

**WESTCHESTER COUNTY AIRPORT**

**MASTER PLAN UPDATE**

**CHAPTER VI: AIRPORT LAYOUT PLAN  
DRAWING SET DESCRIPTION**

***FINAL REPORT***

***DECEMBER 2017***

***PREPARED BY:***



## Table of Contents

<b>6</b>	<b>AIRPORT LAYOUT PLAN DRAWING SET DESCRIPTION .....</b>	<b>6-1</b>
6.1	AGIS Survey .....	6-1
6.2	Airport Layout Plan .....	6-2
6.2.1	Runway System .....	6-2
6.2.2	Taxiway System .....	6-3
6.2.3	Line of Sight .....	6-4
6.2.4	Property Easement/Acquisition .....	6-4
6.3	Airspace Drawings .....	6-5
6.3.1	Inner Portion of the Approach Surface Drawings .....	6-5
6.4	Airspace / Approach Obstruction Identification .....	6-6
6.5	Building Restriction Line .....	6-7
6.6	Terminal Area Drawing .....	6-7
6.7	Land Use Map .....	6-7
6.8	Airport Property Map Exhibit A .....	6-8

## 6 AIRPORT LAYOUT PLAN DRAWING SET DESCRIPTION

According to the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, an Airport Layout Plan (ALP) outlines a blueprint for airport development by depicting proposed facility improvements. The ALP provides guideline by which the airport sponsor can ensure that development adheres to airport design standards and safety requirements, and is consistent with airport and community land use plans. The ALP is a public document and once approved, it enables the airport sponsor and the FAA to plan for facility improvements at the airport.

The airport master plan procedures dictate that the FAA review the set of ALP documents, in addition to the aviation activity forecast, to determine whether appropriate for approval. The Westchester County Airport (HPN) Master Plan Update Aviation Activity Forecast, described in Chapter 3, was approved in September 2015 by the FAA New York Airports District Office (NYADO). The demand levels from the approved aviation activity forecast were translated into facility requirements in Chapter 4. The facility requirements served as the basis for the development of the proposed airport layout associated with the preferred alternative identified in Chapter 5.

The ALP drawing set for the Westchester County Airport Master Plan Update is comprised of 12 illustrations, as follows:

1. Cover Sheet
2. Existing Airport Layout Drawing
3. Airport Airspace Drawing #1
4. Airport Airspace Drawing #2
5. Runway 16 Inner Portion of the Approach Surface Drawing
6. Runway 34 Inner Portion of the Approach Surface Drawing
7. Runway 11 Inner Portion of the Approach Surface Drawing
8. Runway 29 Inner Portion of the Approach Surface Drawing
9. Proposed Airport Layout Drawing
10. Terminal Area Drawing
11. Land Use Drawing
12. Exhibit “A” Airport Property Inventory Map

### 6.1 AGIS Survey

The information utilized to support the development of the ALP was collected during an aeronautical survey of HPN. The survey was officially verified by the National Oceanic and Atmospheric Administration’s National Geodetic Survey (NGS) in December 2014. The imagery used to develop the survey data was collected in September 2012, under the project name HPN-137464. The goal of this project was to provide highly accurate survey data and planimetric data for the Airport. The following Advisory Circulars detail the data collection requirements and accuracies for the project and the verification process by the FAA and the NGS:

- AC 150/5300-16A “General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey”
- AC 150/5300-17C “Standards for Using Remote Sensing Technologies in Airport Surveys”
- AC 150/5300-18B “General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Airport Survey Data Collection and Geographic Information System (GIS) Standards”

The survey type utilized was Vertically Guided and it used existing PACS – ARP HPN (LX7500), SACS – HPN AP STA A (AE2411) and HPN C (AJ8916) for geodetic control. The final deliverables (i.e. shape files, imagery and final report) were delivered to Westchester County through external drive<sup>1</sup>.

