

Alignment Viewer

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Foreword

The Alignment Viewer is a simple utility to display the Chainage/Station and Offset of your current position along a Geometric Alignment.

It allows you to enter Cartesian or world coordinates and converts those to Chainage/Station and Offset using the given transformation parameters.

We have incorporated the ability to load geometric lines through a KML file through which a cross section view can be drawn.

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1. Introduction

Alignment Viewer is a Civil Engineering tool that allows the display of Geometric alignments, lines, points and cross sections. Alignment Viewer was designed to assist with Highway / Railway construction and maintenance.

Alignment Viewer allows the conversion between Geodetic WGS84/ETRS89 world coordinates (Latitude Longitude) to Cartesian Easting Northing and Geometric Alignment coordinates based on a given transformation.

This manual will allow the user to fully utilise the Alignment Viewer.

1.1 Versions

Alignment Viewer is currently released for Android and iOS devices. Both versions of the app are functionally identical with a few small UI differences. In addition, the process of adding projects and transformations varies per devices, as explained in chapter 2.

Current Android App Version: 3.01

Current supported Android operating systems:

- Android 9
- Android 10
- Android 11
- Android 12
- Android 13
- Android 14

Current iOS App Version: 2.9992

Current supported iOS operating systems:

- Up to iOS 14.3



1.2 Other NRG Software

NRG also develops a suite of Topographic and Ground Modelling software for Civil Engineering.

Details of the NRG software system can be found at <http://www.nrgsurveys.co.uk/>

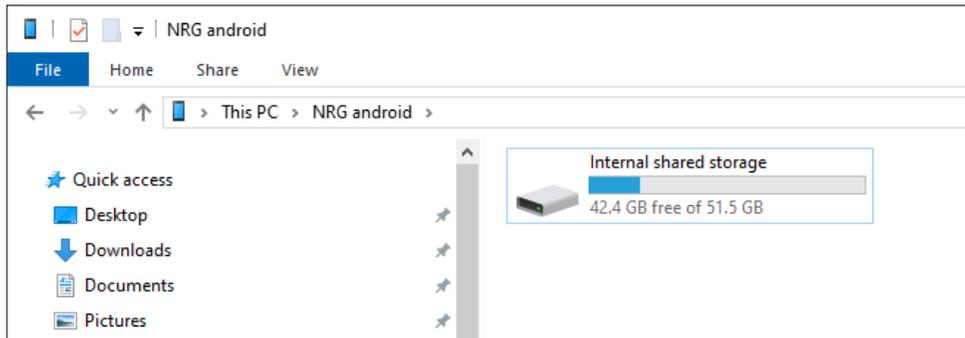
The website contains a full download of the system and many supporting tools can be found within it that can be used in demo mode.

2. Importing a Project

To load a project into Alignment Viewer you must first make sure the project files are on your mobile device and in the correct location. To do this, you will need to manually copy the files you wish to use by following the steps provided in this section.

2.1 Importing a Project on Android

First, you must connect your mobile device to a PC/Laptop that stores your required project files. Once connected you may be prompted to allow the PC/Laptop access to your mobile device's storage, accept/allow this request. You should now be able to the shared storage locations for your device.

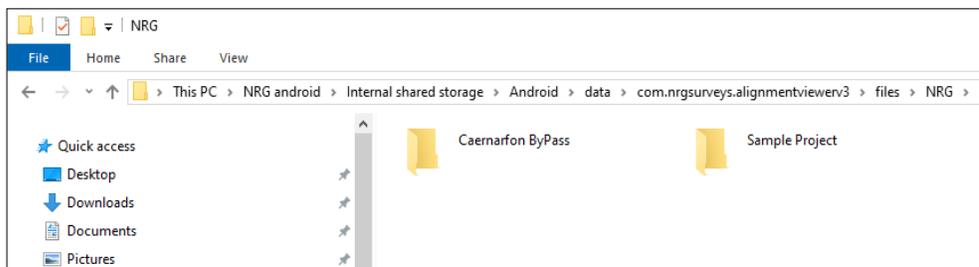


2.1.1 Locating the NRG Folder

If you have not loaded the application yet, please do so before proceeding to the next stage.

Using file explorer, navigate to the NRG folder:

This PC\ANDROID PHONE\Internal shared storage\Android\data\com.nrgsurveys.alignmentviewerv3\files\NRG

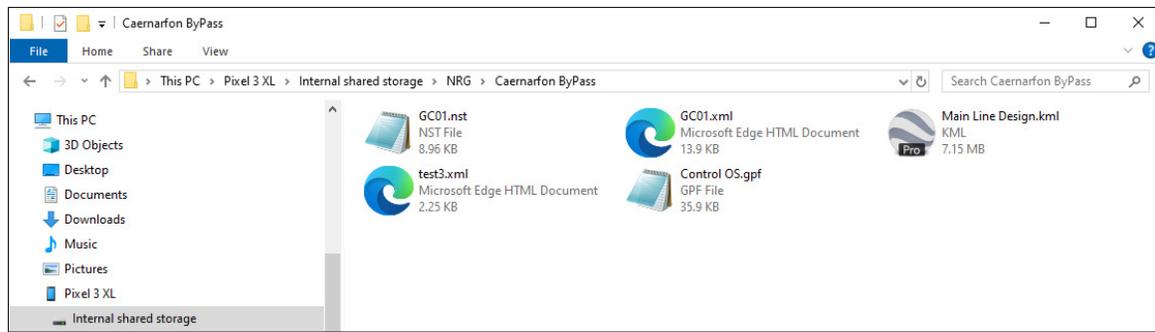


2.1.2 Adding a Project

Once you have located the NRG folder you are now able to create / copy a project across.

