Portland

WHPacific

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MEMORANDUM

Date: 11/25/2008

RE: Obstruction Report

To: G. Paul Wolf
Company: Washington Dept of Aviation
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From: Peter Murphy
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Project#:
Project Name: W27 Part 77 Review

WHPacifc (WHP) was requested by the Washington State Department of Transportation, Aviation Division (WSDOT) to provide a FAR Part 77 Objects Affecting Navigable Airspace surface analysis of the Woodland State Airport (W27).

BACKGROUND AND STANDARDS

The Woodland Airport is a Part 77 Category A (visual) airport, which defines the dimensional standards of the Part 77 surfaces. The surfaces that were evaluated were the Primary Surface, the Approach Surfaces, and the Transition Surfaces. These surfaces are defined as such according to the FAR Part 77:

- Primary Surface is a surface longitudinally centered on a runway which extends 200 feet beyond the runway threshold. The total width of this surface is 250 feet. The elevation of this surface is the same elevation as the runway elevation.

- The Approach Surface is a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. The inner edge of the approach surface is the same width and elevation as the primary surface. The approach surface expands outward uniformly to a width of 1,250 feet. The surface also rises at a slope of 20:1 for a horizontal distance of 5,000 feet away from the primary surface.

- The Transitional Surface are surfaces that extend outward and upward at right angles from the edge of the primary surface and the approach surface at a slope of 7:1 to a height of 150 feet above the runway.

- Refer to the Exhibit 1,attached, that depicts the Part 77 surfaces pertain to the Woodland Airport.

Another airport surface that will be discussed is the Runway Protection Zone (RPZ). The RPZ is defined as "an area off the runway end to enhance the protection of people and property on the ground. It is desirable to clear all objects from the RPZ and to not have land uses which gather people or attract wildlife."

The RPZ is a trapezoid which begins 200 feet from the runway threshold and is 250 feet wide, centered on the extended runway centerline. The RPZ extends outward 1,000 feet to a width of 450 feet also centered on the extended runway centerline. See the attached exhibits for a figure of a RPZ.

ONSITE OBSERVATIONS

An on-site visual inspection was performed October 30, 2008. The primary surface was laid out with a measuring wheel from the runway thresholds and the corners set with wooden stakes. The approaches and the transitional surfaces were then visually inspected by standing at the primary surface and using an inclinometer. The inclinometer measures the angle required to clear an obstruction. In the approach surface, the 20:1 surface corresponds to a 5% clearance slope and the clearance slope for the transitional surface is roughly 14.3%.

Primary Surface

At the northwest end of the primary surface, near the Runway 14 end there is a tall earthen mound, with the lighted windsock, that protrudes into the primary surface by over 60 feet (Photo 1). The fence that separates the airport from the Interstate also is within the primary surface in the northwest side of the primary surface (Photo 2). There are also planes parked in the primary surface at the Runway 14 end (Photo 3). In the Northeast corner of the Runway 14 end, the pump house and the 2 power poles are obstructions as well as the trees along the bank of the Lewis River in this area (Photo 4). In the Southeast corner at the Runway 32 end, there is one tree, adjacent to the picnic table, that is in the primary surface.

Western Transitional Surface

The FAA requires that 17' be added to the elevation of the pavement surface along an Interstate highway and therefore when evaluating the passing semi trucks with the inclinometer, they were observed to have a clearance angle of 17%, which is a penetration of the transitional surface. The entire fence along the Interstate as well as every WSDOT highway sign are also obstructions (Photo 5).

Eastern Transitional Surface

The entire tree line along the west bank of the Lewis River penetrates the transitional surface (Photo 6). There is also a stand of dense trees across the river on the east bank that has some trees with a clearance slope of 22%.

Runway 14 Approach and Approach Transition

There are numerous planes parked in the approach surface (Photo 3). In the northwest portion of the approach, the eave of Hangar C has a clearance slope of 6%, which is greater than the 5% allowed. The sign over the interstate has a slope of 9% and there are some trees that have clearance slopes of 8 to 32%. In the southwest portion of the approach, the eave of Hangar B has a clearance slope of 8% and the overhead light has a slope of 12% (Photo 7). There is also trees and power poles along the river bank which have clearance slopes from 4% to infinity (Photo 8).

