



AIRPORT PLANS

The airport master planning process for Hector International Airport has evolved through the development of forecasts of future demand, facility needs assessments, and the evaluation of airport development alternatives. The planning process has included the development of four working papers, distributed to a Planning Advisory Committee (PAC), and discussed at coordination meetings held throughout the study process. The meetings were held on the same day as the Municipal Airport Authority meetings to allow direct input by the Airport Authority members into the planning process. The coordination of the planning effort has allowed the direct input of each of these representatives into the on-going planning effort, which has resulted in the development of a master plan concept. The purpose of this chapter is to present the master planning concept in narrative and graphic form. The planning process will include one additional coordination

meeting with the PAC and Airport Authority. At that time, a draft final master plan report will be prepared, followed by final documents and executive summaries of the study.

RECOMMENDED MASTER PLAN CONCEPT

The recommended master plan concept provides for anticipated facility needs over the twenty year planning period (and beyond). This will allow the aviation facility to meet the growing demands of commercial service, air cargo, military, and general aviation needs. In addition, the plan identifies the properties that are not anticipated for aviation-related development, and may be used for revenue enhancement.



AIRFIELD DESIGN STANDARDS

The FAA has established design criteria to define the physical dimensions of runways and taxiways, and the imaginary clearance surfaces surrounding the airport. The design standards also define the separation criteria for the placement of landside facilities. As discussed earlier in Chapter Three, FAA design criteria is a function of the critical design aircraft or "family" of aircraft which conduct a minimum of 500 or more operations (takeoffs and landings) each year. The design category is measured by the wingspan of the aircraft, and their approach speed.

As a commercial service airport, the facility must also comply with the requirements of F.A.R. Part 139, *Certification and Operations: Land Airports Serving Certain Air Carriers*. This regulation prescribes the rules governing the certification and operation of land airports which serve scheduled or unscheduled passenger operations of an air carrier that is conducted with an aircraft having a seating capacity of more than 30 passengers. Under F.A.R. Part 139, the airport must complete (and maintain) a certification manual which outlines their compliance under each provision of the regulation. The compliance level required is dependent on the airport's design standards and the size and frequency of the scheduled aircraft service. The master plan and airport layout drawings provide a means to present this information.

All runways and taxiways which are anticipated to be available for air carrier use are required to have safety

areas in compliance with F.A.R. Part 139. However, F.A.R. Part 139 "grandfathers" existing safety areas "if the runway or taxiway had a safety area on December 31, 1987, and if no reconstruction or significant expansion of the runway or taxiway was begun on or after January 1, 1988". While Runway 17-35 and associated taxiways have historically served the air carriers exclusively, it is anticipated that Runway 8-26 will be included as a runway available to air carriers after extension of the runway to 6,300 feet. The certification manual will need to be updated to provide information relevant to the extended runway. Runway 13-31 does not serve air carriers, and does not fall under the requirements of F.A.R. Part 139.

The certification manual contains the following information on the following topics:

- General Information.
- Organization and Management.
- Airport Information.
- Maintenance and Inspection Program.
- Operational Safety.
- Hazardous Materials.
- Aircraft Rescue and Firefighting.
- Snow and Ice Control.
- Airport Emergency Plan.
- Wildlife Hazard Management.
- Maintenance of Certification Manual.

The airport will need to continually monitor their compliance with F.A.R. Part 139 in each of these areas. The capital program developed with this master plan (and included in the following chapter), will include items reimbursable under the Airport

Improvement Program for the purpose of complying with Part 139. However, of particular concern in defining the airport's design category is the adequacy of the safety areas at runway ends. It was noted in the last chapter, that Runway 17-35 (south end) and Runway 13-31 have some existing deviations from standards. The master plan has recommended actions to remedy these deviations and provide full safety areas at runway ends. In the interim period, it will be necessary to maintain threshold displacements and/or to publish declared distances for these runways to create adequate safety areas at runway ends.

As with most airports, runways and landside development areas are designed to differing design standards. Runway 17-35 and associated taxiways must accommodate the most demanding aircraft, including aircraft which use the facility on an intermittent basis for training or weather diversions. The airport must be able to handle the most demanding aircraft in Design Group V, such as the 747, on this runway. However, the other runways may be designed to lesser design categories. Currently, Runway 8-26 and 13-31 handle aircraft primarily in Design Group II (such as twin-engine pistons or turboprops and lighter business jets). However, with an extension to 6,300 feet, Runway 8-26 will be able to handle aircraft to (and including) Design Group III. Eventually, when this runway is extended to 8,000 feet, it will be able to handle aircraft through Design Group V.