Project Files can consist of:

- .kml Files (Lines, Points)
- .nst Files (Alignment)
- .xml Files (LandXML Alignment)
- .gpf Files(Points)
- .txt Files(Points)



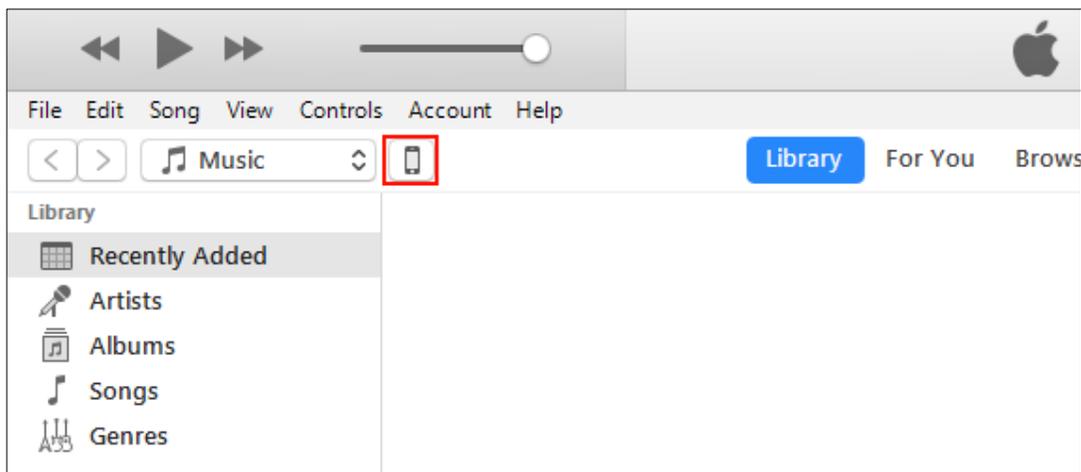
Please note that while a project file may contain as many files as you wish, you may prefer to keep a separate folder for each project. Each project File should have a unique name and should not be called “Transformation”.

2.2 Importing a Project on iOS

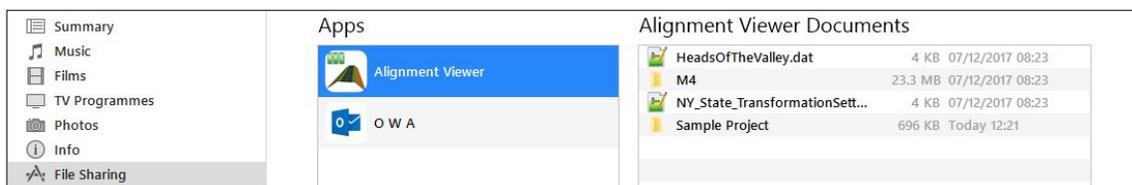
Since Alignment Viewer version 2.9991 there are now two methods of importing a project to your iOS device. App version earlier than 2.9991 only have access to importing a project through iTunes.

2.2.1 Importing a Project Through iTunes

First you must connect your iOS device to a PC/Laptop with the latest version of [iTunes](#) installed. Once connected to iTunes select the device icon highlighted below:



From there select File Sharing → Alignment Viewer:



Drag and drop project folders to the Alignment Viewer documents folder to copy them across.

Once you have located the Alignment Viewer Documents folder through iTunes you can begin copying project folders from your desktop to your iOS device. To copy a project folder across, single click your project folder on your PC/Laptop, then drag the project folder to the Alignment Viewer documents folder shown above and drop the folder. This will copy the folder and all the contained files. Please note that project files placed in the root of the

Alignment Viewer documents folder will **not** be read. Only transformation files (.dat) and project folders will be read from the root of the Alignment Viewer documents folder.

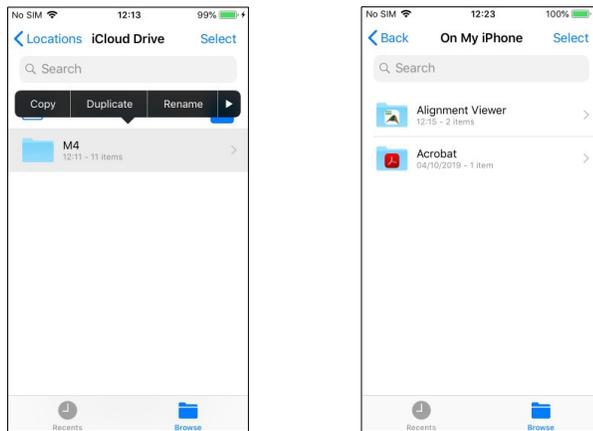
Project folders should consist of only the following file formats:

- .kml Files (Lines, Points)
- .nst Files (Alignment)
- .xml Files (LandXML Alignment)
- .gpf Files (Points)
- .txt Files(Points)