Runway 32 Approach and Approach Transition

When looking out to the south, the first obstructions encountered are the scrub brush, of which part is growing into the runway primary surface. The tallest obstructions are along the Lewis River on both the north and south banks of the river. On the north bank of the river, the clearance angles range from 6% up to 67% (Photo 9). On the south bank, the entire stand of trees with the tallest obstructions requiring clearance angles from 12.5% to 18% (Photo 10).

Runway Protection Zone (RPZ)

The Runway 14 RPZ, as shown on Exhibit 1, extends beyond the waste water treatment plant. The hangars are also within the RPZ. Both of these items are incompatible uses within the RPZ.

CONCLUSION AND RECOMENDATIONS

It is obvious from the information provided that there are numerous objects that penetrate the Part 77 surfaces and are within the RPZ. The following are our recommendations for each item:

- Interstate 5 - No action possible
- Interstate 5 Signs - Install Obstruction lights
- Waste Water Treatment Plant - No action possible
- Hangars A,B & C - The hangars are obstructions to the approach surface and are within the RPZ. In order to comply with FAA standards, the hangars should be removed. There is no area available on the airport to relocate the hangars per FAA standards.
- Fence on west side - No action possible
- Trees along the Lewis River - Removal of the trees is needed but may not be possible due to the environmentally sensitive area of the river bank. Topping of the trees will weaken the trees and is not a viable solution either.
- Airplane Parking - Must be moved out of the primary surface, preferably relocate along the north fence or along the access road, however the parked aircraft will still be within the RPZ.

