

Transportation Plan

Many of the transportation issues in Grosse Ile Township are unique due to the township's location on a series of islands in the Detroit River. Access to the island is limited by the two bridges: the Grosse Ile Parkway Bridge, which is owned by Wayne County and the Toll Bridge, which is privately-owned. This creates a limiting factor to growth on the island due to the limited capacity of the bridges to carry traffic on a daily basis but also the ability to evacuate the island if required due to an industrial, natural, or other disaster.

As a waterfront community, there are also unique issues related to transportation by watercraft. There are a number of navigable canals that run between the islands and make up the township that are used extensively by boaters. The township also contains a number of marinas and boat clubs that serve boaters that live both on and off the island.

The township also contains the Grosse Ile Municipal Airport, which provides facilities for general aviation.

These diverse modes of transportation all need to be planned for within the context of the overall community. Transportation facilities need to be considered in relation to traffic volumes and roadway congestion, safety, non-motorized transportation, land use relationship and intensities, impact on community character, environmental impacts, air quality, noise and fiscal constraints.

When addressing transportation issues, it is important to understand the characteristics of travel. Grosse Ile Township is predominantly a rural residential community. Therefore, much of the traffic in the township will be generated during the peak hours when residents are leaving for and returning from work. Because the township is predominantly residential, a majority of the trips generated by local residents for employment will be to destinations outside of the township.

A key goal of this master plan has been the preservation of the township's natural environment. Natural features such as the waterways not only present constraints to roadway construction, but are also major elements in defining the special context of the transportation network. In addition, other natural features such as woodlands contribute to the natural community character of Grosse Ile. In order to preserve the community character, future road improvements should balance traffic needs with consideration of natural features. Excessive road width leads to increased traffic speeds and a more suburbanized appearance. With a desire to preserve the rural character, natural features, and tree lined roads, creative transportation planning techniques may need to be implemented to meet demands on the road system.

Traffic Volumes

Traffic volume data is measured by average daily traffic counts (ADT), which is an estimate of typical daily traffic on a road. Information for the township's ADT was collected from 1998-2001 to help understand the current traffic patterns of the community. These traffic counts can be found on the Transportation System Map. All of the major roadways throughout the township are within road capacity. In order for a two-lane road to provide a level of service A, which describes roads with very low delays,



ADT should be under 9,500. All of the roads within the township are well beneath this figure with the exception of the Grosse Ile Parkway Bridge, which has over 17,000 ADT. During peak hours, this bridge will operate at a level of service F, which describes roadways with average delays of over one minute per vehicle, which is considered unacceptable to most drivers.

Bridge Traffic

Capacity: The hourly capacity of the two bridges is 1,500 vehicles each (total of both directions). The peak hour peak direction capacity will be a percentage of this based upon the direction distribution of traffic and bridge conditions. For Grosse Ile Township, the peak direction will be off the island during the AM peak hour and onto the island during the PM peak hour. The capacity of the bridge is further reduced by bridge openings. The bridge opens twice an hour, at quarter to and quarter after each hour for recreational boats and on demand for commercial crafts. The bridge openings are controlled by the Coast Guard.

- The peak hour directional split for the County Bridge is 67% peak direction and 33% opposite direction. This results in an 840-vehicle peak hour capacity in the peak direction, after factoring in a reduction of 16% to account for bridge openings. Based upon traffic counts taken in 2002 the current directional volume during the AM peak hour is 904 vehicles. Based upon a projection of these volumes, the projected peak hour, peak direction volume on the County Bridge will be 1,117 vehicles at build-out. The projected traffic volumes will exceed the 840 vehicles per hour in the peak direction capacity of the bridge by 33% once the township is built-out.
- The peak hour directional split for the Grosse Ile Bridge Co. Toll Bridge is 80% peak direction and 20% opposite direction. Assuming an average ten second delay per vehicle to collect tolls, this results in a 576-vehicle peak hour capacity in the peak direction. The directional split for the peak direction in the peak hour for the Toll Bridge is greater than the County Bridge because the on-island traffic on the Toll Bridge in the AM makes up a much smaller percentage of the total bridge traffic. Reducing this figure 16% to account for bridge openings, provides a 484-vehicle peak hour capacity in the peak direction. Based upon traffic counts taken in 2000, the current directional volume during the AM peak hour is 438 vehicles, which is 90% of the bridge peak direction capacity.

Because the County Bridge is operating at or above capacity, this will limit the amount of additional development that can occur on the island without creating serious congestion problems on the bridge. Not only does additional development lead to traffic delays, but also poses issues of public safety, such as the increase of accidents and impacts the overall quality of life for residents by leading to increases in noise and air pollution by overcrowding an already busy road.