2.2.2 Importing a Project Through Files App

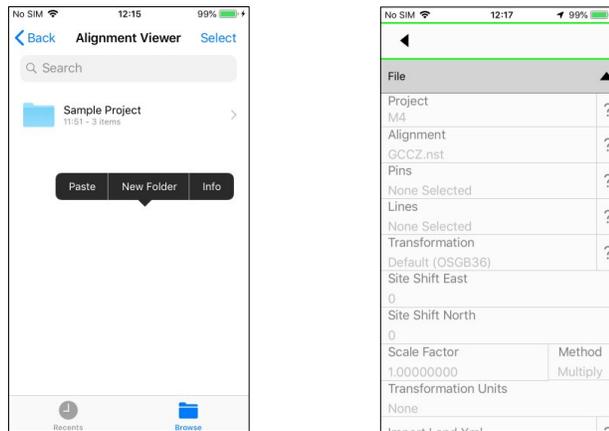
Alignment Viewer version 2.9991 introduced the ability to import a project through the Files App on your iOS device. To do so, first ensure that the project folder has been copied to the iOS device or a connected cloud service.

Open the files app and locate the project folder you wish to copy. Press and hold the folder icon for a few moments then release, you should see a small menu bar popup, select copy.



Navigate to the On My iPhone / On My iPad directory and select the Alignment Viewer folder.

Once inside the Alignment Viewer folder press an empty part of the screen and hold for a few seconds before releasing, you should see a small menu bar popup, select paste.



Once finished you will be able to select the project from within Alignment Viewer.

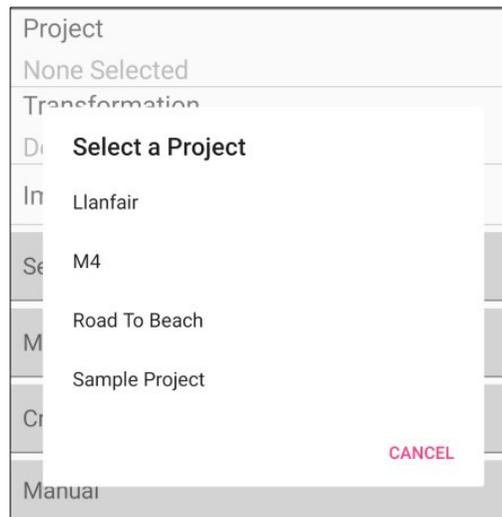
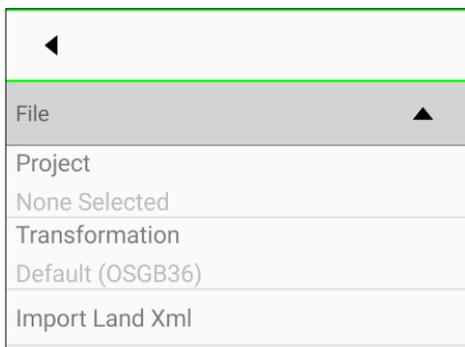
2.3 Creating a Project

Since Alignment Viewer version 2.9991 users now can create projects within the app itself.

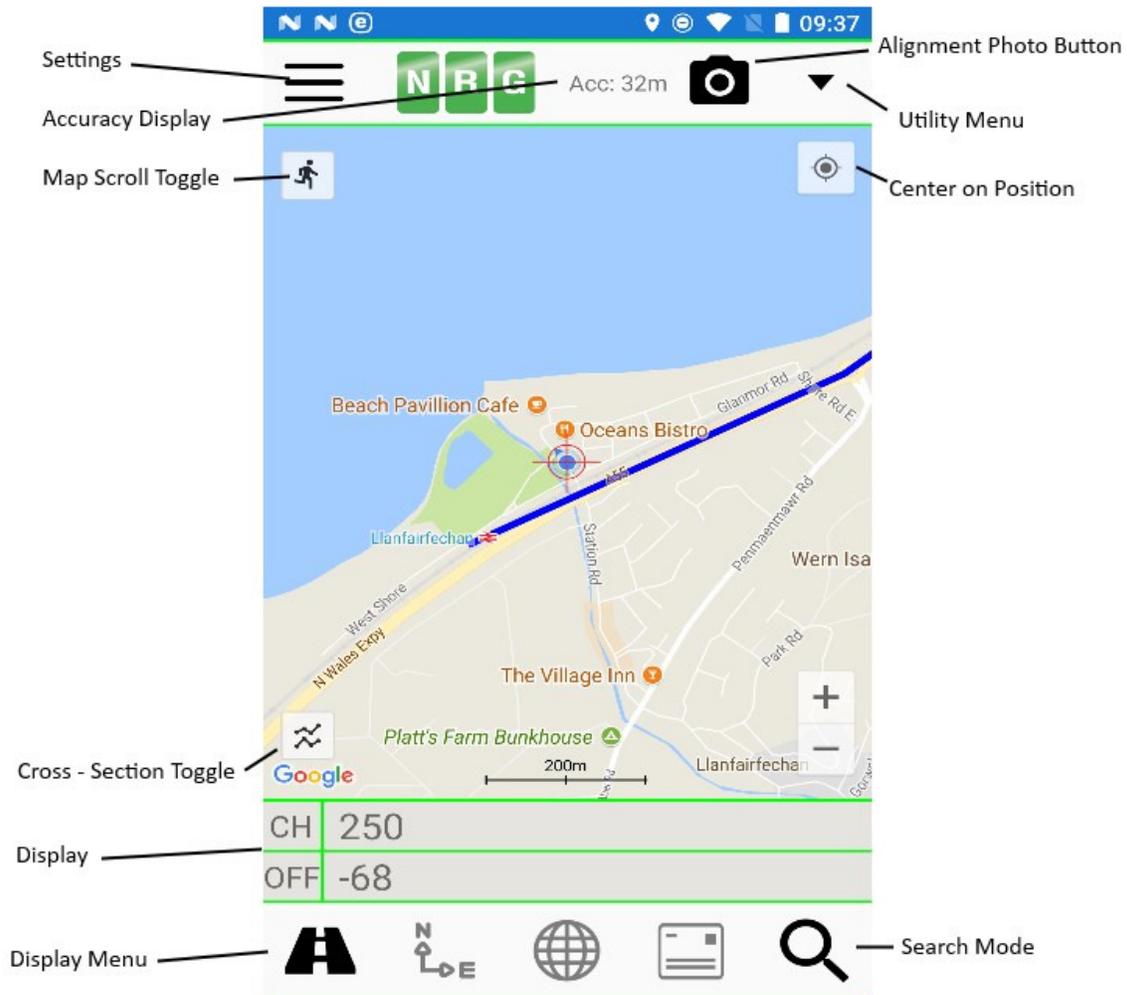
To do so press the settings  button to open the menu, expand the file tab and select project, then select the “New Project” button and enter a name for the new project. Once created the new project will automatically be selected.