The terminal area and air cargo area should be designed for Design Group IV aircraft. The southeast and north

general aviation areas should be designed for Group III aircraft. The T-hangar development on the east side of the north hangar area should be designed to Group II standards, while the larger hangar development area on the west side of the north hangar area should be designed to Group III standards. The parallel runway/taxiway on the east side of the airfield is not expected to be used by aircraft larger than Group II. **Table 5A** summarizes the design standards used for the runway/taxiway system.

AIRFIELD

The recommended master plan concept includes a series of improvements on the airfield to provide additional operational capability and capacity. The first project involves the extension of Runway 8-26, to provide 6,300 feet of runway, and the extension of Taxiway C to serve the entire length of the extended runway. This will increase the utility of this runway in strong east-west winds for aircraft using facilities on the north side of the airfield, or for the turboprop/regional jet aircraft in scheduled service, originating from the terminal area on the west side of the airfield. Pavements on the taxiway system (west of Runway 17-35) will be constructed to withstand the heavier loads of aircraft using air cargo facilities in the northwest quadrant.

It is anticipated that additional taxiway stubs will need to be constructed in the north general aviation area to support small hangar development on the east side of the complex, and large hangar development on the west side of the

TABLE 5A
Planning Design Standards

Runway Design Standards	Runway 17-35	Runway 8-26		Runway 13-31 (and future parallel)
Airport Reference Code	D-V	C-III/D-V		B-II
Approach Visibility Minimums	≤ One-Half Mile	One-Half Mile		One Mile
<u>Runway</u>				
Width	150	100/150		75
Runway Safety Area (RSA)				
Width (centered on runway centerline)	500	500		150
Length Beyond Runway End	1,000	1,000		300
Object Free Area (OFA)				
Width	800	800		500
Length Beyond Runway End	1,000	1,000		300
Obstacle Free Zone (OFZ)				
Width	400	400		120
Length Beyond Runway End	200	200		200
Runway Centerline to:				
Parallel Taxiway Centerline	400	400		240
Edge of Aircraft Parking Apron	500	500		250
<u>Runway Protection Zones (RPZ)</u>		8	26	
Inner Width	1,000	1,000	1,000	500
Outer Width	1,750	1,750	1,500	700
Length	2,500	2,500	1,700	1,000
<u>Obstacle Clearance</u>	17-35	8	26	13-31
	50:1/40:1	50:1/40:1	34:1	20:1

Taxiway And Taxilane Design Standards

	ADG V	ADG III	ADG II
<u>Taxiways</u>			
Width	75	50	35
Shoulder Width	35	20	10
Safety Area Width	214	118	79
Object Free Area Width	320	186	131
Taxiway Centerline to:			
Parallel Taxiway/Taxilane	267	152	105
Fixed or Moveable Object	160	93	65.5
<u>Taxilanes</u>			
Taxilane Centerline to:			
Parallel Taxilane Centerline	245	140	97
Fixed or Moveable Object	138	81	57.5
Taxilane Object Free Area	276	162	115

Source: FAA Airport Design Software Version 4.2D

complex. Based upon the recommendation of the PAC at an earlier meeting, a future connection to the existing general aviation ramp on the north side should be extended from Taxiway B rather than Taxiway C, to avoid congestion at the intersection of Taxiways B/C.

In a few years, when Runway 17-35 is reconstructed, centerline and touchdown zone lighting should be added to provide for lower visibility approaches to this runway. It is recognized that the landing threshold for Runway 35 is displaced to provide for adequate safety area at the south end of the runway and with the construction of 400 feet of runway at the north end, the displaced threshold will become a relocated threshold.. A project to realign 19th Avenue North will eventually allow for the removal of this landing displacement. However, until that time, the published declared distances for Runway 17-35 should reflect the existing length which is available.

Additional taxiway improvements on the airfield include an extension from the westerly end of Runway 8-26 to the terminal area ramp. This will allow access to and from the runway end for scheduled aircraft capable of using Runway 8-26 which originate or terminate in the terminal area. In addition, midfield exits are reflected on Runway 17-35 (to both Taxiways A and B) to allow aircraft to exit the runway more efficiently. The need for midfield exits was confirmed with the airport traffic control tower, which indicated that aircraft must remain on the runway for an extended period without the availability of a convenient exit,

especially when their destination is the terminal ramp on the west side.

Towards the end of the planning period, an additional extension of Runway 8-26 and Taxiway C will provide a total length of 8,000 feet, allowing use by most aircraft operating on the airfield. At that time, the existing portions of the runway will need to be widened to 150 feet and strengthened to handle the heavier aircraft. A parallel taxiway on the south side of Runway 8-26 will provide connections to the terminal area.

The construction of a parallel general aviation runway system on the east side of the airfield will provide for separation of lighter aircraft traffic, especially when the light aircraft are performing training operations.