Photo 1

Photo 2

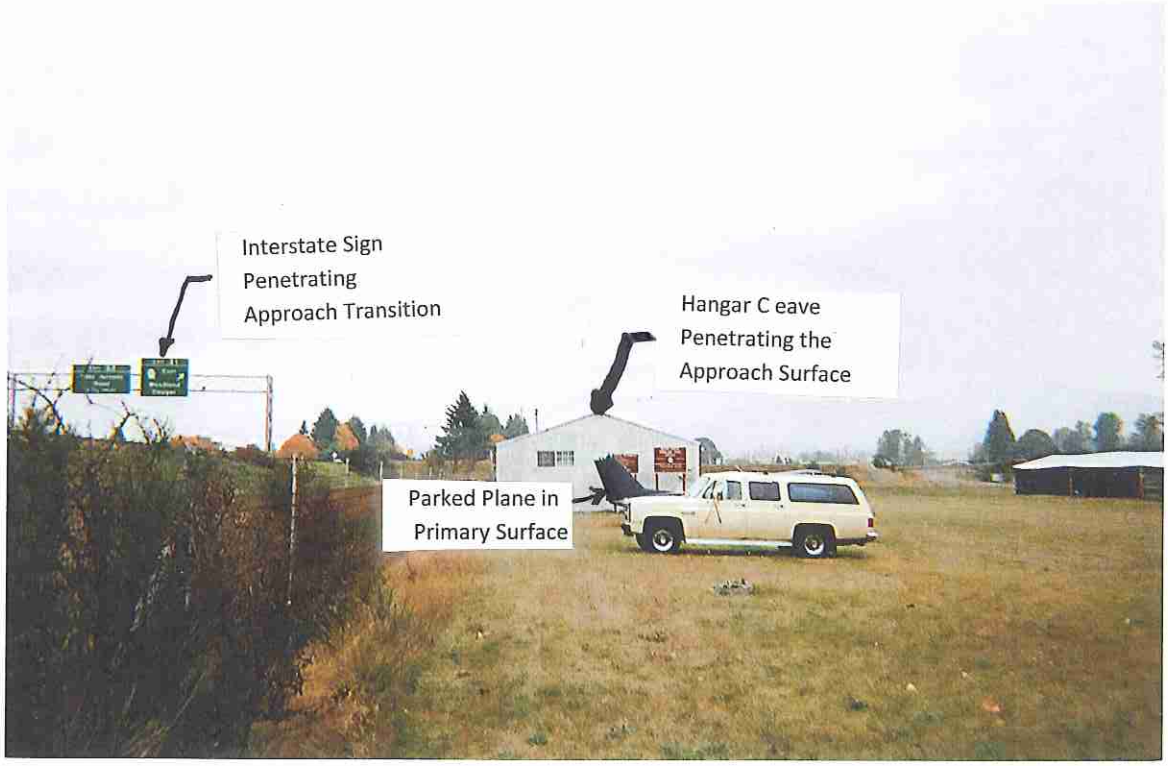


Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

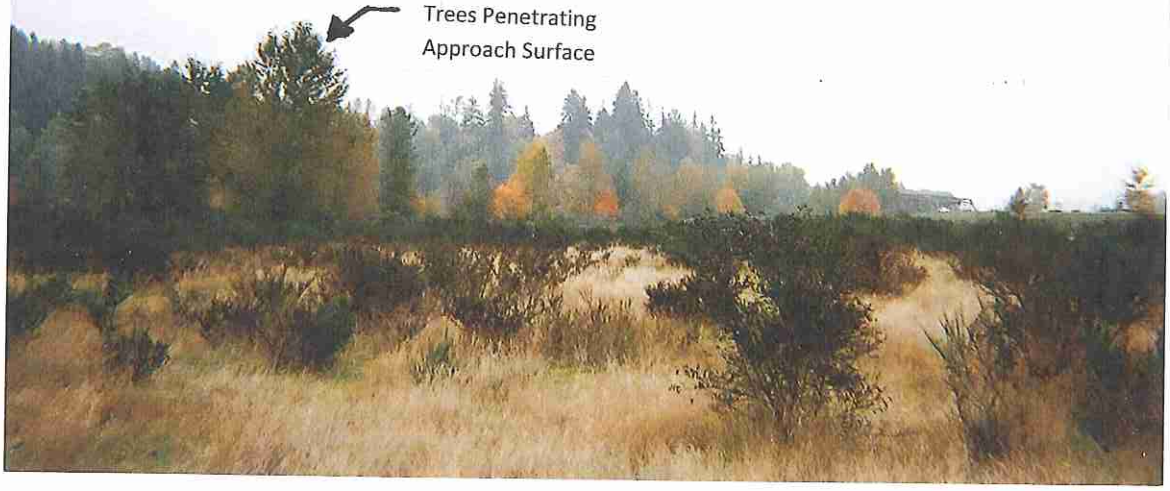
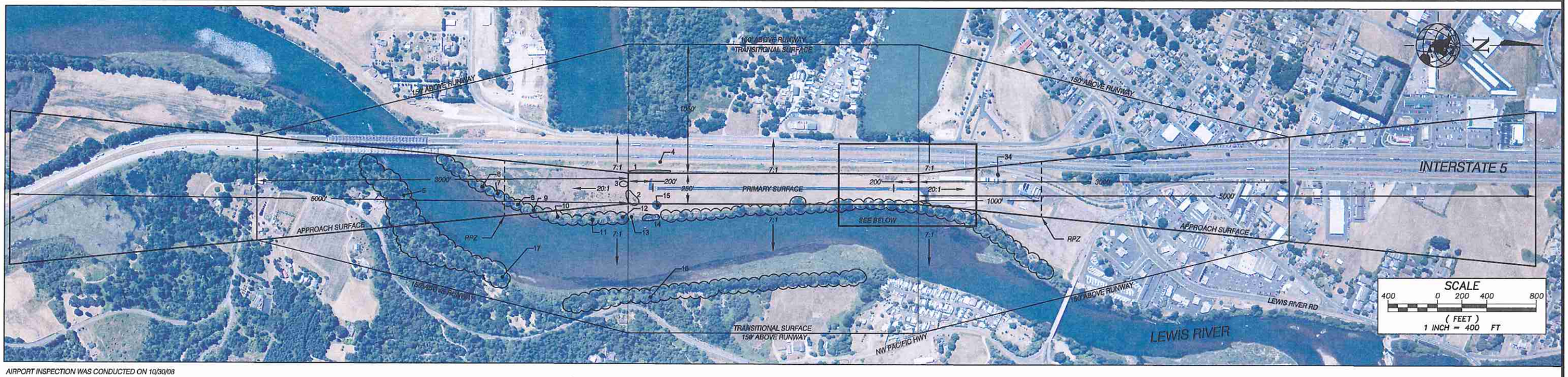