2.4 Accessing a Project

Once you have copied your project files to the mobile device you should now be able to access them from within the Alignment Viewer. To do this press the settings  button to open the menu expand the file tab and select project, then select the project your wish to load.



3. Map UI



3.1 Track Mode

Alignment Viewer offers a track mode which will gather the devices current location based on GPS signals, Wi-fi connections or mobile data connections.

Track mode is enabled when the lower menu matches that below:



To enable search mode and disable track mode press the search mode toggle button.

While track mode is enabled Alignment Viewer will update the positional displays with the current location data. Track mode supports the following displays:

Alignment Display(Chainage/Station/Meterage and Offset)	
Cartesian EN (Easting Northing)	
World Coordinates (Latitude Longitude)	
Postcode	

Please note that Postcodes must be requested on demand by selecting the postcode button. All other displays will update in real time in track mode.

Users can toggle between selected displays.

3.2 Search Mode

Search mode allows the user to find view the coordinates of the cross hairs (centre of the map) in addition to the ability to search for, and move the map to, a specific location.



Search mode offers the same displays as track mode however features two new buttons.

Return to track mode 

Go to location 

Go to location will search the map for the location entered on the currently selected display. Please note that when selecting a postcode to search for a country code (E.g. UK, USA, CAN, AUS, etc) must be provided to find the correct postcode.

3.3 Utility Menu

The utility menu can be accessed by selecting the dropdown button on the main map screen. Loading the utility menu provides access to the following functions:

Place  Pin

Allows the user to place a pin on the map with a Title, Note and coordinate display that will change depending on the currently selected position display.

Edit  Pin

Allows the user to edit the currently selected pin modifying its Title, Note or location on the map.

Save  Pins

Allows the user to save and export the currently displayed pins. Providing the choice of exporting to .kml, .txt (csv) or .gpf(NRG format).

Delete  Pin

Allows the user to delete the currently selected pin from the map.

Clear  Pins
Allows the user to remove all the currently placed pins from the map.

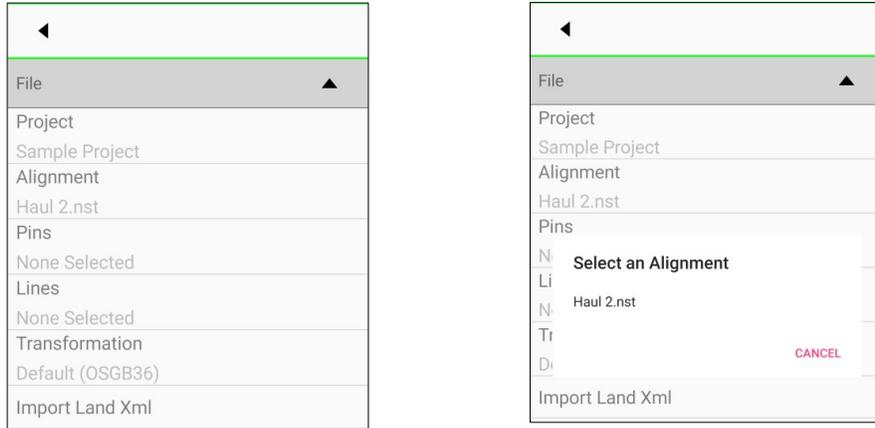
Clear  Lines
Allows the user to remove all the currently placed lines from the map.

Open  Maps
Opens the Maps app providing a navigation route the current camera position.

4. Geometric Alignments

4.1 NRG Alignment

Geometric Alignments can be created in [NRG's PC Road Design](#) application. Alignments created this way will be provided in NRG Alignment String format (.nst) and can be loaded directly into Alignment Viewer from the alignment selection window.