Intersection Capacity: The ability of the bridges to carry traffic efficiently to and from the island will be largely dependant upon the operations and capacity at the intersections on either end of the bridges. Peak-hour intersection capacity analyses were completed for the intersections of Bridge/Jefferson, Bridge/Meridian, Grosse Ile/Jefferson, and Grosse Ile/Meridian. These analyses were based upon current lane configurations, traffic control (signalized or stop sign), and recent traffic counts.



The results of those analyses indicate that the four intersections are operating within acceptable levels during peak hours with the exception of a couple of specific movements at two of the intersections. The westbound left-turn at the unsignalized Bridge/Jefferson intersection is experiencing some afternoon peak hour delays (level of service (LoS) E on an A to F alpha scale) although the volume is very small. The eastbound through/left lane at the Grosse Ile/Meridian intersection is also experiencing significant delays during the afternoon peak hour (also LoS E).

Toll Booth: When looking at the capacity for the toll bridge, it is important to consider not only the bridge capacity but also the physical condition of the infrastructure at the end of the bridge, which tends to lead to traffic back-ups. The additional time it takes to pass through the toll booth on the Toll Bridge should also be incorporated into travel time. There are plans to relocate the toll booth from the center of the bridge to the “mainland” in Riverview. There is sufficient land area between the bridge and Jefferson Avenue to provide for queued vehicles at the toll booth.

However, any potential queue or delay issues could be addressed through various toll operations. All tolls are currently taken directly by an attendant (cash or token). One of several additional operations that could expedite the process would be card/code reader equipment with payment coming either prior to or after use as a pre-paid card or a card that is billed to the card holder. There are likely several other toll-taking improvements that could also help the service rate at this facility.

Evacuation of Island: With the heavy industrial uses along the Detroit River there is the potential for accidental chemical releases to the air, which with the prevailing winds, could cause an immediate health threat to island residents. This situation was experienced in 2001 when a chemical gas release from a chemical company in Riverview required the evacuation of the northern half of the island. Because of the threat of industrial, natural, or other disaster, the bridges need to have the ability to swiftly evacuate the residents of the community. This factor needs to be taken into account when planning for the full population build-out of the island.

The capacity of a typical roadway lane is based upon many factors – width, number of driveways, roadway grades, travel speed, and so on. For facilities such as these two bridge crossings where there is no “side friction” (i.e. driveways), a lane could potentially carry as much as 1,200-1,400 vehicles in an hour. If both lanes (eastbound and westbound) were to be used as westbound lanes, the bridge capacities could potentially be in the 2,400-2,800 vehicles per hour range. In the case of an emergency, vehicular access would take priority and the bridge openings would be adjusted to allow for the rapid evacuation of island residents in automobiles.

Unfortunately, the capacity of the bridge crossings will be far more predicated upon the operations and capacity at either end of the roadway section. In other words, for these crossings to process anywhere near the above volumes, the intersections at either end would need to provide free-flow conditions. That would require good emergency services control of the intersections, especially at the Jefferson Avenue side to ensure that there is a free-flow of traffic into Jefferson Avenue.

Relationship Between Transportation and Land Use



A well-developed master plan must consider plans for land use in the context of transportation planning. Future traffic patterns within the road network will be closely related to specific land use. The intensity of land uses should, in part, be considered in relationship to the suitability of the transportation system. Future traffic volumes will be dependent upon the amount, type and intensity of development. Table 16 provides the estimated traffic generated by various land uses. The figures represent averages and are given for the peak hour and a typical weekday. The peak hour represents the hour during the AM or PM where traffic is greatest (i.e. rush hour); typically from 7-8 AM and 5-6 PM. The fractional numbers represent an average (e.g. .75 of single family homes will have someone leaving during the AM peak hour).

**Table 16
Traffic Volumes
Comparison of Trip Generation Rates**

	Trips In Peak Hour	Trips In Weekday
Residential (per unit)		
Single Family	0.75 (AM)	9.57
Apartment	0.51 (AM)	6.63
Condominium	0.44 (AM)	5.86
Office (per 1,000 sq. ft. gross floor area)		
General Office Building	1.56 (AM)	11.01
Medical Office Building	2.43 (AM)	36.13
Commercial (per 1,000 sq. ft. gross floor area)		
Shopping Center	3.74 (PM)	42.92
Supermarket	11.51 (PM)	111.51
Quality Sit-down Restaurant	7.49 (PM)	89.95
Service Station (per pump)	14.56 (PM)	168.56
Convenience Store	53.73 (PM)	737.99
Drive-in Bank	54.77 (PM)	265.21
Industrial (per 1,000 sq. ft. gross floor area)		
Light Industrial	0.92 (AM)	6.97

Note: A trip is a one-way movement, 10 trips = 5 in, 5 out
 Source: Institute of Transportation Engineers, Trip Generation Manual, 6th Ed.