## 6.2 Airport Layout Plan

The ALP drawing set includes drawings of both the existing and proposed airport facilities (drawing numbers 2 and 9). The major proposed changes to the existing airfield, along with a description of the airport design criteria used for the runway and taxiway systems in the existing ALP and proposed ALP, are described in the section below. The design criteria were translated into the dimensions of the proposed facilities as shown in the proposed ALP drawing.

### 6.2.1 Runway System

#### 6.2.1.1 Runway 16/34

**Airport Reference Code (ARC) Dimensional Criteria-** Runway 16/34 is currently designed to Airport Reference Code (ARC) D-III design criteria. The proposed ALP illustrates the Airport’s maintenance of standards in accordance with ARC D-III design criteria.

**Runway Width and Length-**The dimensions of Runway 16/34 will be maintained at 150 feet in width and 6,549 feet in length. The proposed ALP includes the addition of a 25 foot shoulder to the runway.

**Pavement Strength-** The existing pavement strength for Runway 16/34 (120,000 lbs for dual wheel and dual tandem) will be maintained.

**Instrument Approach Procedures (IAPs)-** The approach minimum for Runway 16 will remain lower than  $\frac{3}{4}$  mile and not lower than 1 mile for Runway 34.

**Runway Protection Zone (RPZ) -** The existing RPZ for Runway 16 will be maintained at 2,500 feet x 1,000 feet x 1750 feet. The existing RPZ for Runway 34 will be maintained at 1,700 feet x 500 feet x 1,010 feet.

**Lighting and Navigation Aids -** It is proposed that the High Intensity Runway Lights (HIRL), Precision Approach Path Indicator (PAPI), Runway End Identifier Light (REILs) for Runway 34, Touchdown Zone Lights (TDZL) and Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) for Runway 16 will be maintained as currently exist.

---

<sup>1</sup> Additional documentation including the survey’s Statement of Work and Final Report can be found on the FAA AGIS portal.

### 6.2.1.2 Runway 11/29

**Dimensional Criteria-** Runway 11/29 is currently designed to Airport Reference Code (ARC) B-II design criteria for visual operations only. The proposed ALP illustrates the Airport's maintenance of standards in accordance with ARC B-II design criteria.

**Runway Width and Length-** The existing width of Runway 11/29 at 150 feet exceeds the ARC B-II design criteria. As a result, the Runway 11/29 width has been decreased to 100 feet in the proposed ALP. A width of 100 feet for Runway 11/29 still exceeds the FAA AC 5300-13A requirement of 75 feet for B-II visual runways, however, 100 feet is the width required to accommodate slightly larger aircraft such as those in the B-III or C-II categories. The length of Runway 11-29 will remain at 4,451'.

**Pavement Strength-** The existing pavement strength for Runway 11/29 (70,000 lbs for single wheel, 120,000 lbs for dual wheel and dual tandem) will be maintained. The extra pavement associated with the decrease of the runway's width will be removed.

**Instrument Approach Procedures (IAPs)-** Runway 11 and 29 are both visual runways.

**Runway Protection Zone (RPZ)-** The existing RPZ will be maintained at 1000 feet x 500 feet x 700 feet.

**Lighting and Navigation Aids-** It is proposed that the Medium Intensity Runway Lights (MIRL), Precision Approach Path Indicator (PAPI) for Runway 11, Runway End Identifier Light (REILs) for Runway 11 will be maintained as currently exists. In addition, it is recommended to install a PAPI and REILS at Runway 29 for better visual guidance.