When a project containing an alignment string is loaded Alignment Viewer will load the first available alignment string file within the project.

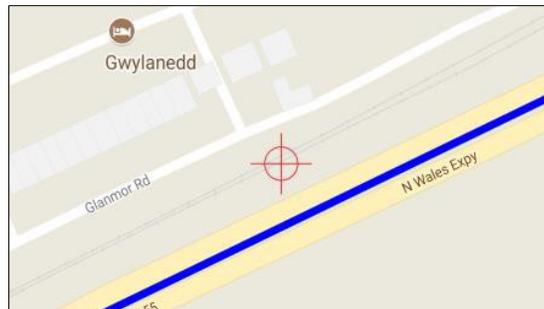
4.2 LandXML Alignments

All alignments used by Alignment Viewer must be in NRG Alignment format. To facilitate this we have included the ability to import LandXML Alignment thereby converting them to NRG Alignments which can then be loaded as normal. To import a LandXML Alignment make sure the project folder containing the .xml file is currently loaded Alternatively since version 2.9991 you can select the Browse... option to search for a LandXML file to import.



4.3 Alignment Data

Once an alignment has been loaded it will be visible on the map as a blue line.



4.3.1 Alignment Position Display

Once an alignment has been loaded Alignment Viewer will begin outputting positional data based on:

- The current Device location (Based on GPS/Wi-fi/Mobile Data).
- The current Camera Position.

By default Alignment Viewer will display the current device location. The format of the position displayed may be changed in the settings menu to accommodate the different user preferences.

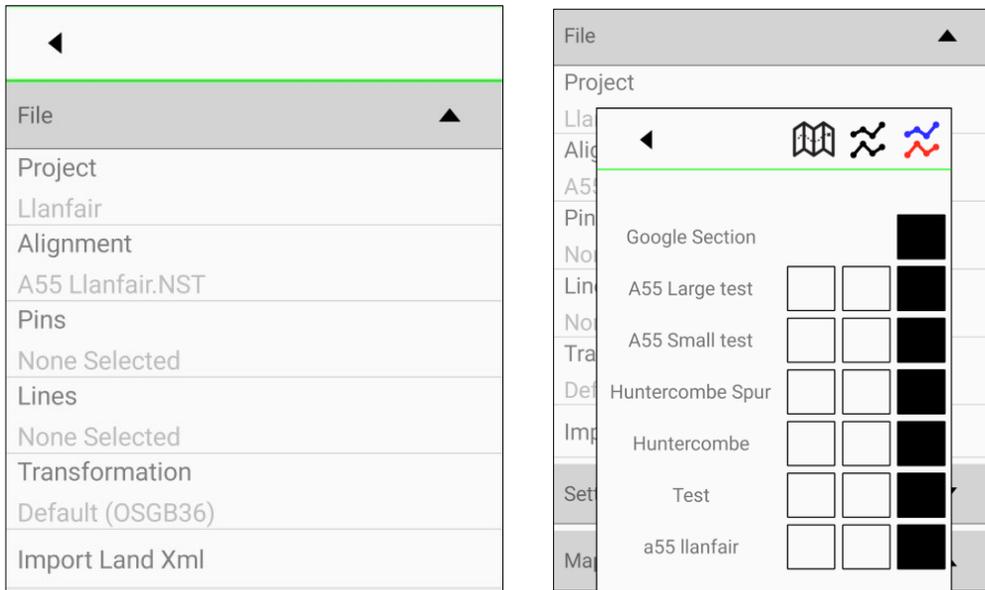
The alignment display will show the value “????” in the following situations:

- No alignment string is loaded.
- The current Device position is before the start of the alignment or after the end of the alignment.
- The current camera position is before the start of the alignment or after the end of the alignment.

5. Geometric Lines

Alignment Viewer provides the ability to load geometric lines from a .kml file and overlay them onto the map. There is also support for finding a cross section perpendicular to the alignment against these lines as discussed in the cross section chapter.

To load a line file, ensure you have a project loaded then select the line button. You will then be prompted with a choice of lines to load from those found within the current project. You will be given a choice to load lines to the map, to the cross section or to both.



5.1 Line Selection

To load a line to the map tick the box in  the column.

To load a line to the cross section tick the box in  the column.

To finalise the changes you have made select  the button.
Note that you can load and unload multiple lines at once.

Be aware that while Alignment Viewer can support the loading of many lines there may be a short delay when loading in files containing 500+ geometric lines.

6. Geometric Pins/Points

Alignment Viewer provides support for loading in Pins from a .kml, .gpf or .txt (csv) file. In addition, there is support for creating user defined pins and exporting pin arrays to the previously stated file types.

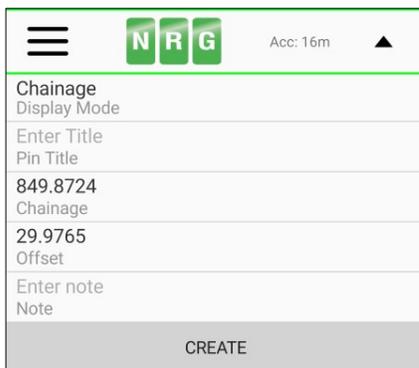
6.1 Creating a Pin

Alignment viewer offers support for creating pins based on the following coordinate systems:

- Chainage/Station/Meterage and Offset.
- Cartesian Easting Northing
- Latitude Longitude

To create a pin first load the dropdown utility menu with  then select the place pin button. 