Functional Classification

Management of the roadway system in Grosse Ile Township can be improved through the establishment of a classification of roads and planning and designing these facilities for their specific purpose. A functional system or hierarchy of roads provides for movement of traffic as well as access to specific sites. This hierarchy will range from major arterials, which primarily provides for travel to areas outside of the township, to local subdivision streets, which serve to access individual homes. The roadway system in Grosse Ile Township consists of four different road classifications which are depicted on Map 7 and described briefly below.

- **Arterials:** Arterials provide access to important traffic generators, such as airports and shopping centers and to areas outside of the township. The primary function of



these roads is to move large volumes of traffic, therefore, access to these roads must be properly managed in order to maintain safe and effective movement. Arterials in the township consist of Meridian Road, Grosse Ile Parkway and Bridge Road both west of Meridian.

- **Collectors:** The collectors serve to gather traffic from local roads and subdivision streets of residential neighborhoods and deliver it to arterial roads. Collectors also serve to provide access to abutting properties. Collectors designated by Wayne County include Groh Road, Bridge Road, East River Road and West River Road.
- **Local Collectors:** In addition to the above collectors designated by Wayne County, there are also a few local streets that function as collectors. These include Macomb Street, Ferry Road, Church Road and Parke Lane.
- **Local Streets:** Local streets serve primarily to provide access to individual property and homes. These roadways are generally short, and provide connection to collector streets. Examples of local streets include Bellevue Road, Manchester Boulevard and Thoroughfare Road.

Roadway Improvements

One challenge for the township is to manage growth and road improvements to provide a safe and efficient roadway system without compromising the natural features that give the township its character. Over time, traffic levels will increase creating capacity deficiencies. While the need for roadway improvements will be limited, maintaining the capacity of the network through transportation management is preferable to roadway widenings. Transportation management practices described later in this chapter, such as access management, can be used to maintain the efficiency of the transportation network and minimize the need for roadway widenings. The approach of managing the system combined with targeted improvements limits costs and minimizes impacts to the community character. Existing road conditions are shown on Map 8.

- Throughout the township, roads are expected to remain two lanes, with turn lanes added at key locations, such as intersections, to improve efficiency and safety. In order to preserve the natural character of Grosse Ile Township, any future road widening to add additional lanes should balance traffic needs with consideration of natural features. Any road widening can lead to a more suburbanized appearance. Periodic congestion may be preferred over additional lanes to accommodate traffic during peak hours.
- There are a number of roads within the township that do not meet current standards for lane width. Some older roads do not have sufficient width to accommodate traffic safely. When these roads are reconstructed, they will need to be widened to provide sufficient lane width. In some instances there may be insufficient right-of-way. In these areas additional right-of-way will need to be acquired for roadway improvements.
- Selected intersection improvements should be made at locations that have irregular geometrics, sight distance problems or poor level of service. Improvements can include turn lanes, sight distance improvements, pavement improvements, signalization or roundabouts.



- Because Grosse Ile Parkway is the primary entrance to the community and Meridian Road is the main north-south arterial, the intersection of these two roads is a critical intersection from both a traffic flow and community image standpoint. This intersection is currently signalized, but as traffic levels increase other improvements may be needed at this key intersection. The poor afternoon peak hour conditions for eastbound traffic at the Grosse Ile Parkway and Meridian intersection was noted earlier. One potential solution to revising the operations and/or geometrics at that location would be to reconstruct the intersection as a modern roundabout. Significant gains have been documented relative to crash rates (safety) and efficiency (capacity) when replacing a standard intersection with a roundabout.

Roundabouts are becoming more widely used for the primary purpose of improving safety and operations at intersections. With conventional types of traffic controls, only alternating streams of vehicles are permitted to proceed through the intersection at one time, causing a loss of capacity to occur when the intersection clears between phases. In contrast, the only restriction on entering a roundabout is the availability of gaps in the circulating flow. The slow speeds within the circle allow drivers to safely select a gap that is relatively small. By allowing vehicles to enter simultaneously from multiple approaches using short headways, a possible advantage in capacity can be achieved with a roundabout. This advantage becomes more predominant when the volumes of left or right turning-movements are relatively high. Roundabouts are not the answer at all locations but can prove very successful when properly reviewed and designed.



