

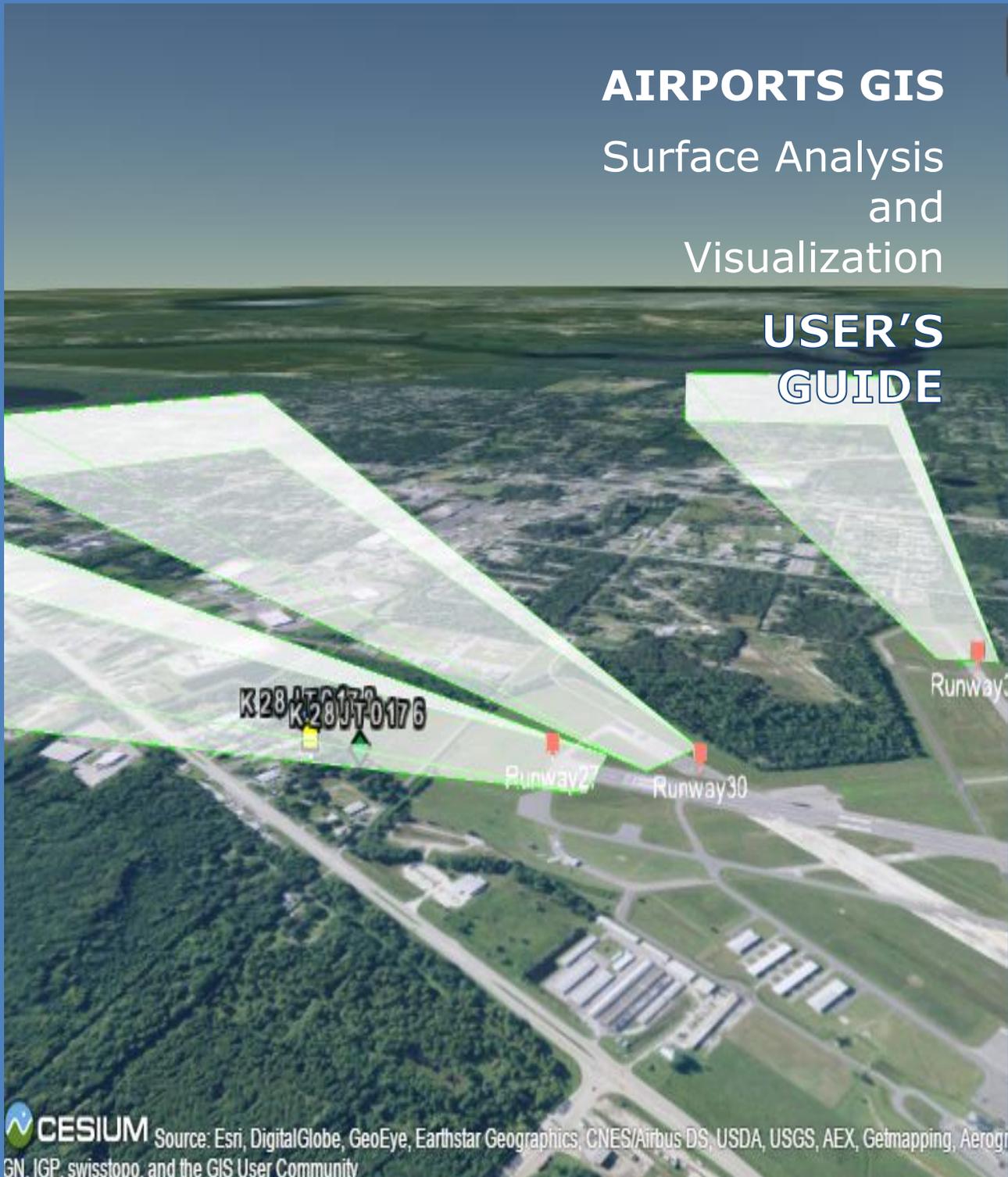


Office of Airports (ARP)  
Office of Aviation Safety (AVS)  
Air Traffic Organization (ATO)

# AIRPORTS GIS

Surface Analysis  
and  
Visualization

## USER'S GUIDE



**CESIUM** Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerog  
GN, IGP, swisstopo, and the GIS User Community

An **FAA** Guide

This guide is for airport sponsors, their employees, and contractors. It provides general guidance for using the Surface Analysis and Visualization tool to analyze, review, edit, and mitigate surface penetrations on airport surfaces.

Underlined hyperlinks throughout this document allow readers to maneuver within the document and access documents on the internet. When navigating within this document, return to the previously viewed page by simultaneously pressing the “Alt” and “←” keys.

# Surface Analysis and Visualization User's Guide

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## About Surface Analysis and Visualization

The Surface Analysis and Visualization tool is a part of the Federal Aviation Administration's (FAA) Airports Geographic Information Systems (Airports GIS) application. This tool evaluates Airports GIS and AirNav data to find and display object penetrations of airport surfaces. Use this tool to analyze surfaces for each runway at your airport and then view object penetrations of these surfaces. You can identify the amount by which an object penetrates a surface, validate or invalidate the penetration, assess the risk associated with each penetration, identify mitigations, and generate detailed surface penetration reports.

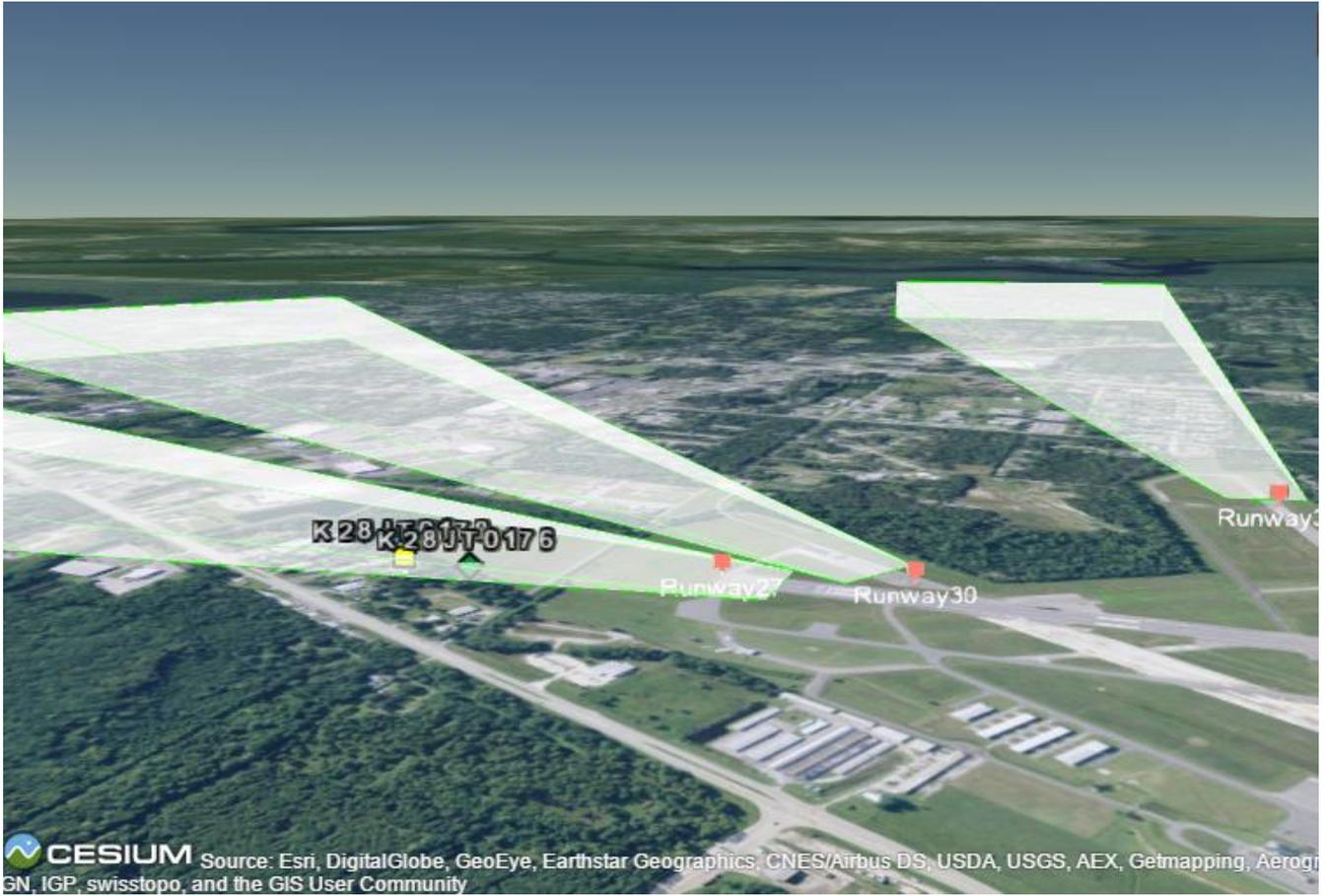
This user's guide helps airport owners and their associated personnel understand how to use this tool.

**Important:** This tool does not evaluate for:

- Offset approach conditions
- Excessive Decision Altitude
- Approaches with Visual Descent points outside 10,000 feet (1.654 NM)

Airport sponsors or owners will receive specific guidance from the FAA Flight Procedures Team (FPT) on objects requiring mitigation for any of the above-listed situations.

This example screen shot shows 3 surfaces and associated penetrations.