You will then be presented with a menu that allows you to enter the pin data. The current coordinate system will be taken from your currently displayed coordinate system and the initial coordinates will be taken from the centre of the displayed map. Finally, after entering the desired information press Create to place the pin.

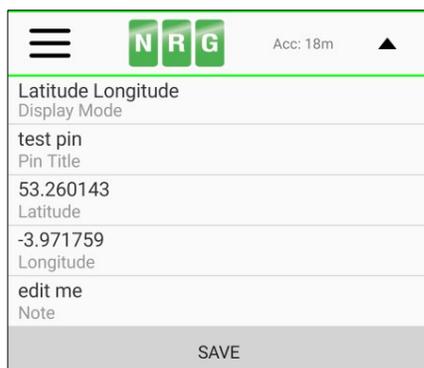


Chainage Display Mode
Enter Title Pin Title
849.8724 Chainage
29.9765 Offset
Enter note Note
CREATE

6.2 Editing a Pin

Alignment Viewer allows a pin to be selected, and then edited by opening the dropdown menu  and selecting the edit pin button. 

Editing a pin works in the same way as creating a pin but the initial data will be taken from the currently selected pin, pressing save will confirm the changes to the pin.



Latitude Longitude Display Mode
test pin Pin Title
53.260143 Latitude
-3.971759 Longitude
edit me Note
SAVE

6.3 Removing Pins

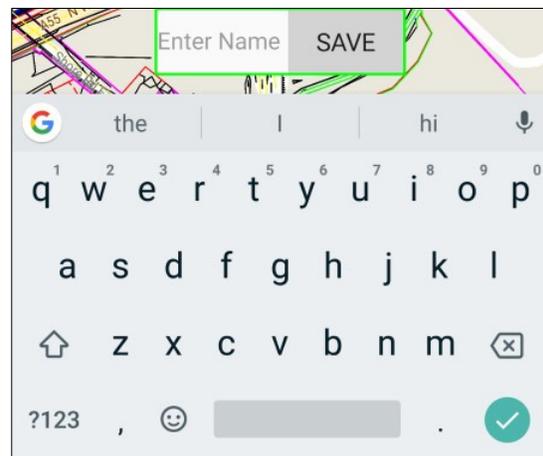
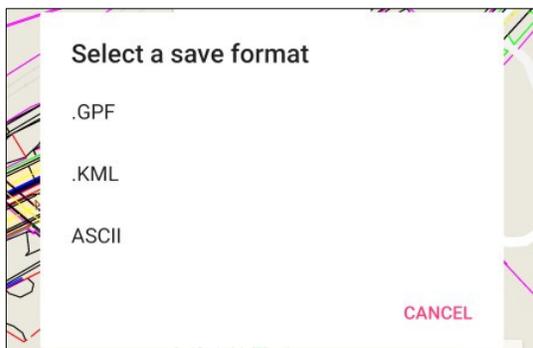
Pins can be removed by loading the utility menu with ▼ then selecting whether to delete and individual pin with the Delete Pin  button or delete all pins shown on the map with the Delete Pins  button. Note that to delete an individual pin you must first select the pin on the map.

6.4 Exporting Pins

Alignment Viewer supports exporting pin arrays to the following formats:

- .kml (Google Earth file)
- .gpf (NRG format)
- .txt (ASCII / CSV format)

Pin arrays can be exporting by loading the utility menu with ▼ then selecting the save pins  button. After selecting the export format you will be prompted to enter a name for the save file. Please note that you will be required to confirm a name when a file of the same name already exists as the original file will be overwritten. Once a name is chosen pressing save will export the file to the currently loaded project folder.



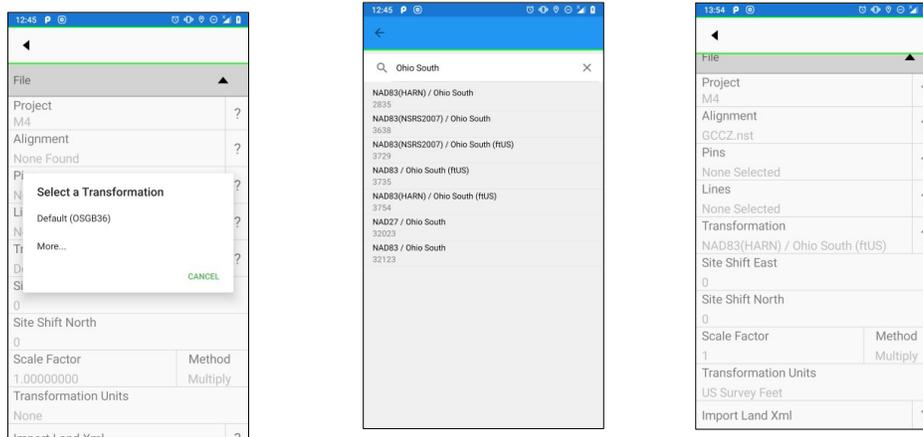
7. Transformations

Alignment Viewer makes use of transformation files to convert the spherical coordinates used by navigation systems (WGS84) to local cartesian systems.