## 6.2.2 Taxiway System

The proposed ALP includes various improvements to the existing taxiway system at HPN. The taxiway naming has been revised as well, due to the additional taxiways in the proposed layout. The development recommendations for the Airport's taxiway system are as follows:

### 6.2.2.1 Runway 16/34 Taxiway System

**Dimensions-** The proposed ALP will maintain the dual parallel taxiway system to both the east and west sides of Runway 16/34. Taxiway L will be relocated and realigned with Runway 16/34 at a distance from the runway centerline that is compliant with ADG III standards. Taxiway A will be relocated in order to increase the available ramp space. Concerning the runway exits, the proposed ALP includes some modifications for Runway 34 arrivals, such as the removal of the east portion of Taxiway F, the addition of four high-speed exits and the straightening of Taxiway C which creates a cross field taxiway for Runway 16/34. For Runway 16 arrivals, an additional high-speed exit Taxiway P is proposed. In addition, the proposed ALP recommends the addition of an ADG III bypass Taxiway B on each side of the Runway 16 departure staging area and the addition of an ADG III bypass Taxiway Q on each side of the Runway 34 departure staging area. Taxiways B and Q are located 152 feet centerline-to-centerline from their parallel runway entrances (Taxiways L and A on each side of the runway). They were designed in compliance with TDG 3 standards, which require a taxiway width of at least 50 feet and respecting the applicable fillet design standards prescribed by the FAA

**Configurations-** Taxiways D, M, E and N are all high-speed exits with a 30 degree angle. Taxiway C will be realigned to intersect Runway 16/34 at a 90 degree angle. The south portion of Taxiway L will be realigned to be fully parallel to the runway.

#### 6.2.2.2 Runway 11/29 Taxiway System

**Dimensions-** The proposed ALP will maintain the parallel Taxiway K on the west side of Runway 11/29. Taxiway K will be relocated at a distance from the runway centerline that is compliant with ADG III standards and which allows the increase of the General Aviation (GA) ramp space. The proposed ALP includes the removal of existing Taxiway H as it was creating a hotspot configuration. In addition, the proposed layout recommends the addition of ADG III bypass Taxiways H on the west side of the Runway 29 departure staging area and R on the west side of the Runway 11 departure staging area. Taxiways R and H dimensions are also based on TDG 3 requirements.

**Configurations-** Taxiway H and Taxiway R, two new taxiways included in the proposed ALP, intercept Runway 11/29 at a 90 degree angle.

### 6.2.3 Line of Sight

The analysis of the line of sight from the existing Air Traffic Control Tower (ATCT) did not reveal any major obstructions on airport property for the preferred layout. There is currently some off-property tree foliage that may partially obstruct the western section of the Taxiway Lima holding apron next to the Runway 34 end. It is recommended that the Airport monitor potential tree obstructions located on-airport property through a vegetation mitigation program, as described in the FAA Engineering Brief No. 91, Management of Vegetation in the Airport Environment. For off-property obstructions, some discussions/negotiations are recommended with the land owners for tree lowering activities.

### 6.2.4 Property Easement/Acquisition

Runway Protection Zone (RPZ) standards prescribe that at a minimum, airport owners should maintain the RPZ clear of all facilities supporting incompatible activities. The RPZ's function is to enhance the protection of people and property on the ground. Where practical, airport owners should own the property under the runway approach and departure areas to at least the limits of the RPZ. It is desirable to clear the entire RPZ of all above-ground objects. Where this is impractical, airport owners, at a minimum, should maintain the RPZ clear of all facilities supporting incompatible activities.<sup>2</sup>

As shown in the existing and proposed layout plan drawings, a significant amount of RPZ area is located off-airport property. An RPZ area of approximately 54 acres for Runway 16/34 and 23 acres for Runway 11/29 is located outside airport property. Additionally, most of the RPZ on the Runway 29 end is located within the State of Connecticut.

The RPZs on all runway ends have significant portions of off-airport areas, and may need land acquisitions/easements, based on further evaluations. No other property easement/acquisition requirements were identified.

---

<sup>2</sup> Federal Aviation Administration, AC 150/5300-13A, February 2014.

## 6.3 Airspace Drawings

The airspace drawings included in the ALP drawing set illustrate the different federal criteria and airspace regulations in place in order to provide a safe and efficient environment for aircraft operations at HPN. The airspace drawings are based upon 14 CFR Part 77 regulations which specify a set of imaginary surfaces that, when penetrated, designate an object as being an obstruction affecting navigable airspace. In addition, these drawings show the existing and future conditions according to the proposed ALP.