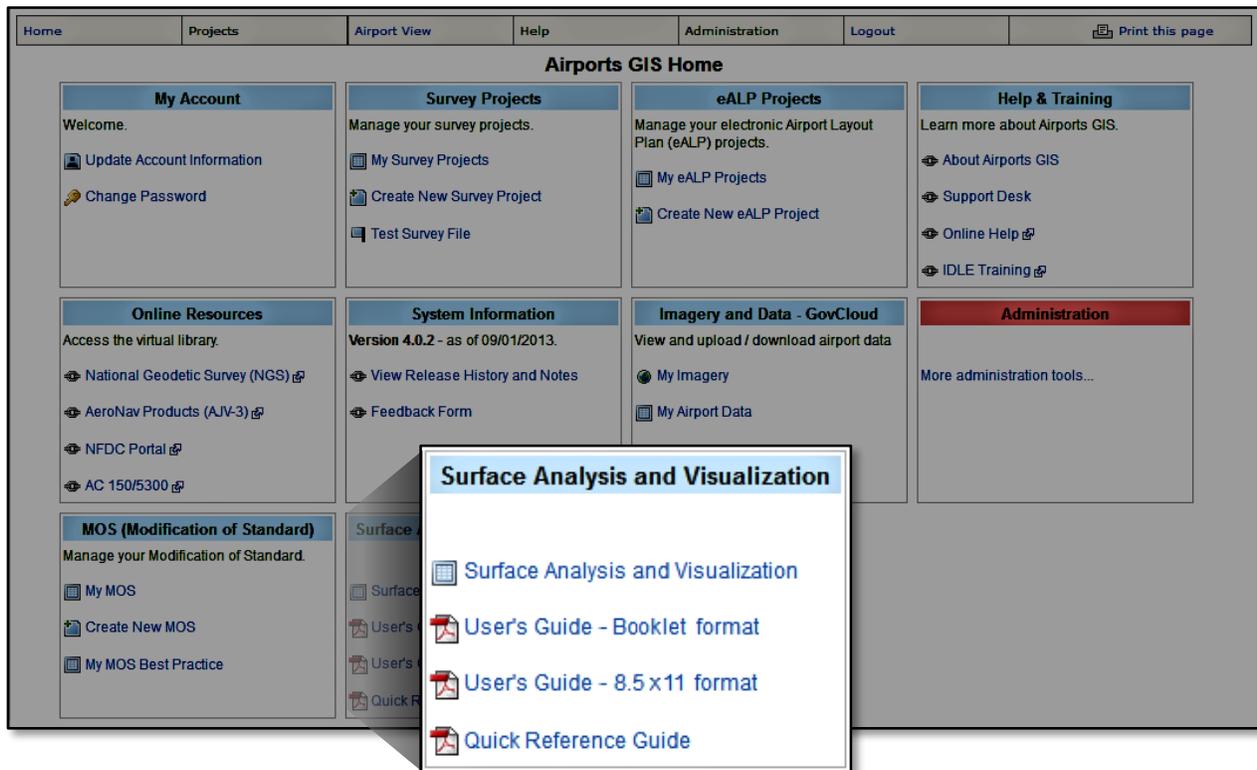


## About Airports GIS

Airports GIS helps the FAA collect airport and aeronautical data to meet the demands of the Next Generation Air Transportation System (NextGen).

Use Airports GIS to upload survey data for your airport, upload and access airport data, submit changes to survey data, complete an electronic Airport Layout Plan (eALP), and view and analyze surface penetrations.

The image below shows tools you might see after you log into Airports GIS. In this example, find the Surface Analysis and Visualization application on the bottom row.

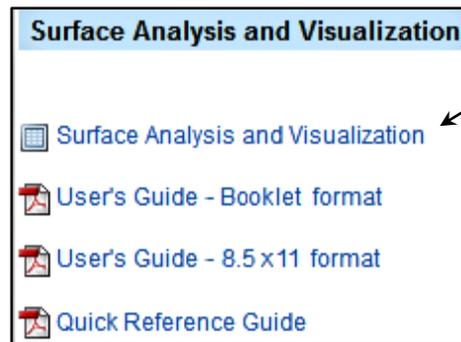


## Launching Surface Analysis and Visualization and Setting Penetration Surfaces to Analyze

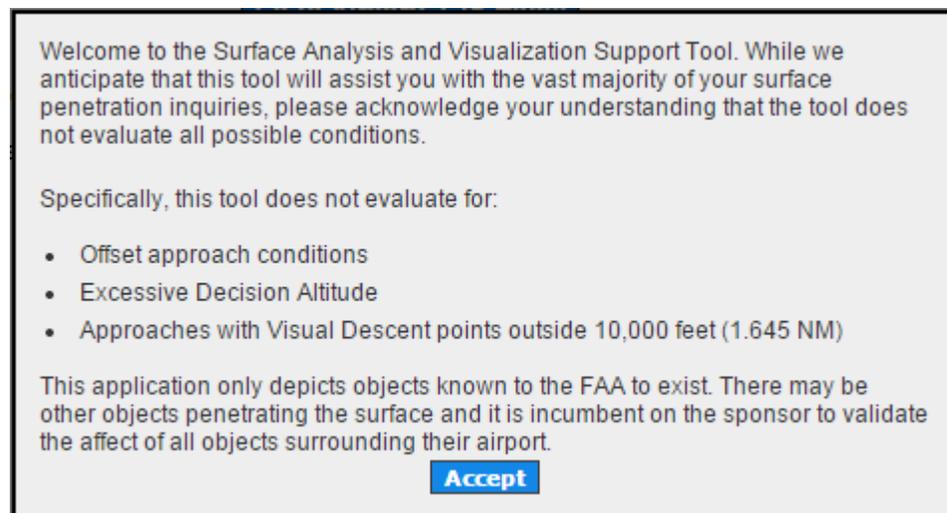
The Surface Analysis and Visualization tool lets you analyze and verify penetrations of specific surfaces at your airport. After you log in to Airports GIS, you will launch the Surface Analysis and Visualization tool, choose your airport, and specify surfaces to analyze for penetrations.

### Accessing your airport

1. Log in to Airports GIS.
2. On the **Airports GIS Home** page, click [Surface Analysis and Visualization](#).



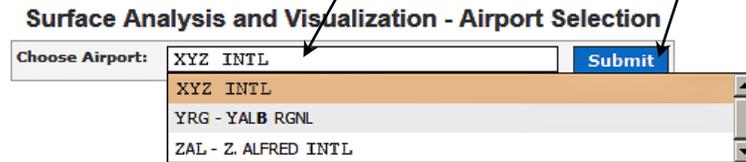
The following message pops up:



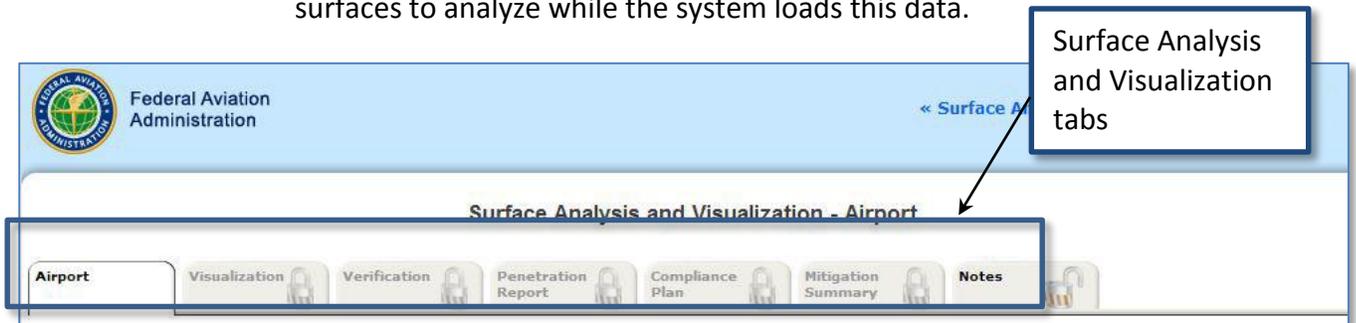
3. Read the disclaimer and click **Accept**.

The system displays the **Surface Analysis and Visualization – Airport Selection** page.

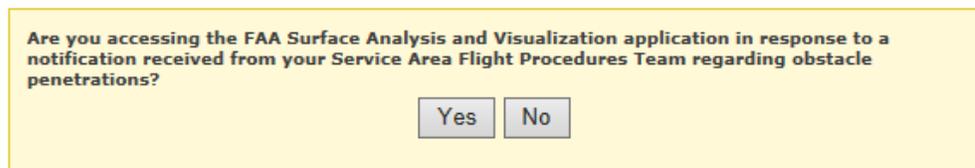
4. Type the airport identifier, select from the pull-down menu, and click **Submit**.



You will see the **Airport** tab followed by the **Visualization, Verification, Penetration Report, Compliance Plan, Mitigation Summary, and Notes** tabs. These tabs contain the analysis and visualization tool functions. The current tab is white; inactive tabs are gray. A locked lock icon on a tab means no user has submitted data for analysis. When you activate the **Airport** tab, the submit button is inactive, or gray, until the system has uploaded all object data for your airport. You can add runways and surfaces to analyze while the system loads this data.



The first time you log in the system will ask you to identify whether you are accessing this tool in response to a notification you received from your Service Area Flight Procedures Team regarding obstacle penetrations. You will see the following message:



5. Do one of the following:
  - a. If you received notification about obstacle penetrations, click **Yes**.
  - b. If you did not receive notification about obstacle penetrations, you can use this tool, but you must confirm you understand the use of the tool

does not implement changes at the FAA. Click **No** and follow instructions.

**Note:** To exit the Surface Analysis and Visualization tool and return to the [airport selection](#) page, click **Back**.

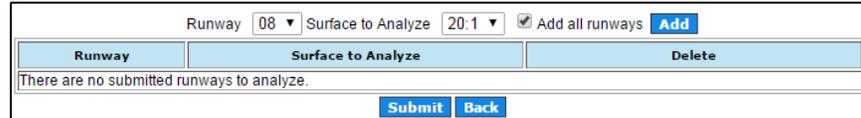
## Submitting Airport Runways and Surfaces to Analyze

After you use the steps above to log in to Airports GIS and select your airport, you can use the steps below to identify and submit runways to analyze for surface penetrations. Airport owners, their authorized staff, and authorized FAA staff members can add airport surfaces to analyze.

