure 6 PDF button for retrieving PDFs

7. For problems with links or nodes, double-clicking the edit box allows the editor to add an existing problem code or enter a comment clicking “Other” (Figure 7). More explanations of problem codes are listed in ‘QAQC Problem Code Examples’.

Figure 7 Link problem code assigning interface

8. Add node button is useful for where there is a node missing on webmap but existing in PDF maps. PAY ATTENTION TO: There are some dual-way roads on the webmap but showing one link in the PDF map (Figure 8). WHEN ADDING NODES ON THOSE DUAL-WAY ROADS, PLEASE MAKE SURE THAT YOU HAVE ADDED TWO NODES FOR TWO DIRECTIONS.

Figure 8 Add Node button
9. Delete node button is useful for 1) Wrongly adding one node on the route by editors; 2) Developers added lots of railway and creek/river nodes on the routes where mistakes may happen (Figure 9).

![Figure 9 Delete node button](image)

10. Once all edits have been made, and problems have been assigned, click the “Accept All” button in the bottom left. The selected portion of the route that was highlighted red should now be highlighted green.

Continue working down the next route.

**QAQC Editing Examples**

1. The selected link does not have the correct LinkID listed (should be 2076). Also, the node 1282 is incorrect and should be 3531, as shown by the PDF map (Figure 10).

![Figure 10 Editing example](image)
Click in the LinkID box and type the correct LinkID. Do the same for the NodeID. Once finished editing, click “Accept All” in the left and the link should be highlighted green with the correct IDs displayed as shown (Figure 11).

![Figure 11 Editing example](image)

2. Double click on a node in its display field to open the “Report Node Problem” window. Choose from the drop down list the appropriate problem. Make additional comments if needed in the provided comments box (Figure 12).

Click the drop down menu and select the appropriate problem. The text box is provided for any additional comments needed. Click “Submit” and that node display field should then be highlighted red. Click “Accept All” to finish the edit.

![Figure 12 Problem code interface](image)
3. Ramp Naming

If one State Route intersect with one Interstate, editors can name the on/off – ramp as either S014R or I065R (Figure 13); If one State Route or one Interstate intersects with local roads, editors can name the ramp using ‘State Route/Interstate LinkID’ + ‘R’ (S014R or I065R e.g.).

Figure 13 Ramp Naming

Webmap Functions (Buttons)

1. Add node button is useful for where there is a node missing on webmap but existing in PDF maps. More details please refer to the STEP 8 in ‘QAQC Procedures’.
2. Delete node button is useful for 1) Wrongly adding one node on the route by editors; 2) Developers added lots of railway and creek/river nodes on the routes where mistakes may happen. More details please refer to the STEP 9 in ‘QAQC Procedures’.
3. **SHIFT+LEFT CLICK**: This is used to assign a single ID to all of the links (NOT NODES) selected. First, click one linkID box with the correct LinkID value, then **SHIFT+LEFT CLICK**.

4. **PRIMARY NODE BUTTONS**
When multiple eGIS Nodes have the same PdfNodeID which happens very often in interchanges (State Routes and Interstate), editors need to assign one of the eGIS Nodes as primary one to benefit the historical traffic crash records transferring.

Steps: 1) Select the route which has multiple nodes with the same PdfNodeID; 2) Then double click on the nodes which should be the primary node, and the window will pop out (Figure 14); 3) Select the appropriate node as the primary node (With star symbol).

![Figure 14 Primary Node Interface](image)

**Figure 14 Primary Node Interface**

**Primary nodes rules: KEEP CONSISTENT!**

(1) **Southeastern rule**
(2) **Southern rule**

(3) **Eastern Rule**

(4) If conflicts, go with **Eastern rule**

(5) If none of these rules works, pick up one available node in this intersection as a primary node.
5. Report Issue button
If editors find any issues related to the webmap like ‘website crashes frequently’, ‘PDF button cannot retrieve any PDF maps’, ‘The performance of website slows down a lot’ or ‘Editor cannot save any edits’, please click the ‘Report Issue’ button and write down some descriptions of one issue and send it to the developer.

QAQC Problem Code Examples
1. Node is not on PDF map: A node is on a link in the webmap but is not on the PDF map. Specifically, there is a node along a route in the pdfs that is not in that same spot on the webmap. In this case, node 1683 is missing on the webmap. The problem “Node Missing” should be assigned to node 1683, and this NODE ID SHOULD BE CHANGED TO ‘-2’ (Figure 15).

2. Node ID is not on PDF map: The node from the webmap is on the PDF map but does not have the node ID. NOW EDITORS ARE USING ‘-3’ AS A SHORTCUT!

3. Node should intersect the closest link: A correct node is near the right intersection but is slightly misplaced. In other words, a correct node for a certain intersection is misplaced near that intersection.

4. Link is not on PDF map: A link is in the webmap but not on the PDF map, and this LINK ID SHOULD BE CHANGED TO ‘-2’ (Figure 16).

5. Link ID is not on PDF map: A link from the webmap is in the PDF map but does not show the link ID (Figure 17). NOW EDITORS ARE USING ‘-3’ AS A SHORTCUT!

6. Link is too short (undershoot): A link in the webmap is incomplete between nodes and falls short of a node (Figure 18).

7. Link is too long (overshoot): A link extends past the node where it is supposed to end (Figure 19).

8. Other: For links and nodes, the option of “Other” may be assigned to a unique problem that does not fit the description of the listed problems (Make comments). Any comments like ‘XXX Node/Link missing’ should be assigned the NEAREST EXISTING NODE.
Figure 15. Node is not on PDF map

Figure 16. Link is not on PDF map

Figure 17. LinkID is not on PDF map
Notes
1. When doing QAQC, “-2” will play the same role as “-1”, which means “null”. PLEASE CHANGE ALL ‘-1’ TO ‘-2’.

2. Some LINKIDs initially are “-4”, which need to be further checked by editors.
3. In the PDF maps, some PDF nodes are the intersections of railway or river lineworks with routes. These PDF nodes can be added on the routes by using ‘Add node’ button.

4. Several PDF maps can point to one same area, but each PDF map may carry different amount of information (Figure 20, 21). Editors should use the PDF map with more detailed information.

Figure 20 PDF map with less information

Figure 21 PDF map with more information
5. If there is a big piece of links existing in the PDF maps but not on the webmap, please find and click the closest node (the option of “Other”) on the webmap, then write down the comments about a big piece of node/link missing. BECAUSE WE CANNOT ADD ANY LINEWORKS INTO THE WEBMAP NOW.

6. Any questions, please send an email to QIFAN NIE (QNIE1@CRIMSON.UA.EDU).