TERMINAL AREA

One of the earliest needs in the terminal area is for additional rental car storage, and new service areas, followed closely by additional aircraft gate positions. In the current fiscal year, the Airport Authority is pursuing additional space for rental car storage and a consolidated service area on the west side of the terminal. Additional areas have been reserved in the terminal area for expansion of these areas, as well as for additional public parking and employee parking.

In the near term, the most efficient means for obtaining additional gate positions is to reconfigure existing aircraft parking positions to allow six positions to be served from the four existing gate positions. The existing departure area is considered adequate

to satisfy demands through the short and intermediate term periods. At that time, a pier extension on the terminal will provide for additional boarding area, allowing for four (or more) gate positions on the pier extension while maintaining at least two gates (1 and 4) from the current boarding area.

Another identified need is to provide additional bag claim lobby, claim frontage, and rental car office area. This can be accomplished with a 50-foot extension on the west end of the building, which will also create additional space for airline operations in the non-public area of the bag claim area. Additional area will also be created for rental car offices and counter.

AIR CARGO AND GENERAL AVIATION

Future demand for air cargo ramp, sortation buildings, and truck transfer can be met in the northwest quadrant, west of the current facilities used by Airborne Express. It is anticipated that the construction of additional air cargo facilities will be phased to coincide with demand. A series of three 40,000-square foot buildings, each supported by 25,000-square yards of apron and 11,000-square yards of truck court and auto parking have been included with each phased development. The entirety of this development will be located east of County Drain #10. All air cargo operations by heavy jets should be located in the northwest quadrant, since the pavements on the east side of the airfield (on both the north ramp and in the southeast quadrant) are not stressed to handle repeated loadings by

heavier aircraft. While air cargo activities continue to be undertaken in the southeast quadrant at this time, only lighter turboprop aircraft currently use the area. The northwest quadrant offers the best location for further expansion of facilities and access to Interstate 29.

Expansion of general aviation facilities has been shown both in the southeast quadrant and on the north ramp. While the southeast quadrant offers little additional expansion potential, the closure of Runway 3-21 has offered the potential for additional large hangar development north of the old terminal building, facing Taxiway B. In addition, some in-filling potential exists between existing hangars, which provides the opportunity for several large hangars to be added (these options were examined in the last chapter). However, most small and large hangar development will need to take place on the north ramp, where the area has been segregated for small and large hangars. While several small hangars (including nested hangars) have already been constructed north of the FBO facilities, no large hangars have yet to be constructed (other than the FBO hangar facilities). The area may be phased to meet the specific demands that the airport experiences in the future.

AIRPORT LAYOUT PLAN DRAWINGS

The remainder of this chapter provides a brief description of the airport layout drawings that will be submitted to the FAA for review and approval. These drawings have been prepared to

graphically depict the ultimate airport layout, facility development, safety areas, and imaginary surfaces that extend beyond airport property lines. The set of plans include:

- Airport Layout Drawing
- Airport Airspace Drawing
- Inner Approach Surface Drawings (all runways)
- Terminal Area Drawing
- Landside Facilities Drawings (north and southeast)
- Airport Land Use Drawing
- Airport Property Map

The layout drawings are prepared on a computer-aided drafting system to allow easier updating and revisions. New aerial photography was flown on May 1, 2000 and new topographic mapping was prepared for the base drawings used in this master plan. The set provides detailed information on existing and future facilities. The drawings set will be submitted to the FAA for approval and must reflect any future development under consideration by the FAA for potential funding. Therefore, the drawings should be continually updated as new facilities are constructed.

AIRPORT LAYOUT DRAWING

The Airport Layout Drawing (ALD) graphically presents the existing and ultimate airport layout. Detailed airport and runway data is provided to facilitate the interpretation of master planning recommendations. Both airside and landside recommendations are depicted.

AIRPORT AIRSPACE DRAWING

To protect the airspace around the airport and approaches to each runway end from hazards that could affect the safe and efficient operation of aircraft arriving and departing the airport, standards contained in F.A.R. Part 77, *Objects Affecting Navigable Airspace*, have been established for use by local authorities to control the height of objects near the airport. The Airport Airspace Drawing included in this master plan is a graphical depiction of this regulatory criterion. The Airspace Drawing is a tool to aid local authorities in determining if proposed development could present a hazard to the airport and obstruct the approach path to a runway end.

To increase the percentage of time that the airport is accessible in poor weather conditions, and to accommodate the commercial air carrier, air cargo, and business aircraft using the facility, this master plan recommends planning for improved approaches to Runway 17-35, and an improved approach to Runway 8. The addition of centerline and touchdown lighting, combined with upgraded approach lights will provide approaches below one-half mile visibility on Runway 17-35, while an improved approach to Runway 8 will provide for one-half mile visibility.