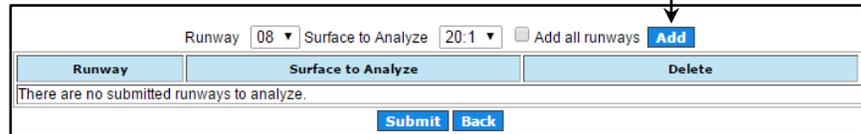
1. Use the previous steps to display the **Airport** tab.



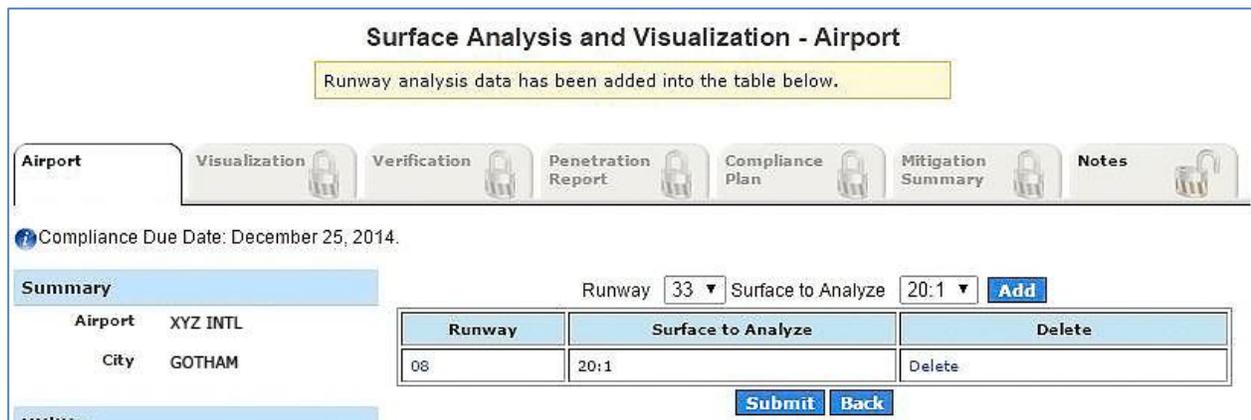
2. To analyze the same surface type on all runways, select the surface to analyze, select **Add all runways**, and click **Add**.



3. To analyze individual runways, from the pull-down menus, select a runway, the surface you want to analyze, and click **Add**.



The tool adds this information to the table as shown in the example below.



4. Continue to add runways you want to analyze.

- To see who created a surface, in the **Runway** column click the hyperlink for the runway.

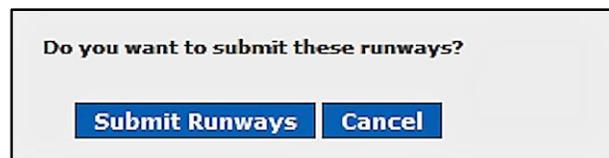
| Runway             | Surface to |
|--------------------|------------|
| <a href="#">15</a> | 20:1       |
| <a href="#">33</a> | 20:1       |
| <a href="#">26</a> | 20:1       |
| <a href="#">08</a> | 20:1       |
| <a href="#">33</a> | 20:1       |

- To delete a runway configuration, click that runway's **Delete** hyperlink.

Note: You can delete any surface configuration including surfaces added by authorized FAA personnel.

- To analyze the surfaces you have defined, click **Submit**.

The tool displays the following dialog box:



- Click **Submit Runways**.

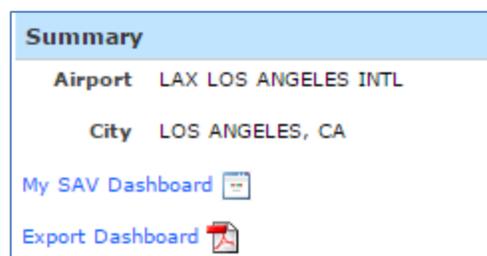
The tool processes your request. When it finishes you can [view the penetrations on a map](#), [verify and validate objects](#), [review a penetration report](#), [define a compliance plan for each penetration](#), and [log and share notes](#) on each penetration. You can also [define and submit alternate mitigation plans](#) for situations where you plan to use a visual glide slope indicator (VGSI), full scale deflection, restricted Category C and D minimums at night, or your airport has a restricted access road, and [view a mitigation summary](#) where you can confirm and accept updates.

## The Summary, Utilities, and Online Help/Resources panes

The **Summary**, **Utilities**, and **Online Help/Resource** panes are available on the left side of the screen on each tab.

### Summary

The **Summary** pane lists your airport and city. If you are accessing this tool in response to a notification you received from your Service Area Flight Procedures Team regarding obstacle penetrations, the two hyperlinks in this pane allow you to



view or export verification, compliance, and mitigation status data about each penetration.

The hyperlinks on the **Utilities** pane generate reports in comma separated value (CSV) format and submit various forms.

### Utilities

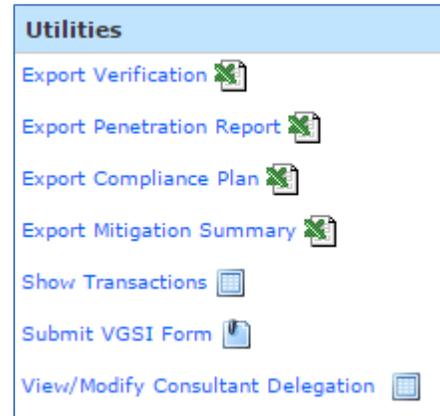
After you submit runway data for analysis using the steps explained above (see [Submitting Airport Runways and Surfaces to Analyze](#)), you can export the surface penetration data into a CSV file by clicking one of the export links in the Utilities pane. Each report lists the data by object identifier and reflects the information you see on each related tab, **Verification**, **Penetration Report**, **Compliance Plan**, and **Mitigation Summary**. To download this data, in the **Utilities** pane click the appropriate hyperlink.

To see a list of all surface analysis actions taken for this airport, click [Show Transactions](#) .

You can also request a visual glideslope mitigation for any runway by clicking [Submit VGSI Form](#)  and following instructions.

### Online Help/Resource

The **Online Help/Resource** pane contains hyperlinks to help files and 20:1 policy guidance.

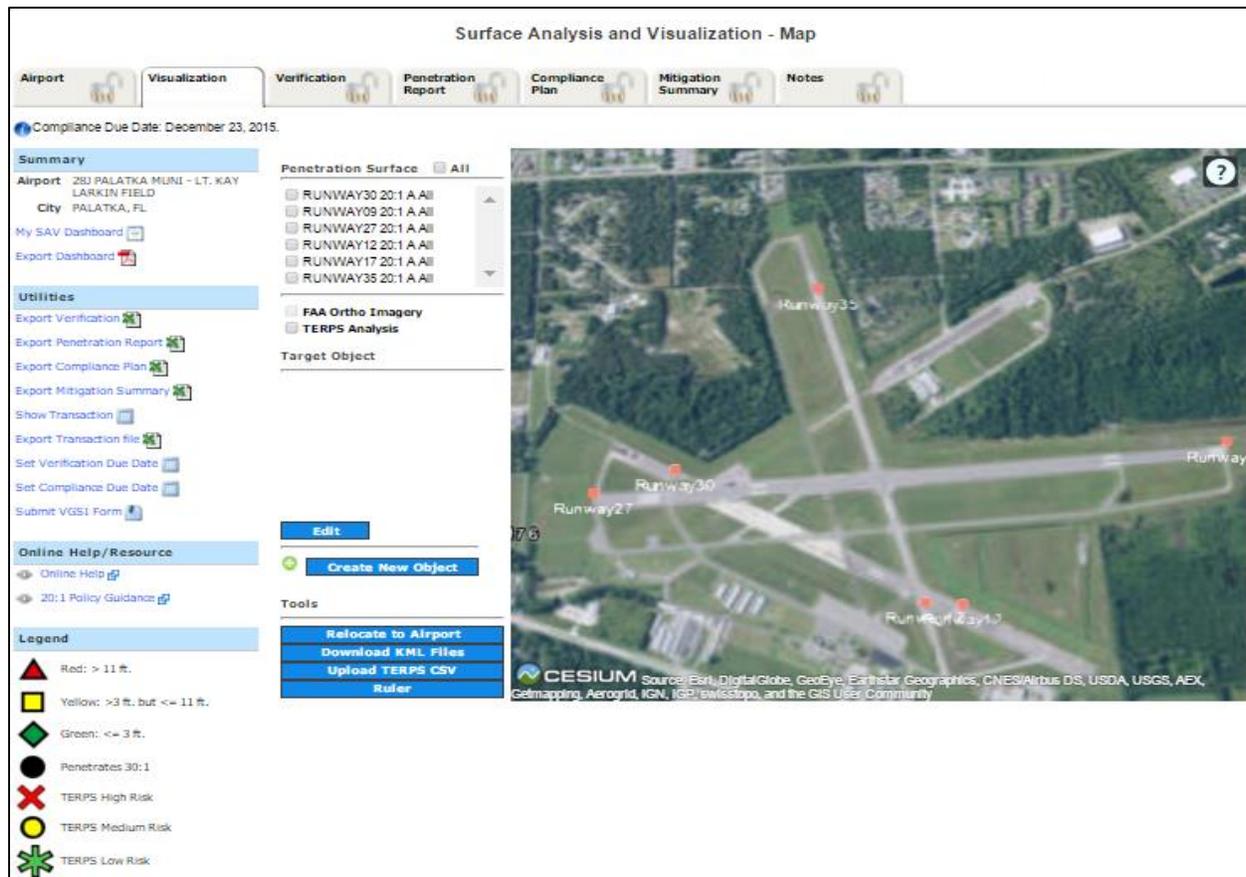


## Viewing Surface Penetrations

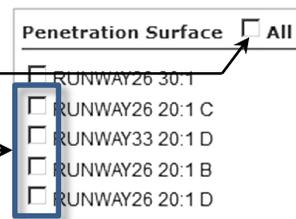
1. After you have submitted runways and surfaces to analyze, click the **Visualization** tab.