Photo 9

Photo 10

DWG INDEX:

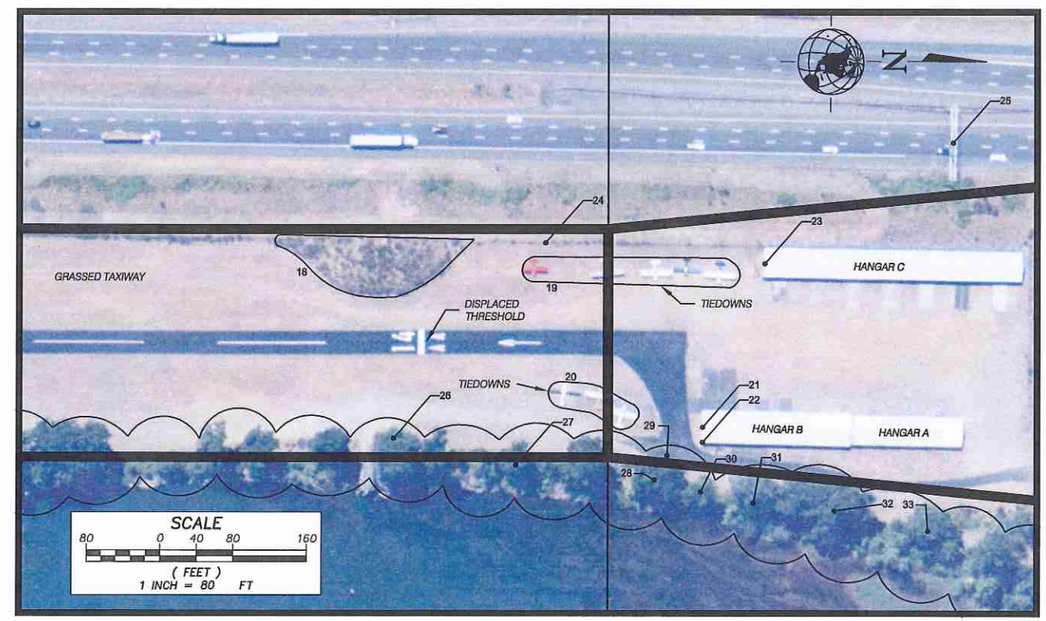


AIRPORT INSPECTION WAS CONDUCTED ON 10/30/08

OBSTRUCTION DATA TABLE

OBSTRUCTION NO.	ITEM	PART 77 SURFACE	SLOPE TO CLEAR OBJECT (%)
1	BUSHES AND FENCE	TRANISITIONAL	∞
2	SPARSE BRUSH	PRIMARY	∞
3	SPARSE BRUSH	RW 32 APPROACH	∞
4	INTERSTATE SIGN	TRANSITIONAL	24%
5	TREES	RW 32 APPROACH	12.5%
6	TREES	RW 32 APPROACH	6%
7	TREES	RW 32 APPROACH	6%
8	TREES	RW 32 APPROACH	16%
9	TREES	RW 32 APPROACH	13%
10	TREES	RW 32 TRANSITIONAL APPROACH	28%
11	TREES	RW 32 TRANSITIONAL APPROACH	67%
12	TREES	RW 32 TRANSITIONAL APPROACH	62%
13	TREES	TRANSITIONAL	36%
14	TREES	TRANSITIONAL	36%
15	TREE	PRIMARY	∞
16	TREES	TRANSITIONAL	22%
17	TREES	TRANSITIONAL APPROACH	18%
18	MOUND WITH WINDSOCK	PRIMARY	∞
19	AIRCRAFT	PRIMARY/ RW14 APPROACH	∞
20	AIRCRAFT	PRIMARY/ RW14 APPROACH	∞
21	HANGAR EAVE	RW 14 APPROACH	8%
22	LIGHT ON HANGAR	RW 14 APPROACH	12%
23	HANGAR EAVE	RW 14 APPROACH	6%
24	FENCE	PRIMARY	∞
25	INTERSTATE SIGN	TRANSITIONAL APPROACH	9%
26	PUMP HOUSE BLDG	PRIMARY	∞
27	TREES	TRANSITIONAL	∞
28	TREES	TRANSITIONAL APPROACH	∞
29	POLE	RW 14 APPROACH	35%
30	TREE	TRANSITIONAL APPROACH	50%
31	TREES	TRANSITIONAL APPROACH	48%
32	TREES	TRANSITIONAL APPROACH	39%
33	TREES	TRANSITIONAL APPROACH	12%
34	TREE	RW 14 APPROACH	8%