By default, Alignment Viewer uses the OSGB36 (UK) transformation however, Alignment Viewer provides built in support for most common EPSG grid transformations.

7.1 Changing the Transformation

In order to change the transformation Alignment Viewer uses to convert coordinate to and from WGS84, go the settings menu, expand the file tab and select "Transformation". From there select More...



Enter the EPSG number or relevant search terms such as country of use to find the desired transformation and select it. Once selected all new coordinate calculations will make use of the new transformation.

8. Cross Sections

Alignment Viewer provides support for loading a cross section of a given .kml line that intersects with a geometric alignment.

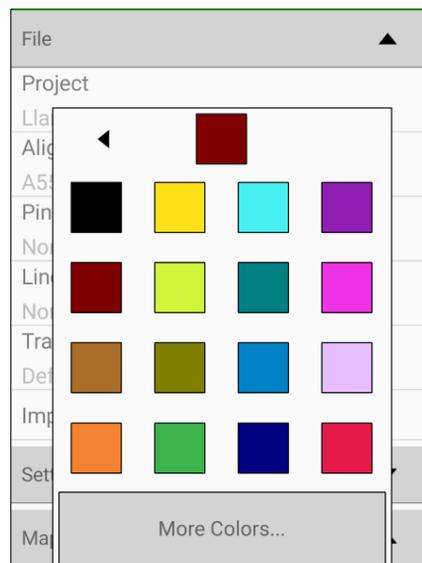
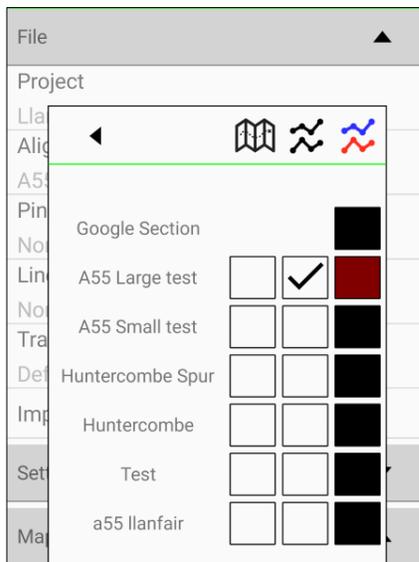
8.1 Enable and Disable Cross Sections

Cross sections can be enabled and disabled in several ways:

- Loading a line file as a cross section will enable cross section view.
- Clicking the  button on the map screen will toggle cross section view on/off.
- Cross section view can be enabled / disabled through the cross-section options in the settings menu.
- Unloading all lines from cross section will be disable the cross-section view.

8.2 Creating a Cross Section

Cross sections can be created by loading at least one geometric line file into the cross section. This can be done by ticking the box next a line file and under the  symbol. Users may also change the colour of the cross-section line for each line by clicking the button  under the  symbol and selecting their colour preference.



Once a line file is loaded and the cross-section view is visible data will begin to fill the view when either of the following criteria are met:

- The device position is past the start of the alignment and there is intersection data to display while the device is in tracking mode.
- The map position is past the start of the alignment and there is intersection data to display while the device is in search mode.

The amount of intersection data to display can be heavily configured in the cross settings options.

8.3 Cross Section View

Once all the previous steps have been taken the cross-section view will begin to show the intersection data as shown below.



The cross-section view is fully interactable, you can:

- Pan – Place one finger on the screen and move the cross section.

- Zoom – Place two fingers on the screen and pinch / un-pinch them.
- Reset position – Double tap the cross section or press the centre cross section button.

The cross-section view may also be paused allowing the user to explore the given cross section without the data being updated to a new cross section.

The user may also lock the cross section to a certain offset / zoom level to focus on an area of the cross section while still receiving real time updates of the intersection data.

9. Settings

Alignment view offers a comprehensive settings menu allowing the user to customize their experience as they wish. All settings are saved when changed so users will be able to maintain their preferences throughout multiple sessions.

9.1 General Settings

Country Code allows the user to select which country they prefer to obtain Postcode results from. E.g. UK, USA, CAN, AUS, etc.

Offset Display allows the user to select where the offset should be displayed with a positive or negative value or with the “Left/Right” suffix where Left is negative offset values and right is positive.

Alignment Distance allows the user to select whether they want the alignment value to be displayed as Chainage, Station or Meterage, it has no effect on the values returned.

Alignment Format allows the user to select whether they want the Chainage/Station/Meterage value to be returned as “10000” or “10+000” format.

Decimal Places allows the user to select how many decimal places certain values will be displayed until. (Note: Latitude and Longitude will always be displayed with 6 decimal places).

Text Size allows the user to select the size of the text used in the app.

9.2 Map Settings

Map Type allows the user to select whether the displayed map is Street, Satellite or Hybrid.

Crosshair allows the user to enable or disable the crosshair in the centre of the map screen.

Map Status allows the user to enable or disable the map view. Note that this can only be disabled in certain situations such as landscape mode or when a cross section is loaded.

Scale Bar allows the user to enable or disable the scale distance bar shown on the bottom of the map view.

Scale Measurements

Metric

Scale Measurements allows the user to change the units of measurement used for the scale distance bar to Metric or Imperial.

9.3 Cross Section Settings

Cross section

Enabled

Allows the user to select whether the cross section is enabled or disabled. This is functionally the same as the toggle button.