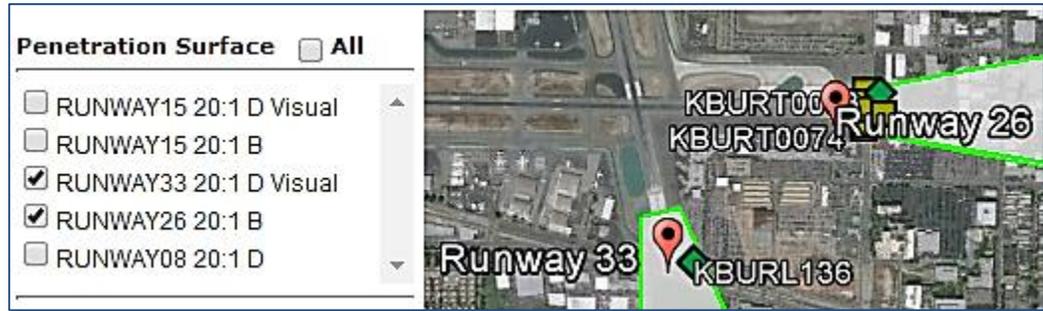
The system launches the CESIUM mapping interface and displays your airport. It displays the surface penetrations for all of the runways and surfaces you defined in the **Airport** tab using red, yellow, green, and black symbols.



2. To see all penetration surfaces, click **All**, or specify any combination of runways.



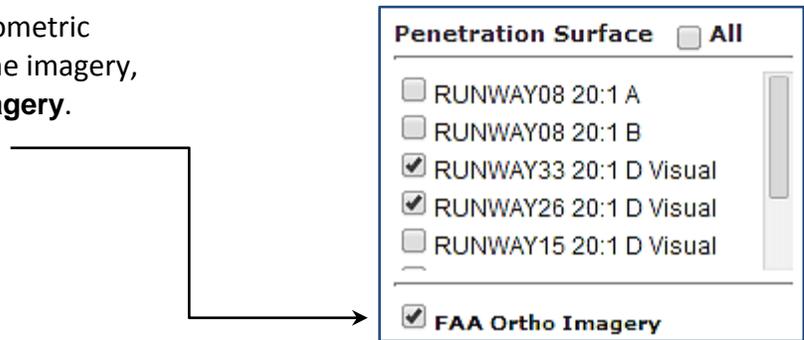
The system draws the surfaces you selected. The example below shows the defined surfaces for Runway 26 and Runway 33:



### Viewing FAA orthometric imagery

You can overlay FAA orthometric imagery data on top of the map imagery as a separate map layer.

To overlay FAA orthometric imagery data over the imagery, click **FAA Ortho Imagery**.

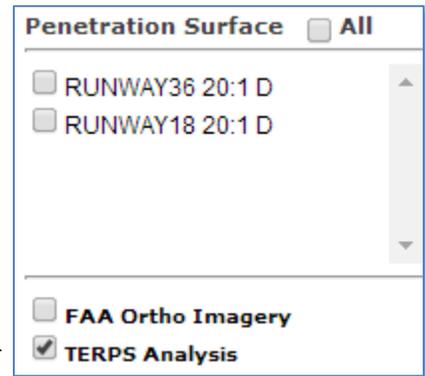
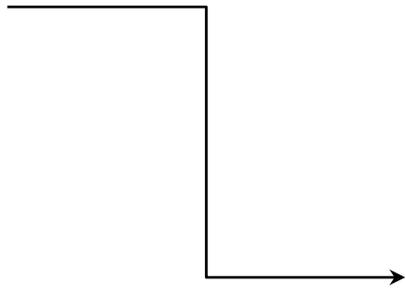


### Viewing TERPS objects

Airports GIS system administrators can upload Terminal Instrument Procedures (TERPS) objects to your airport for analysis. Airports must create compliance

plans, mitigate, and track TERPS object penetrations. The system marks TERPS object penetrations using red, yellow, and green symbols.

To see TERPS objects, click **TERPS Analysis**.

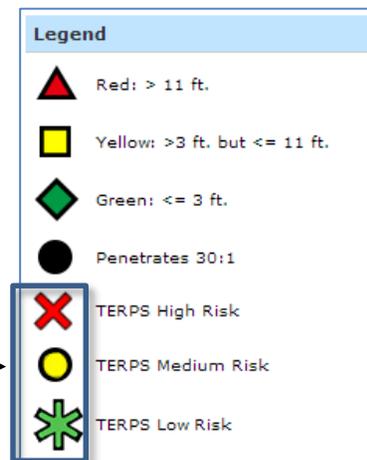


## Penetration legend

Colored symbols on the map show objects that penetrate a surface. The red triangle, yellow square, and green diamond symbols show decreasing extents of 20:1 penetrations. The black circle shows 30:1 penetrations. The red, yellow, and green symbols below mark decreasing severity of the TERPS object penetrations.

These symbols represent the extent the object penetrates a surface.

TERPS objects



### 20:1 penetrations

 Red triangles represent high risk penetrations verified to be more than 11 feet above the defined 20:1 surface. For these penetrations, the FAA must take immediate action to restrict the Instrument Approach Procedure (IAP) visibility to at least one statute mile (SM) and, if the object is not lit, restrict night operations.

 Yellow squares represent medium risk surface penetrations verified to be greater than 3 feet and up to and including 11 feet above the defined 20:1

surface. FAA is not required to take immediate action to restrict IAPs for these penetrations.

-  Green diamonds represent low risk surface penetrations verified to be 3 feet or less above the defined 20:1 surface. FAA is not required to take immediate action to restrict IAPs for these penetrations.

### 30:1 penetrations

-  Black circles represent penetrations to the 30:1 Glidepath Qualification Surface (GQS). When an object exceeds the height of the GQS, the FAA will not authorize Approach Procedures with Vertical Guidance (Instrument Landing System (ILS), Precision Approach Radar (PAR), Lateral Navigation (LNAV), Vertical Navigation (VNAV), etc.).

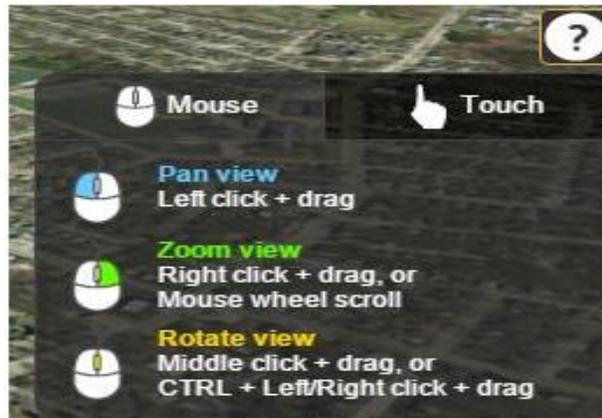
### TERPS penetrations

-  Red "X" symbols represent high risk TERPS penetrations.
-  Yellow circles represent medium risk TERPS penetrations.
-  Green asterisks represent low risk TERPS penetrations.

## Navigating the map

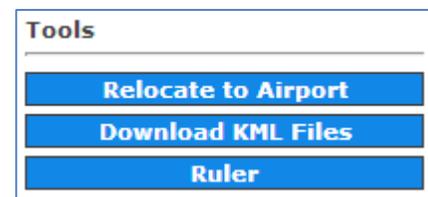
You can drag, tilt, zoom in, zoom out, and rotate the map by pressing and manipulating the mouse wheel and mouse buttons. Access the instructions for

navigating the map by clicking on the question mark symbol in the top right corner.



## Map tools

The buttons to the left of the map let you snap the display back to the original aerial view, generate and view penetration data, and use a ruler to measure points on the map.



### Resetting the map display

To reset the display back to the original aerial view of the airport, click **Relocate to Airport**.

### Viewing surface penetrations on the map

After you have added penetration surfaces, you can view the surfaces and penetrating objects on the map by downloading the data in Keyhole Markup Language (KML) and opening the files in the map.

1. To download the KML files, on the **Visualization** tab, click **Download KML Files**.

The system saves the surface and object data to your computer's Downloads directory as compressed files identified with your airport code for example, BUR.zip. File names identify the type of content. Each surface is contained in a separate KML file named by penetration surface. Object data is stored in numbered files like the example below:

|                               | Name                            | Type     |
|-------------------------------|---------------------------------|----------|
| Surface geometry files        | BUR_RUNWAY33_20TO1_B.kml        | KML File |
|                               | BUR_RUNWAY26_20TO1_D_Visual.kml | KML File |
|                               | BUR_RUNWAY15_20TO1_D_Visual.kml | KML File |
|                               | BUR_RUNWAY08_20TO1_B.kml        | KML File |
| Object penetration data files | BUR_R4.kml                      | KML File |
|                               | BUR_R2.kml                      | KML File |
|                               | BUR_R1.kml                      | KML File |

You will need to “unzip” or decompress these files.

- To unzip the KML files, navigate to your “Downloads” directory, select the zipped KML directory, right click to display the system menu, select **Extract All...**, and follow system instructions to save the extracted files.
- To display any KML file in the map, you can double click a file, select files and drag them into the mapping interface.

### Measuring points on the map

To measure data points on the map:

- Zoom and pan the map to display the points you want to measure.
- Click **Ruler**.

The **Ruler** button toggles to **Click Start Point**.

- On the map, click the first point.

The system places a start point designator at the location you chose. The **Click Start Point** button toggles to **Click End Point**.

- Click the second point.

The **Click End Point** button toggles to **Reset** and the system places a designator at your second selection. It also displays the distance like this example:



- To remove these pins from the map click **Reset**.