NOTE: SLOPE OF APPROACH SURFACE (20:1) IS 5%
SLOPE OF TRANSITIONAL SURFACE (7:1) IS 14.3%
SLOPES LISTED IN CHART WERE OBSERVED FROM EYE LEVEL AND ACTUAL CLEARANCE SLOPES WOULD BE GREATER



DESIGNED BY: PJM
DRAWN BY: DWM
LAST EDIT: 11/26/2008
CHECKED BY:
APPROVED BY:
PLOT DATE: 12/03/08

DATE	BY	REV#	REVISION	CK'D	APPR.

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WSDOT AVIATION DIVISION
WOODLAND STATE AIRPORT
PART 77 OBSTRUCTION EVALUATION

WOODLAND WASHINGTON

SCALE:	PROJECT NO.	DRAWING FILE NAME:		SHEET
SEE ABOVE	034275	34275-AIRP-EX1	1	1/1

[Path: P:\WSDOT Aviation Division\034275\Design\Drawings\Civil\34275-AIRP-EX1.dwg] [Layout1]
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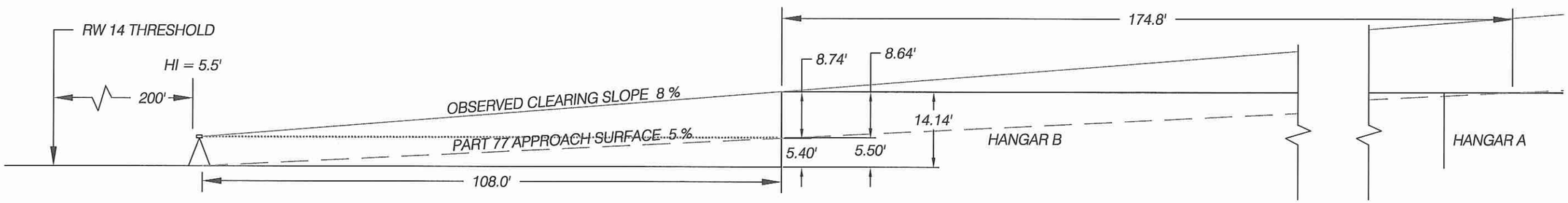
DWG INDEX:

CALCULATION OF HANGAR HEIGHT

- OBSERVED ANGLE TO CLEAR HANGAR WAS 8% FROM A DISTANCE OF 108'
- 108' x 0.08 = 8.64'
- MEASURING TOOL WAS 5.5 FEET ABOVE GROUND (H.I.)
- HEIGHT OF HANGAR = 8.64'+5.5' = 14.14'

CALCULATION OF PENETRATION

- APPROACH SURFACE BEGINS AT THRESHOLD ELEVATION 200' FROM THRESHOLD
- APPROACH RISES AT A SLOPE OF 5%
- AT THE HANGAR, 108' AWAY, THE APPROACH SURFACE REACHES A HEIGHT OF 5.40'
- THE HANGAR IS 14.14'. THE AMOUNT THE HANGAR OBSTRUCTS = 14.14' - 5.40' = 8.74'
- THE DISTANCE FROM THE BEGINNING OF THE APPROACH SLOPE TO WHERE THE HANGAR IS NO LONGER A PENETRATION IS, 14.14'/0.05 = 282.8'
- 282.8' - 108' = 174.8'
- AT LEAST 174.8' OF THE HANGAR IS PENETRATING THE APPROACH SURFACE
- ALL OF HANGAR B IS PENETRATING THEAPPROACH SURFACE AND APPROXIMATELY 15' OF HANGAR A