F.A.R. Part 77 Imaginary Surfaces

The Airspace Drawing assigns three-dimensional imaginary surfaces to each runway. These imaginary surfaces emanate from the runway centerline

and are dimensioned according to visibility minimums associated with each runway approach and aircraft approach speeds. The Part 77 imaginary surfaces include the primary surface, approach surface, transitional surface, horizontal surface, and conical surface. Part 77 imaginary surfaces are described in the following paragraphs.

- PRIMARY SURFACE

The primary surface is an imaginary surface longitudinally centered on the runway. The primary surface extends 200 feet beyond each runway end. The elevation of any point on the primary surface is the same as the elevation along the nearest associated point on the runway centerline. Under Part 77 regulations, the primary surfaces for Runways 17-35 and 8-26 (ultimate) are 1,000 feet wide, while only 500 feet wide for Runway 13-31 and the future parallel runway.

- APPROACH SURFACE

An approach surface is also established for each runway. The approach surface begins at the same width as the primary surface and extends upward and outward from the primary surface end and is centered along an extended runway centerline. The approach surfaces for Runways 17, 35, and 8 (future) extend 50,000 feet from the primary surface at an upward slope of 50:1 for 10,000 feet and 40:1 for the remaining 40,000 feet. The approach surface for Runway 26 extends 10,000 feet from the primary surface at an

upward slope of 34:1, while the approach surfaces for Runways 13 and 31 (and future parallel) extend 5,000 feet from the primary surface at an upward slope of 20:1.

- TRANSITIONAL SURFACE

Each runway has a transitional surface that begins at the outside edge of the primary surface at the same elevation as the runway. The transitional surface also connects with the approach surfaces of each runway. The surface rises at a slope of 7:1 up to a height which is 150 feet above the highest runway elevation. At that point, the controlling surface is the horizontal surface.

- HORIZONTAL SURFACE

The horizontal surface is established at 150 feet above the highest elevation of the runway surface. Having no slope, the horizontal surface connects the transitional and approach surfaces to the conical surface at a distance of 10,000 feet from the primary surfaces of each runway.

- CONICAL SURFACE

The conical surface begins at the outer edge of the horizontal surface, then continues for an additional 4,000 feet horizontally at a slope of 20:1. Therefore, at 4,000 feet from the horizontal surface, the elevation of the conical surface is 350 feet above the highest airport elevation.

INNER APPROACH SURFACE DRAWINGS

The Inner Approach Surface Drawings, prepared for each of the runway approaches, is a scaled drawing of the runway protection zone, obstacle free zone, obstacle free area, and safety area for each runway end. It extends for twice the distance of the runway protection zone, providing plan and profile views of the runway ends which can assist airport authority staff, engineers, or consultants with identification of existing obstructions or potential obstructions within these areas. Elevations and topographic information obtained from the May 2000 aerial mapping effort have been used to prepare the drawings.

TERMINAL AREA DRAWING

The Terminal Area Drawing provides greater detail of the terminal area facilities on the west side of the airport. Recommended areas for future parking facilities have been noted, as have expansions of the terminal building and boarding area. The parking configuration on the air carrier ramp reflects a potential reconfiguration after the pier is extended onto the ramp.

AIRPORT LAND USE DRAWING

The objective of the Airport Land Use Drawing is to coordinate uses of the airport property in a manner compatible with the functional design of the airport facility. Airport land use planning is important for the orderly development and efficient use of available space. There are two primary

considerations for airport land use planning: first, to secure those areas essential to the safe and efficient operation of the airport; and second, to determine compatible land uses for the balance of the property which would be most advantageous to the airport and community. The plan depicts the recommendations for ultimate land use development on the airport, taking into consideration future runway/taxiway development. The building restriction lines are based upon ultimate layouts and line-of-sight from the existing airport traffic control tower location. As future facilities are proposed on airport property, they need to be coordinated with the local FAA office.

PROPERTY MAP

The Property Map provides information on the acquisition and identification of all land tracts owned by the Municipal Airport Authority. It denotes which properties were obtained by fee simple title or aviation easements. It also indicates the date of acquisition for each tract and the federal aid project number. Properties recommended for purchase are also noted.

SUMMARY

The airport layout drawings are designed to assist the Municipal Airport Authority in decision-making relative to future development. The plan considers anticipated development needs based upon forecasts developed for a 20-year planning period. Flexibility will be essential in future development as activity may not occur exactly as forecast. For this reason, areas should

be reserved for terminal and air cargo facilities which exceed the expectations of this plan. The Airspace Drawing should be used by local officials as a tool to ensure land use compatibility and restrict the heights of future structures

or antennae which could pose a hazard to air navigation. The drawings provide the Municipal Airport Authority with overall direction for development, ensuring long term airport viability and services for the Fargo-Moorhead region.