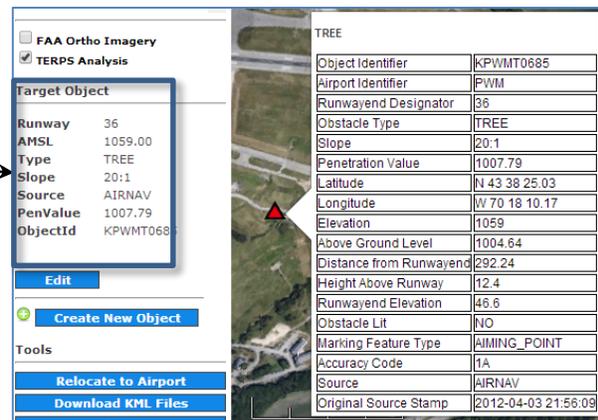
## Selecting and editing penetrating objects

You can edit data for each penetrating object. Although the system refreshes the maps and data tables to reflect your change, your change is limited to what you see on the screen and is not submitted to FAA. The system saves your edits and lists them by their object identifier in tables on the **Verification**, **Penetration Report**, **Compliance Plan**, and **Mitigation Summary** tabs.

1. To view data for any object indicated by a symbol on the map, click the object symbol. If two objects overlap, the system pops them up so you can easily select the object you prefer.

A pop-up appears with the details for that object. This example shows the data table for the selected tree.

The **Target Object** pane to the left of the map lists data for this tree.



The screenshot shows a map interface with a red triangle symbol on a tree. To the left is a 'Target Object' pane with the following data:

|          |          |
|----------|----------|
| Runway   | 36       |
| AMSL     | 1059.00  |
| Type     | TREE     |
| Slope    | 20:1     |
| Source   | AIRNAV   |
| PenValue | 1007.79  |
| Objectid | KPWMT068 |

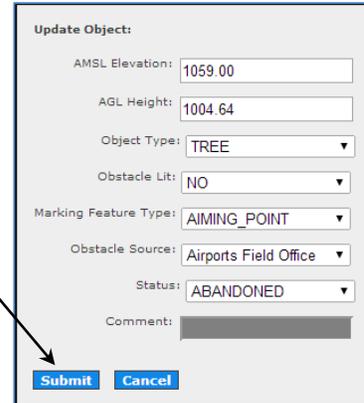
Below the 'Target Object' pane are buttons for 'Edit', 'Create New Object', 'Relocate to Airport', and 'Download KML Files'. To the right of the map is a detailed data table for the selected tree:

|                         |                     |
|-------------------------|---------------------|
| TREE                    |                     |
| Object Identifier       | KPWMT0685           |
| Airport Identifier      | PWM                 |
| Runwayend Designator    | 06                  |
| Obstacle Type           | TREE                |
| Slope                   | 20:1                |
| Penetration Value       | 1007.79             |
| Latitude                | N 43 38 25.03       |
| Longitude               | W 70 18 10.17       |
| Elevation               | 1059                |
| Above Ground Level      | 1004.64             |
| Distance from Runwayend | 292.24              |
| Height Above Runway     | 12.4                |
| Runwayend Elevation     | 46.6                |
| Obstacle Lit            | NO                  |
| Marking Feature Type    | AIMING_POINT        |
| Accuracy Code           | 1A                  |
| Source                  | AIRNAV              |
| Original Source Stamp   | 2012-04-03 21:58:09 |

2. To remove the table from view, click anywhere outside the displayed box on the map. Note the information for the object remains in the **Target Object** field until you click another object.
3. When data for the object you want to edit appears in the **Target Object** pane, click **Edit**.

The **Update Object** box displays the object data. For information about any of these fields, see [AC 150/5300-18, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System \(GIS\) Standards](#).

4. Edit the data in the **Update Object** box and click **Submit**.



The screenshot shows a form titled "Update Object" with the following fields and values:

| Field                 | Value                 |
|-----------------------|-----------------------|
| AMSL Elevation:       | 1059.00               |
| AGL Height:           | 1004.64               |
| Object Type:          | TREE                  |
| Obstacle Lit:         | NO                    |
| Marking Feature Type: | AIMING_POINT          |
| Obstacle Source:      | Airports Field Office |
| Status:               | ABANDONED             |
| Comment:              |                       |

At the bottom of the form are two buttons: "Submit" and "Cancel". An arrow points from the "Submit" button in the text above to the "Submit" button in the form.

The system updates the data for this object and redraws the map.

## Creating a new object

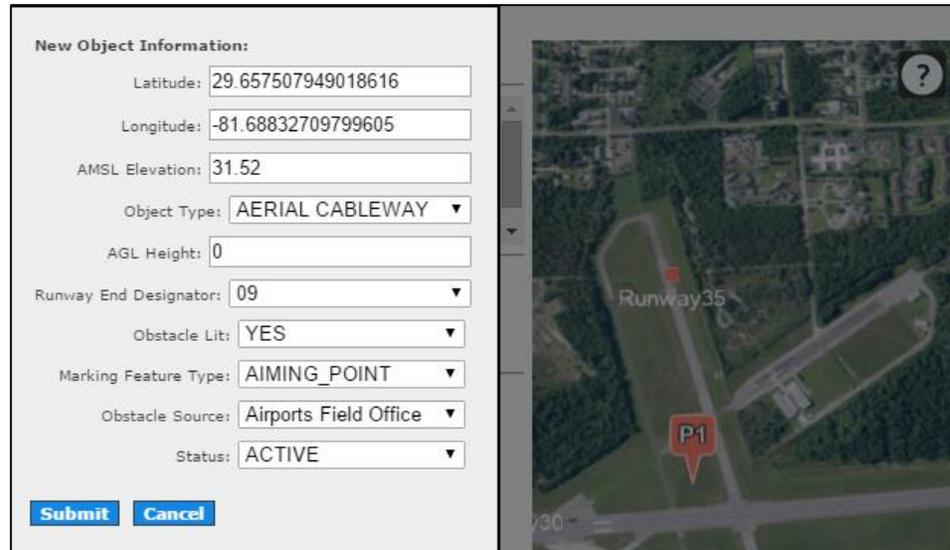
When you create a new penetrating object, the system applies a unique number – the object identifier – to the object and updates the displayed maps and data tables to reflect your change. It also adds this object to tables in the **Verification**, **Penetration Report**, **Compliance Plan**, and **Mitigation Summary** tabs. Your change is limited to what you see on the screen and is not submitted to the FAA.

1. Click **Create New Object**.

The button toggles to **Creating Objects**.

2. Zoom and pan the map to display the location of the object.
3. Double click the object location.

The system places a pin on the map and displays the **New Object Information** box. The system automatically updates the **Latitude**, **Longitude**, **AMSL** (above mean sea level) **Elevation** and **Runway End Designation** fields. The rest of the fields show default values like the example below. For information about any of these fields, see [AC 150/5300-18](#).



The image shows a software interface for adding a new object. On the left is a form titled "New Object Information" with the following fields:

- Latitude: 29.657507949018616
- Longitude: -81.68832709799605
- AMSL Elevation: 31.52
- Object Type: AERIAL CABLEWAY (dropdown)
- AGL Height: 0
- Runway End Designator: 09 (dropdown)
- Obstacle Lit: YES (dropdown)
- Marking Feature Type: AIMING\_POINT (dropdown)
- Obstacle Source: Airports Field Office (dropdown)
- Status: ACTIVE (dropdown)

At the bottom of the form are "Submit" and "Cancel" buttons. On the right is a satellite map showing an airport area with a red pin labeled "P1" and a runway labeled "Runway35".

4. Update all of the fields.

**Note:** To assign the AMSL Elevation value, the system applies the elevation at the point you selected. The system assumes this value represents the elevation of the base of the object. When you insert an AGL (above ground level) height, the system adds this height to the AMSL Elevation. Adjust these values as necessary to reflect the AMSL of the top of the object.

5. Click **Submit**.

The system refreshes the maps and data tables on the screen to show the new object.

## Verifying Objects

The **Verification** tab lists every object penetrating a surface at your airport. The table lists objects by risk level starting with the highest risk penetrations descending to the lowest risk. From this tab, you can verify the object type, location, and risk level.

| Object Identifier                         | Object Type       | Object Verification<br><a href="#">Write Comment</a> |                                 | Latitude      | Longitude      | Risk Level |
|---|-------------------|--|---------------------------------|---------------|----------------|------------|
| <a href="#">KBUR0002</a><br>(20:1 Slope)  | OL ON BLAST FENCE | <input checked="" type="radio"/> Valid               | <input type="radio"/> Not Valid | N 34 11 51.49 | W 118 20 56.61 | Medium     |
| <a href="#">06-030549</a><br>(20:1 Slope) | FENCE             | <input checked="" type="radio"/> Valid               | <input type="radio"/> Not Valid | N 34 11 51.49 | W 118 20 56.61 | Medium     |
| <a href="#">KBURT0068</a><br>(20:1 Slope) |                   |  | <input type="radio"/> Not Valid |               |                | Medium     |
| <a href="#">06-030634</a><br>(20:1 Slope) |                   |  | <input type="radio"/> Not Valid |               |                | Medium     |
| <a href="#">KBUR0023</a><br>(20:1 Slope)  |                   |  | <input type="radio"/> Not Valid | N 34 11 52.58 | W 118 22 12.86 | Medium     |
| <a href="#">06-030515</a><br>(20:1 Slope) |                   |  | <input type="radio"/> Not Valid | N 34 11 52.22 | W 118 20 56.52 | Medium     |

To enter and post a new note for an object, select any blue hyperlink for that object, and see [Logging and sharing notes](#).

Mark an object as valid or not valid.

## Invalidating objects

You can specify whether an object is valid and notify AirNav or Airports GIS about the actual status of the penetration.

- To invalidate an object, click **Not Valid**.

After you select the Not Valid radio button for an object, click the [Write Comment](#) hyperlink under the **Object Verification** column heading.

The following dialog box appears:

Removed  Lowered  Lighted  Other

Do you want to change the values for all of the selected objects?