DESIGNED BY: PJM	CHECKED BY: ####
DRAWN BY: DWM	APPROVED BY: ####
LAST EDIT: 12/1/2008	PLOT DATE: 12/03/08

DATE	BY	REV#	REVISION	CK'D	APPR

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WSDOT AVIATION DIVISION
WOODLAND STATE AIRPORT

PART 77 OBSTRUCTION EVALUATIOIN
EXHIBITION 1: HANGAR A&B

WOODLAND WASHINGTON

SCALE:	PROJECT NO.	DRAWING FILE NAME:	SHEET
1" = 20'	034275	34275-AIRP-HANGARS	EX2 2/2

[Path: P:\WSDOT Aviation Division\034275\Design\Drawings\C\vil\34275-AIRP-HANGARS.dwg] [HANGAR B]
Date: 12/3/2008 3:41 PM Author: dmorgi [Plotter: pdfcreator] [Style: Full Size.ctb]

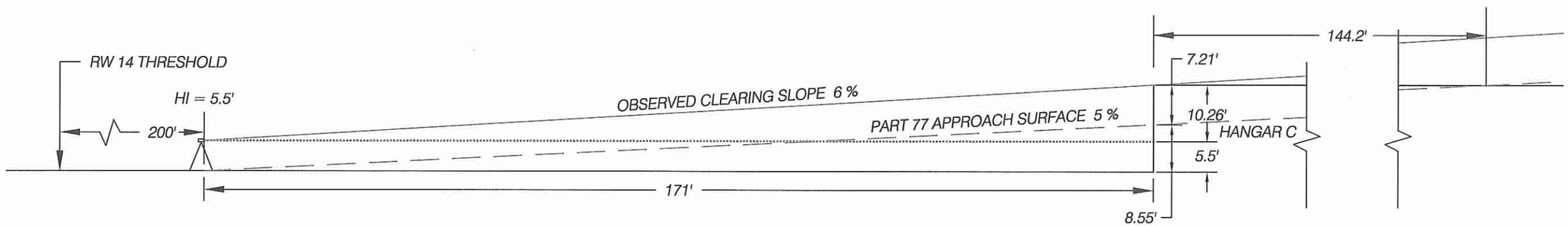
DWG INDEX:

CALCULATION OF HANGAR HEIGHT

- OBSERVED ANGLE TO CLEAR HANGAR WAS 6% FROM A DISTANCE OF 171'
- 171' x 0.06 = 10.26'
- MEASURING TOOL WAS 5.5 FEET ABOVE GROUND (H.I.)
- HEIGHT OF HANGAR = 10.26'+5.5' = 15.76'

CALCULATION OF PENETRATION

- APPROACH SURFACE BEGINS AT THRESHOLD ELEVATION 200' FROM THRESHOLD
- APPROACH RISES AT A SLOPE OF 5%
- AT THE HANGAR, 171' AWAY, THE APPROACH SURFACE REACHES A HEIGHT OF 8.55'
- THE HANGAR IS 15.76'. THE AMOUNT THE HANGAR OBSTRUCTS = 15.76' - 8.55' = 7.21'
- THE DISTANCE FROM THE BEGINNING OF THE APPROACH SLOPE TO WHERE THE HANGAR IS NO LONGER A PENETRATION IS, 15.76'/0.05 = 315.2'
- 315.2' - 171' = 144.2'
- AT LEAST 144.2' OF THE HANGAR C IS PENETRATING THE APPROACH SURFACE



NOTE: (7.21')*(20/1) = 144.2' (5%)

144.2' TO WHERE THE HANGAR IS NO LONGER AN OBSTRUCTION. ROUGHLY 1/2 OF HANGAR IS OBSRUCTING.

DESIGNED BY	PJM	CHECKED BY:	####
DRAWN BY:	DWM	APPROVED BY:	####
LAST EDIT:	12/3/2008	PLOT DATE:	12/03/08

DATE	BY	REV#	REVISION	CK'D	APPR.

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WSDOT AVIATION DIVISION
WOODLAND STATE AIRPORT

PART 77 OBSTRUCTION EVALUATIOIN
EXHIBITION 1: HANGAR C

WOODLAND WASHINGTON

SCALE:	PROJECT NO.	DRAWING FILE NAME:		SHEET
1" = 20'	034275	34275-AIRP-HANGARS	EX1	1/2

[Path: P:\WSDOT Aviation Division\034275\Design\Drawings\Civil\34275-AIRP-HANGARS.dwg] [HANGAR A]
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