The 14 CFR Part 77 regulations define imaginary surfaces which are the following:

- **Primary Surface-** Centered on the runway, the primary surface extends 200 feet beyond either end of the runway and its width is based on the Runway Design Code (RDC). As a result, the primary surface width for Runway 11/29 is 500 feet and 1,000 feet for Runway 16/34.
- **Horizontal Surface-** A horizontal plane 150 feet above the Airport Elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the Primary Surface of each runway and connecting the arcs with tangent lines.
- **Conical Surface-** A surface which extends upward and outward from the outer limits of the horizontal surface for a horizontal distance of 4,000 feet. The slope is 20:1 (5 percent).
- **Transition Surface-** A surface extending outward and upward, at right angles to the runway centerline and runway centerline extended, from the sides of the Primary Surface and the Approach Surfaces. The slope is 7:1 (14.3 percent) and the surface extends until it intersects the Horizontal or Conical Surface.
- **Approach Surface-** For a visual approach such as on Runway 11/29, a surface longitudinally on the extended centerline of the runway, beginning at the end of the Primary Surface. The width at this point is 500 feet and it flares to 1,500 feet at a distance of 5,000 feet from the end. For Runway 16 and 34, the approach surface is centered on the extended runway centerlines. The inner edge is the same width as the primary surface (1,000 feet) and the outer edge width is 16,000 feet at a distance of 50,000 feet from the end. The Runway 16 and 34 approach surfaces slope is at a ratio of 50:1 for the first 10,000 horizontal feet and an additional horizontal distance of 40,000 feet at a ratio of 40:1.

More details concerning the dimension and layout of the Part 77 surfaces can be found in drawings 3 to 8.

### 6.3.1 Inner Portion of the Approach Surface Drawings

The following drawings provide a more detailed view of the Inner Portion of the FAR Part 77 Imaginary Approach Surfaces associated with each runway end at HPN.

These drawings also illustrate the approach clearance requirements specified by the Threshold Siting Criteria from the FAA Advisory Circular (AC) 150/5300-13A. The Threshold Siting Surfaces (TSS) is used to determine if the location of the landing threshold ensures that the related approach is clear from any obstruction. The following TSS were identified for evaluation:

- **Runway 16-** The TSS will remain Type 7, defined as when the approach end of runways is expected to accommodate instrument approaches having visibility minimum  $< \frac{3}{4}$  statute mile (1.2km). The TSS Type 7 slope is 34:1. Since the Runway end 14 is equipped with an ILS that allows for vertically guided approaches, the TSS should also comply with the Glide Path Qualification Surface (GQS) that has a slope of 30:1. However since the TSS Type 7 surface is more stringent than the GQS, only the TSS 7 surface is shown on the drawing.
- **Runway 34-** The TSS will remain Type 5 (Approach end of runways expected to support instrument night operations serving greater than approach Category B aircraft). The TSS Type 5 slope is 20:1. Since the Runway end 34 is equipped with an ILS that allows for vertically guided approaches, the TSS should also comply with the Glide Path Qualification Surface (GQS) that has a slope of 30:1.
- **Runway 11-** The TSS will remain Type 3 (Approach end of runways expected to serve large airplanes (Visual day/night); or instrument minimums  $\geq 1$  statute mile (1.6km) (day only)). The slope is 20:1.
- **Runway 29-** The existing conditions consider a Threshold Siting Surface Type 3 (TSS3), defined as when the approach end of runways is expected to serve large airplanes (Visual day/night); or instrument minimums  $\geq 1$  statute mile (1.6km) (day only). Six obstacles penetrate the TSS3. By looking at the 2015 traffic analysis and type of operations, the proposed alternative suggests to downgrade the Runway 11/29 to Type 2, which means approach end of runways to serve small airplanes (with less than 12,500 lbs certificated takeoff weight) with approach speeds of 50 knots or more. As a result, no obstruction penetrates the Threshold Siting Surface Type 2 (TSS2).