This function only applies on writing multiple comments on the objects with same action.

- Specify whether the object is **Removed**, **Lowered**, **Lighted**, or **Other**, and type an explanation in the text box.

3. Click **Yes**.
4. After you have confirmed and updated the status of each object penetration, you submit your complete verification plan by clicking **Submit Verification Plan**.

The system displays the following:



5. Click **Yes**.

The tool sends a notification email to the source of the object data, AirNav, or Airports GIS with the information you specified for each invalid object.

## Reviewing Surface Penetration Reports

The **Penetration Report** tab lists, by the severity of risk level, object penetrations on every surface submitted for analysis. You will also find any object you have updated or created which penetrates a defined surface.

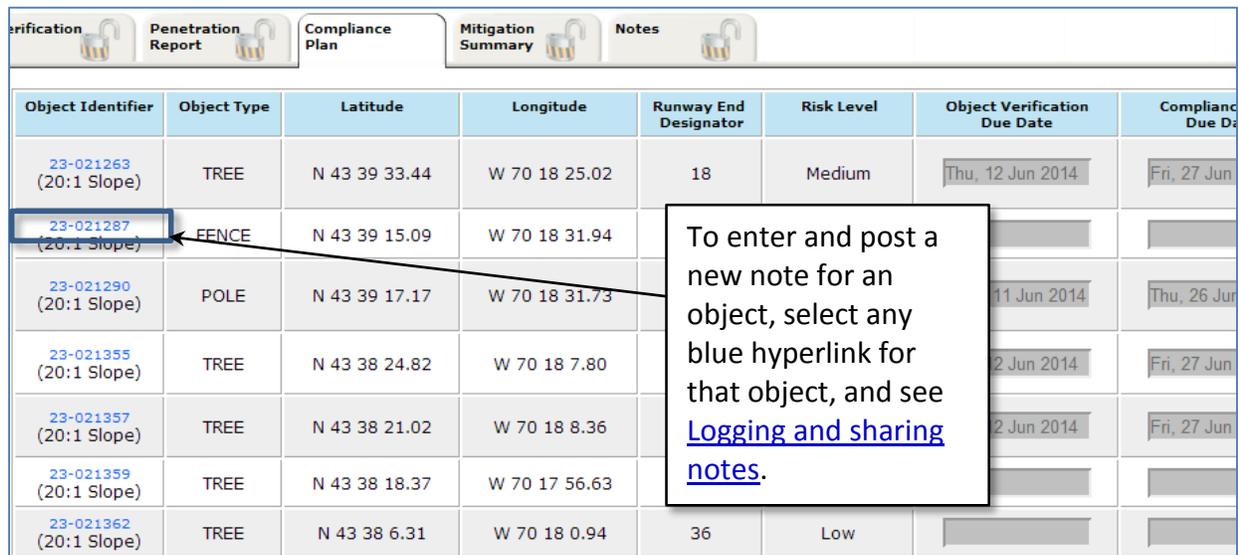
| Object Identifier                         | Object Type       | Latitude      | Longitude      | Runway End Designator | Risk Level | Penetrates      | Penetration |
|---|-------------------|---------------|----------------|-----------------------|------------|-----------------|-------------|
| <a href="#">KBUR0024</a><br>(20:1 Slope)  | TREE              | N 34 11 55.42 | W 118 22 13.77 | 08                    | High       | 20:1 Surface(s) | 29.14 feet  |
| <a href="#">KBURT0008</a><br>(20:1 Slope) | TREE              | N 34 11 56.28 | W 118 22 13.79 | 08                    | High       | 20:1 Surface(s) | 19.98 feet  |
| <a href="#">06-030505</a><br>(20:1 Slope) | BLDG              | N 34 11 55.86 | W 118 22 14.19 | 08                    | High       | 20:1 Surface(s) | 12.34 feet  |
| <a href="#">KBURT0009</a><br>(20:1 Slope) | BLDG              | N 34 11 55.86 | W 118 22 14.19 | 08                    | High       | 20:1 Surface(s) | 12.34 feet  |
| <a href="#">KBUR0002</a><br>(20:1 Slope)  | OL ON BLAST FENCE | N 34 11 51.49 | W 118 20 56.61 | 26                    | Medium     | 20:1 Surface(s) | 10.2 feet   |
| <a href="#">06-030634</a><br>(20:1 Slope) | POLE              | N 34 11 53.34 | W 118 20 56.32 | 26                    | Medium     | 20:1 Surface(s) | 8.14 feet   |
| <a href="#">KBUR0027</a><br>(20:1 Slope)  | TREE              | N 34 11 56.65 | W 118 22 20.61 | 08                    | Medium     | 20:1 Surface(s) | 7.31 feet   |
| <a href="#">KBUR0023</a><br>(20:1 Slope)  | RD(N)             | N 34 11 53.58 | W 118 22 12.86 | 08                    | Medium     | 20:1 Surface(s) | 7.21 feet   |
| <a href="#">06-030515</a><br>(20:1 Slope) | FENCE             | N 34 11 52.22 | W 118 20 56.52 | 26                    | Medium     | 20:1 Surface(s) | 6.88 feet   |

To enter and post a new note for an object, select any blue hyperlink for that object, and see [Logging and sharing notes](#).

## Establishing and Submitting Penetration Compliance Plans

Except for objects you define as “Not Valid” on the **Verification** tab, the table on the **Compliance Plan** tab reports every object penetrating the surfaces you defined and submitted under the **Airport** tab, any penetrating objects you edited or created under the **Visualization** tab, and any TERPS or other penetrating objects created by the FAA. The table lists all objects by severity of risk level from highest to lowest severity. On the **Compliance Plan** tab you can review verification, compliance, and mitigation completion dates for each object and indicate the type of mitigation action you plan to take for each object.

The system automatically generates the dates you see on this tab. For more information about these dates and your obligations for responding to your Flight Procedure Team regarding penetrations, see the [Airports GIS online help for the Compliance Plan tab](#).<sup>1</sup>



| Object Identifier                         | Object Type | Latitude      | Longitude     | Runway End Designator | Risk Level | Object Verification Due Date | Compliance Due Date |
|---|-------------|---------------|---------------|-----------------------|------------|------------------------------|---------------------|
| <a href="#">23-021263</a><br>(20:1 Slope) | TREE        | N 43 39 33.44 | W 70 18 25.02 | 18                    | Medium     | Thu, 12 Jun 2014             | Fri, 27 Jun 2014    |
| <a href="#">23-021287</a><br>(20:1 Slope) | FENCE       | N 43 39 15.09 | W 70 18 31.94 |                       |            |                              |                     |
| <a href="#">23-021290</a><br>(20:1 Slope) | POLE        | N 43 39 17.17 | W 70 18 31.73 |                       |            | 11 Jun 2014                  | Thu, 26 Jun 2014    |
| <a href="#">23-021355</a><br>(20:1 Slope) | TREE        | N 43 38 24.82 | W 70 18 7.80  |                       |            | 2 Jun 2014                   | Fri, 27 Jun 2014    |
| <a href="#">23-021357</a><br>(20:1 Slope) | TREE        | N 43 38 21.02 | W 70 18 8.36  |                       |            | 2 Jun 2014                   | Fri, 27 Jun 2014    |
| <a href="#">23-021359</a><br>(20:1 Slope) | TREE        | N 43 38 18.37 | W 70 17 56.63 |                       |            |                              |                     |
| <a href="#">23-021362</a><br>(20:1 Slope) | TREE        | N 43 38 6.31  | W 70 18 0.94  | 36                    | Low        |                              |                     |

### Removing, lowering, lighting or specifying no action for objects

You must supply an explanation for each type of mitigation you plan to take for each object. Your explanation might apply to more than one surface penetration. You can apply the same mitigation explanation to groups of objects

<sup>1</sup> <https://airports-gis.faa.gov/public/twenty2oneHelp/contents/twenty2one/compliancePlan.html>

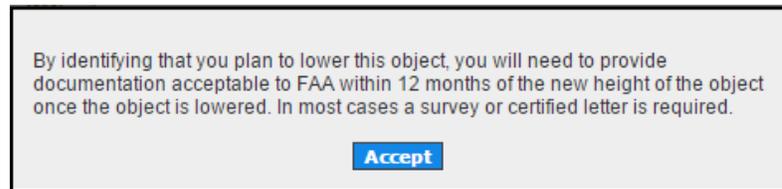
except for trees or lowered objects. You must separately address any object ID identified as a tree.

To lower any object you must be prepared to upload a survey or certified letter defining the height of the object after you lower it.

### Lowering objects

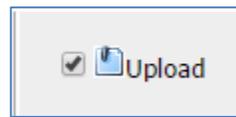
1. For an object you need to lower, including trees, select **Lower**.

The following displays:



2. Click **Accept**.

The  **Upload** icon appears next to the check box in the table:

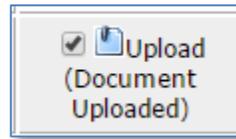


3. Click  **Upload**.

The following displays:

4. To browse for and select for your supporting documentation, click **Choose File**, navigate to your file and select it.
5. Type a description of the file, and click **Submit**.

The table updates to show you have uploaded the document:



- Repeat this process for each object you need to lower.

### Removing, lighting, or specifying no action for objects not identified as trees

Your reasons for certain mitigations might apply to groups of object IDs. Except for lowering an object or for trees, you can apply the same comment to a group of object IDs.