Cross-section Centre

Centre by Mid-point

Allows the user to select how the centre point for the cross section is determined.

Centre by Mid-Point will centre the cross section around the middle of the points to be displayed (E.g. a cross section from -20 offset to 60 offset will centre at 20 offset)

Centre by Offset allows the user to select the offset they want to centre the cross section to. This allows certain sections of the cross section to always be on the centre of the screen regardless of the full size of the cross section.

Scale Section to (Meters)

50

Allows the user to select the distance to be searched for intersection points.

Vertical Exaggeration

1

Allows the user to select the level of vertical exaggeration shown by the cross section view.

Elevation Segment Distance (Meters)

1

Allow the user to select the distance between each point requested by the Google Elevation button. (For example, setting the distance to 1m with a cross section 80m wide will return 80 data points along the cross section view.)



Allows the user to determine whether the x and y scale bars are visible or not.

10. Landscape Mode

The Alignment Viewer Landscape mode was designed to allow users to place their device on the dashboard of their vehicle and receive real-time updates to their position. For this reason, some features are not available to use in landscape mode to prioritize the visibility the position displays. Features available in landscape mode are as follows:

- Chainage/Station/Meterage and Offset display.
- Cartesian Easting Northing Display.
- Latitude Longitude Display.
- Postcode Display.
- Track Mode.
- Project Menu & Settings.
- Cross section view.
- Map View.

Landscape mode can be enabled by turning your mobile device on its side.

10.1 Position Displays

In Landscape mode the position displays have been redesigned to appear in the centre of the screen and appear larger than their portrait counter parts.

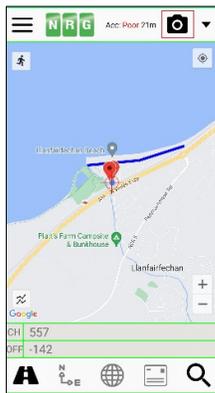
Landscape mode displays can also be double tapped to fill the screen providing even greater visibility. Double tapping a display a second time will reset its size. Displays can also be move by touching the display with one finger and moving the display.

11. Photos

11.1 Taking Photos

The App allow the user to take photographs, watermarked with the photo location.

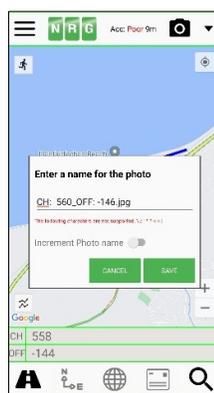
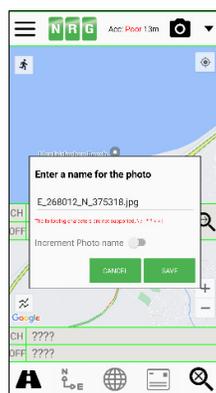
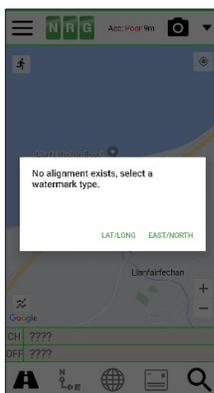
Select the camera symbol to take a photo.



If no alignment exists for the project, the app will watermark the photo with coordinates rather than chainage and offset to the selected alignment string. The app gives the choice of either LAT/LONG or EASTING/NORTH. For Android users, the photo will automatically be saved with a filename relating to either coordinates or chainage/offset. This can be changed by the user by entering a different filename.

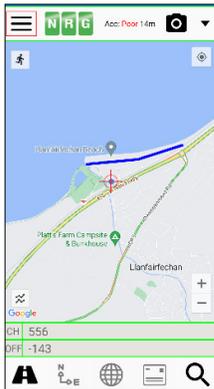
When using chainage/offset the increment photo name can be switched on. This adds a number to the end of the filename, so when taking multiple pictures at the same chainage and offset each photo will have a different filename.

For IOS users there is no filenaming options.

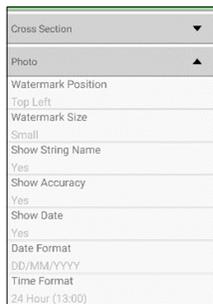


11.2 Photo Settings

Photo settings are accessed via the settings menu.



Expanding the photo tab reveals the photo settings.



The watermark position and size can be changed on the photo. You can also select what is to be displayed, including string name, positional accuracy, date and time.

11.3 Photo Storage Location

For IOS users, photos are stored in the Apple Photos app storage location.

For android users, photos are stored in the **Pictures Folder** within the **Internal Storage Folder** on the phone.

Pictures

Home Share View

↑ > This PC > NRG android > Internal shared storage > Pictures >

Name	Type
.thumbnails	File folder
PhotosEditor	File folder
Screenshots	File folder
CH_ 546_OFF_ -140.jpg	JPG File
CH_ 546_OFF_ -143.jpg	JPG File
CH_ 546_OFF_ -1432.jpg	JPG File
CH_ 546_OFF_ -1433.jpg	JPG File
CH_ 546_OFF_ -1434.jpg	JPG File
CH_ 547_OFF_ -132.jpg	JPG File
CH_ 547_OFF_ -137.jpg	JPG File
CH_ 561_OFF_ -149.jpg	JPG File
CH_ 575_OFF_ -149.jpg	JPG File