## 6.4 Airspace / Approach Obstruction Identification

Using the survey data described in Section 6.1, the determination of the obstructions to the Part 77 imaginary surfaces can be found in the note section of ALP drawings. The AGIS survey was filtered so that only the highest point within a 100 foot radial area is shown.

As summarized in the ALP sheet number 3, a total of 160 survey points were identified as obstructions to the Part 77 surface: 6 obstructions to the Conical surface, 19 obstructions to the Primary surface, 22 obstructions to the Horizontal surface and 113 obstructions to the Transitional surface.

ALP drawings 5 to 8 contain the obstruction information to the TSS as well as obstruction to the Part 77 in the inner portion of the approach surface. Runway 16 approach has one off-property tree obstruction to the Type 7 TSS surface. Runway 34 approach has one off-property tree obstruction to the Type 5 TSS surface. Runway 11 does not have any obstructions to its Type 3 TSS surface. Runway 29 has 6 clusters of trees, located in the State of Connecticut, penetrating the existing Type 3 TSS surface; however the proposed Type 2 TSS surface is clear from obstructions.

Survey objects that are less than 5 feet below the inner approach or the threshold siting surfaces were also identified as they should be monitored along the year. For example, tree elevation may increase year after year and the tree may become an obstruction to the related surface.

The recommended action for any obstruction is to remove, lower or light the obstruction as much as practicable. Any obstruction removal would require a separate analysis in coordination with the FAA,



state and local agencies as well as the property owners. Obstruction marking and lighting projects should be compliant with the FAA AC70/7460-1L Change 1. The airport should continue to have a vegetation mitigation program, as described in the FAA engineering brief # 91, to keep track of possible tree obstructions including growing foliage.

## 6.5 Building Restriction Line

The Building Restriction Line (BRL) is the line indicating where airport buildings must not be located, limiting building proximity to aircraft movement areas. The BRL is placed on the proposed ALP for identifying suitable building area locations on airports.

The BRL was set beyond the Runway Protection Zones (RPZs), the Obstacle Free Zones (OFZs), the Object Free Areas (OFAs), the runway visibility zone, NAVAID critical areas, areas required for TERPS, and ATCT clear line of sight (LOS). The BRL is located where the Part 77 surfaces are at 35 feet above their origin points. Hangar F and the deicing storage tanks east of the airport appears on top of the BRL on the drawing, however there is no infringement since their top elevation is lower than the Part 77 transitional surface elevation at these locations.

## 6.6 Terminal Area Drawing

The drawing presents a large-scale depiction of areas with significant terminal facility development. Such a drawing is typically an enlargement of a portion of the proposed ALP which includes a plan view of passenger terminal area, aprons, buildings, hangars, parking lots and roads.

As the proposed ALP shows, the terminal area drawing highlights the landside preferred alternatives with two proposed car parking garage and the terminal car parking. In addition, the drawing focuses on the aprons configurations that are extended until the realigned Taxiway A, showing the proposed stand marking, proposed service road, RON area proposed, ARFF facility and airside vehicle storage, the proposed taxiways system and the two high speed exits.

## 6.7 Land Use Drawing

This drawing presents on- and off-airport land uses and zoning in the area around the airport following the information provided in the 2015 Airport Land Use map. The land use for each and all parcels as depicted on this drawing reflects existing land use. In particular the drawing contains the land use information within the noise contours and to the extents of the future RPZs.

No changes in land use are proposed as part of the effort of this study. The drawing also shows the noise contour for DNL 65, 70 and 75 dB. The assumptions relative to the noise contours can be found in the Chapter 5.

## 6.8 Exhibit “A” Airport Property Inventory Map

This drawing depicts the airport property boundary, the various tracts of land that were acquired to develop the airport, and the method of acquisition. The drawing should also depict easements beyond the airport boundary.

The different sources of data used to create this drawing are the 2008 Exhibit A, the Parcel Data Information and the Airport Deed of Westchester County Airport.