- For each object not identified as a tree, select **Remove**, **Light**, or take **No Action**. Continue to select radio buttons for all object IDs with similar mitigation reasons.

| Remove<br>Add<br>Comment | Lower<br>Add<br>Comment  | Light<br>Add<br>Comment  | No Action<br>Add<br>Comment |
|--------------------------|--------------------------|--------------------------|-----------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>    |

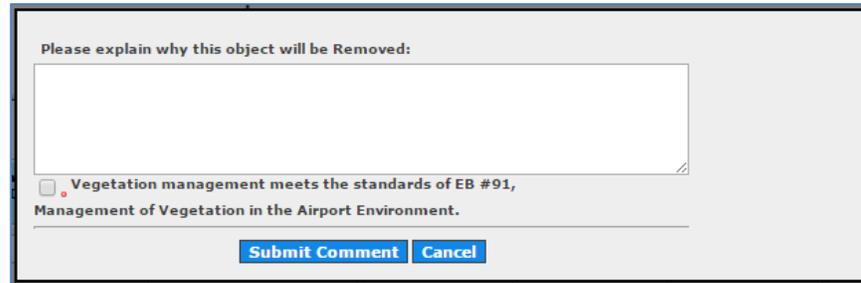
- Click the [Add Comment](#) hyperlink at the top of any row, and in the displayed box or boxes type a comment explaining the removal, lighting, or no action activities for the checked object IDs. Add any details you think clarify your decision. For objects you plan to light, check the **Object lit according to the standards of AC 70/7460-1, Obstruction Marking and Lighting** box.
- To save your entries click [Submit Comment](#).
- The system adds the [Show Comment](#) hyperlink under the object IDs. To view your explanations for any object, click this hyperlink.

### Removing, lighting, or specifying no action for objects identified as trees

You must apply removal, lighting, or non-action mitigations to each tree individually. Like other objects, to lower a tree, you must be prepared to upload a survey or certified letter defining the height of the tree after you lower it. To lower a tree, see [Lowering objects](#).

- For an object ID identified as a tree, click the **Remove**, **Light**, or **No Action** radio button.

A box like the following appears. If you specified **No Action**, the box will not include the **Vegetation management** option.



The screenshot shows a dialog box with a light gray background. At the top, it says "Please explain why this object will be Removed:". Below this is a large, empty text input area. Underneath the input area, there is a checkbox that is currently unchecked. To the right of the checkbox, the text reads "Vegetation management meets the standards of EB #91, Management of Vegetation in the Airport Environment." At the bottom of the dialog box, there are two buttons: "Submit Comment" and "Cancel".

2. Type an explanation, click the **Vegetation management meets the standards of EB #91** option, and click **Submit Comment**.

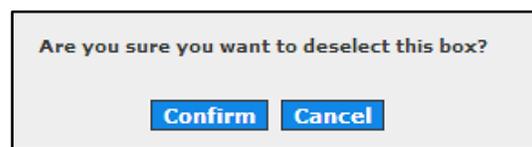
The system adds the [Show Comment](#) hyperlink under this object ID. To view your explanations for any object, click this hyperlink.

3. Repeat these steps for every tree.

## Removing a mitigation designation

You can remove a mitigation you previously assigned to remove, lower, light, or take no action for an object using the steps below.

1. To remove a previously assigned mitigation, click the checked box in the **Remove, Lower, Light, or No Action** column for the corresponding object.



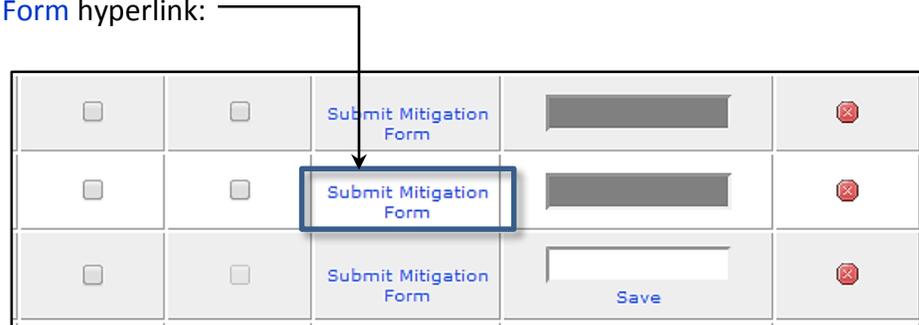
The screenshot shows a confirmation dialog box with a light gray background. The text inside the box asks "Are you sure you want to deselect this box?". At the bottom of the dialog box, there are two buttons: "Confirm" and "Cancel".

2. Click **Confirm**.

## Submitting a request for an alternate mitigation

For mitigations involving full scale deflection, restrictions of Category C and D minimums at night, or a restricted access road, you can submit an alternate mitigation request.

1. In the **Other** column of the designated object, click the [Submit Mitigation Form](#) hyperlink:



The following form appears. Define your mitigation in the top portion of the form. The middle portion is for the responsible FAA Airports Division Official for your airport. The lower portion is for the responsible FAA Flight Procedure team for your airport.

Select the type of mitigation you are requesting to use

|  |  |  |
|--|--|--|
| <input type="checkbox"/> Utilize VGSJ                  | <input type="checkbox"/> Restrict Category C and D minimums at night |  |
| <input type="checkbox"/> Utilize Full Scale Deflection | <input type="checkbox"/> Restricted Access Road                      |  |

Is this a request for temporary or permanent exemption?

|  |                                 |   |
|--|---------------------------------|---|
| <input checked="" type="radio"/> Permanent | <input type="radio"/> Temporary | Start Date: <input type="text" value="Mon, 08 Dec 2014"/> |
|--|---------------------------------|---|

**Responsible Airport Official**

|   |  |  |
|---|--|--|
| Full Name: <input type="text" value="Linda Mooring"/> | Position: <input type="text" value="Airport Sponsor"/> | Date of Request: <input type="text" value="Mon, 08 Dec 2014"/> |
|---|--|--|

[Save](#) [Submit](#) [Cancel](#)

**Responsible FAA Airports Division Official**

|                                 |                                |  |
|---------------------------------|--------------------------------|--|
| Full Name: <input type="text"/> | Position: <input type="text"/> | Date of Request: <input type="text" value="Mon, 08 Dec 2014"/> |
|---------------------------------|--------------------------------|--|

Comment:

ADO/Region Acknowledgement of Receiving Mitigation Request

**Responsible FAA Flight Procedure Team**

|                                 |                                |  |
|---------------------------------|--------------------------------|--|
| Full Name: <input type="text"/> | Position: <input type="text"/> | Date of Request: <input type="text" value="Mon, 08 Dec 2014"/> |
|---------------------------------|--------------------------------|--|

Comment:

FPT Acknowledgement of Receiving Mitigation Request

[Back](#)

2. To cancel and erase the data in this form at any time, click **Cancel**.
3. Select the type of mitigation you are requesting to use by clicking the checkboxes for any combination of the following options:

Utilize VGSI  
 Utilize Full Scale Deflection [What's this](#)       Restricted Access Road

- **Utilize VGSI** (See step 4 below)
- **Utilize Full Scale Deflection**
- **Restricted Access Road**

4. If your mitigation requires the use of a VGSI, you will need to submit the VGSI form located in the **Utilities** section by doing the following:

- a. Click the [Submit VGSI Form](#) hyperlink under the **Utilities** pane.

The following box displays:

Please provide the runway(s) that you are requesting VGSI mitigation.

- b. Select the runway for which you wish to submit the VGSI form and click .

A form like the following showing the runway numbers at your airport displays:

Do you desire to retain/establish night minimums?  Yes  No

Do you request use of the VGSI to mitigate the hazard associated with the unlit obstacle(s)?  Yes  No

Please provide the runway(s) that you are requesting VGSI mitigation.  15  33  26  08

Who owns the VGSI equipment? (e.g. Airport, FAA, etc.)  Airport  FAA  State  Other

Date VGSI equipment was commissioned?

Did FAA Flight Inspection commission the VGSI?  Yes  No

What is the commissioned VGSI Glide Path Angle (GPA)?  Please input decimal in 2 digits. Ex: 3.20

What is the commissioned VGSI Threshold Crossing Height (TCH)?  ft. Please put number between 0-80

Does the VGSI equipment currently meet obstruction clearance standards?  The VGSI equipment meets the obstruction clearance standards specified in the current version of FAA Order 6850.2, Visual Guidance Lighting Systems and Advisory Circular 150/5340-30, Design and Installation Details for Airport Visual Aids. [What's This?](#)

- c. Complete the form. For detailed information about mitigating VGSI penetrations, please see [FAA Order 6850.2B, Visual Guidance Lighting Systems, AC 150/5340-30, Design and Installation Details for Airport Visual Aids](#), and [FAA TI 8200.52](#),

[Flight Inspection Handbook](#). The system saves your changes as you work and will prompt you for more information and dates when necessary.

- d. To save but not submit your VGSI form, click **Save**.
- e. When you have completed the form, type your password and click **Submit**.
- 5. To designate this mitigation as a permanent condition, select **Permanent** and specify a start date to indicate when you plan to implement the mitigation.

Is this a request for temporary or permanent exemption?  Permanent  Temporary

- 6. To designate this mitigation as a temporary condition, select **Temporary** and specify a start and end date for the mitigation.

Temporary      Start Date   End Date

If you are not ready to submit your changes you can save your edits and return to the system to complete the process.

- 7. To save (and not submit) your edits, click **Save**.

The system saves your edits. On the **Compliance Plan** page (click the **Compliance Plan** tab), the word “Pending” appears under the [Submit Mitigation Form](#) hyperlink for the object.



You can return to the tool any time to complete and submit the form.

- 8. When your form is complete, to submit to your designated FAA Airports Division Official and Flight Procedure team the changes you applied to the mitigation request form, if necessary, return to the form by clicking its [Submit Mitigation Form](#) link and click **Submit**.

The system asks you to confirm your submittal.

- 9. To confirm your submittal, click **Yes**.

The system sends email notifications alerting the FAA about the request you submitted. On the **Compliance Plan** page (click the **Compliance Plan** tab) the word "Completed" appears under the [Submit Mitigation Form](#) hyperlink for the object.



10. To return to the object table in the **Compliance Plan** tab, click the **Compliance Plan** tab or scroll down to the bottom of the Mitigation Request Form page and click the **Back** button.

## Submitting a compliance plan

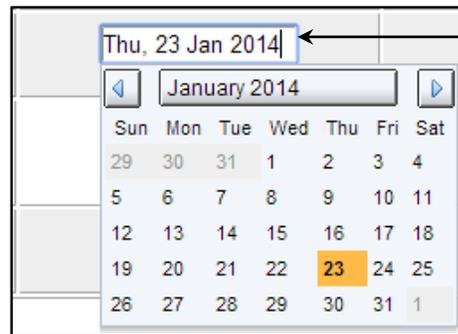
After you have specified a compliance method, added comments for each identified object penetration, and set the Mitigation Completion date for all object IDs, at the bottom of the Compliance Plan page, you can submit your plan to the appropriate FAA offices. To send your plan to the appropriate FAA offices, select **Submit Compliance Plan**. (This button is gray and unavailable until you complete or submit all of the necessary data for each object ID.) The system submits the compliance plan to the appropriate FAA Offices.

**Note:** You must submit the compliance plan to the FAA as soon as possible but no later than 30 days from the date FAA receives validation of the object penetration.

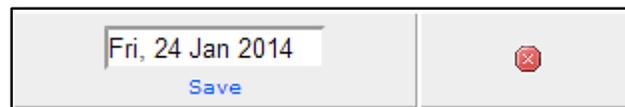
## Setting a Completion Date for a Mitigation

After you finish mitigation actions (to remove, lower, light, take no action, or perform an alternative mitigation) for an object, do the following to set the completion date:

1. If necessary, navigate to the **Compliance** tab, display the object table, and scroll the list to view the object identifier.
2. To set the mitigation date, in the **Mitigation Complete Date** column for that object, select or type the date.



3. **Important:** under the date, click [Save](#).

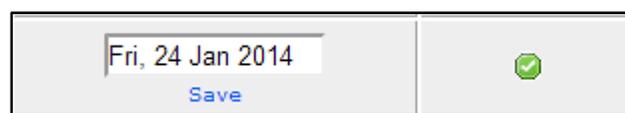


The system asks you to confirm the date like in this example:



4. Click **Yes**.

The system accepts the date and changes the red "X" in the **Completed** column to a green check mark like this example:



## Reviewing the Mitigation Summary and Accepting Object Updates

The **Mitigation Summary** tab provides an overview of the mitigation and verification status of all objects identified as surface penetrations. The information is available on two tabs. Find information and review the status of each object ID on the **Object Information** tab. On the **Mitigation Information** tab, you can save compliance changes to file, confirm and accept updates, request an FAA return service for your mitigation plan, and save changes to the FAA database.

For more information about each column on this page, see the [Airports GIS online help for the Mitigation Summary Plan tab](#).<sup>2</sup>

| Object Information   |                          | Mitigation Information |                 |            |                    |              |               |                |
|----------------------|--------------------------|------------------------|-----------------|------------|--------------------|--------------|---------------|----------------|
| Object Identifier    | Object Type              | Runway End Designator  | Surface         | Risk Level | Penetration Amount | MSL          | Latitude      | Longitude      |
| 06-AIRPORTSGIS-94449 | AMUSEMENT PARK STRUCTURE | 08                     | 20:1 Surface(s) | High       | 519.25 feet        | 7285.47 feet | N 34 15 38.39 | W 116 51 50.72 |
| 06-036837            | POLE                     | 26                     | 20:1 Surface(s) | Medium     | 6.5 feet           | 6789.00 feet | N 34 15 47.57 | W 116 50 44.28 |
| KL35L056             | TREE                     | 26                     | 20:1 Surface(s) | Medium     | 4.14 feet          | 6965.00 feet | N 34 15 46.38 | W 116 50 25.61 |

1. To add notes to an object, on the **Object Information** tab click the object's hyperlink (see [Logging and sharing notes](#)).
2. Click **Mitigation Information**.

The Mitigation Information tab is displayed:

| Compliance Plan Status |   | Mitigation Request Status | Mitigation Completion Date | Updates Accepted |
|------------------------|---|---------------------------|----------------------------|------------------|
| Lit                    |   | N/A                       | Wed, 4 Mar 2015            | No               |
| Lowered                | <a href="#">(Click to see the uploaded files)</a> | N/A                       | Wed, 11 Mar 2015           | No               |
| Removed                |   | N/A                       | Thu, 12 Mar 2015           | No               |

[Save Changes to File](#)
[Confirm and Accept Updates](#)
[Request FAA Return Service or Capability](#)
[Save FAA Database Update Data](#)

3. If applicable, to review a pending mitigation request status, click the [Filed Mitigation Request](#) hyperlink for that object.
4. To save all changes to file, click **Save Changes to File**, and click **Yes** in the dialog box.

<sup>2</sup> <https://airports-gis.faa.gov/public/twenty2oneHelp/contents/twenty2one/mitigationSummary.html>

5. To confirm all updates made to any object including any new objects, at the bottom of the page click **Confirm and Accept Updates**, and in the displayed box click **Accept**.

Note: If authorized FAA personnel have added surfaces to analyze, the system adds a message directing you to check the parameters for this surface. To see who created surfaces on your airport, click **Cancel**, go to the **Airport** tab, and then click the hyperlinks in the **Runway** column.

6. To alert the FAA about your mitigation, do the following:

- a. Click **Request FAA Return Service or Capability**.

The following form displays:

Please indicate why you are requesting the FAA to return service:

Mitigation of All indicated risk category Penetrations is complete:  High  Medium

Mitigation of All Category A/B area penetrations is complete:

Supporting Runway(s):  08  26

Mitigation of all identified Obstacle Penetrations is complete:

**Send Request** **Cancel**

- b. Select applicable options, and click **Send Request**.

The system sends your request via email to applicable FAA offices.

7. To save object ID changes to the FAA database, click **Save FAA Database Update Data** and in the displayed box, click **Yes**.

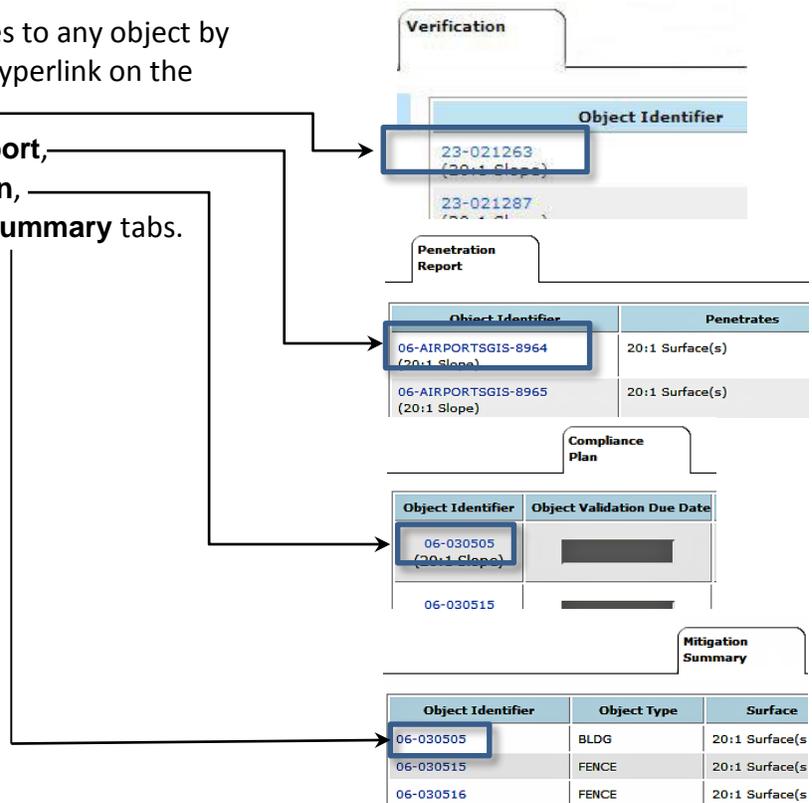
## Reviewing and Replying to Surface Analysis and Visualization Notes



The **Notes** tab lists all of the notes entered for each object. Enter notes for each object using hyperlinked object identifiers on the **Verification**, **Penetration Report**, **Compliance Plan**, and **Mitigation Summary** tabs. Each note includes the name of the person submitting the note, and the date and time the note was submitted.

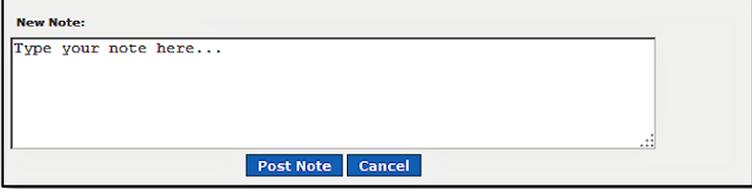
### Logging and sharing notes

You can add notes to any object by clicking its blue hyperlink on the **Verification**, **Penetration Report**, **Compliance Plan**, and **Mitigation Summary** tabs.



### Adding notes

- To add a note to an object, click the object's hyperlink from one of the above tabs or to add a new note, on the **Notes** tab, click the **Post new note** hyperlink.



The image shows a 'New Note' dialog box. It features a title bar with the text 'New Note:'. Below the title bar is a large text input area containing the placeholder text 'Type your note here...'. At the bottom of the dialog, there are two buttons: 'Post Note' and 'Cancel'.

2. In the New Note box, type your note and click **Post note**.

The **Notes** tab displays. Your note appears at the bottom of the list.

## Replying to notes

You can reply to any note by clicking the [Reply](#) hyperlink below the note on the **Notes** tab.

## Further Reading

- [AC 70/7460-1, Obstruction Lighting and Marking](#)
- [AC 150/5300-18, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System \(GIS\) Standards](#)
- [Engineering Brief #91, Management of Vegetation in the Airport Environment](#)



**U.S. Department  
of Transportation**  
Federal Aviation  
Administration