- The majority of major roadways in the township were reported in good or very good condition by Wayne County in 1999. West River Road, however, was reported in poor condition and has a substandard road width for a two lane road. This roadway has been programmed for resurfacing and widening between Groh and Parkway in the summer of 2002.
- There are a number of gravel roads within the township. The township should work towards paving these roads through establishment of special assessment districts.
- With all roadway improvements consideration will need to be given to the design of the roadway to ensure it fits into the context of the community. Selected major roadways within the township should include bike paths and informal landscaping.

Residential Roads

The typical pavement width for local residential streets within a subdivision is 27 feet, back to back of curb. This width allows for two travel lanes with parking on one side of the road. At limited locations where there are two cars parked across the street from one another there will be a single lane in the center of the road requiring two on-coming cars to slow down and yield for one another. While this helps to keep speeds low it should only be allowed on local residential streets where volumes are lowest.



With any new roadway development, roads should be required to tie into the existing road network. This maintains a system of interconnected streets, which maintains the efficiency of the overall road network. The use of cul-de-sacs and other dead end streets should be discouraged except in areas where natural features such as wetlands or existing adjacent development patterns precludes through streets. With a connected street system, motorists are provided with multiple routes, which helps to reduce driving distances and diffuse traffic. Providing road connections between adjacent subdivisions allows for the movement between neighborhoods without the need to access major roads. It also provides alternative means for residents within the subdivisions to access the major road network at locations that are most efficient for traveling to their destination, shortening trips and thereby minimizing traffic impacts to the major road network. Connected streets also provide continuous routes that enhance non-motorized transportation. With connected streets, special consideration needs to be given to network design to discourage use by through traffic that does not have an origin or destination within the local neighborhood.

Traffic Calming

In neighborhoods where there are concerns with cut-through traffic and vehicle speeds, traffic calming techniques can be implemented to keep traffic speeds down and increase safety for pedestrians. Traffic calming is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users. Traffic calming measures are regulatory features and/or design of a street that causes drivers to slowdown and be more attentive. The intent is to reduce crashes, air pollution, congestion levels and noise pollution, and generally improve the environment of the street. Any traffic calming designs need to be coordinated with the Fire Department to ensure that emergency response times are not impacted. Some of the most common traffic calming devices are as follows:

- **Street Narrowing, Slow Points, or Chokers:** Features that narrow the street to a minimum safe width including curb modifications, channelization, and landscaping.
- **Angle Points or Chicanes:** Curbed horizontal deflections in the path of vehicle travel that are built along the edge of travel-way similar to street narrowing treatments.
- **Median Slow Points or Channelization:** Include center located islands that divide the opposing travel lanes at intersections or at mid-blocks, pedestrian refuge treatments and the other standard forms of intersection traffic control islands.
- **Intersection Diverters:** Features that partially close an intersection to limit the allowable turning movements and divert traffic.
- **Roundabouts:** Raised, center rotary islands that are used as a replacement for traffic signals and stop signs at intersections.
- **Getaways or Perimeter Treatments:** Visual and physical treatments used to communicate a message to drivers entering a residential neighborhood such as traffic signs, intersection narrowing, medians and textured pavement surfaces such as brick and landscaping features.



Traffic Impact Analysis

Increases in traffic may over time begin to place a strain on the local road system. One procedure to help ensure that traffic impacts are properly evaluated during the development process is to require a traffic impact study. A traffic impact study allows for the evaluation of a development's potential impact on the local road system and the identification of roadway improvements needed to mitigate the traffic impact, such as adding additional turn lanes or re-timing a traffic signal. Traffic impact studies would only be required for uses that have the potential to generate a large volume of additional traffic, such as restaurants and automobile service stations.

Access Management

Control of the location and spacing of driveways or access points along the main roads within the township will improve safety and help preserve the roadway's ability to carry traffic. Access management guidelines have two functions, to protect the public investment in the roadway by minimizing congestion and crash potential and to provide property owners with reasonable access to property. The goal of access management is to provide standards that will facilitate traffic operations and improve public safety along major roads. Access management looks at the following factors:

- **Number of Access Points:** Because the number of driveways allowed along major roads will affect traffic flow, ease of driving, and crash potential, the number of driveways on a major road should be limited. Alternative access should be provided from side streets wherever possible.
- **Sight Distance:** Proper sight distance needs to be provided at driveways and intersections to ensure a vehicle can safely enter or exit the traffic stream.
- **Driveway Spacing:** Driveways need to be adequately spaced from intersections and other driveways to assist in the reduction of turning movement conflicts.

Natural Beauty Roads

The Natural Beauty Road Act (Part 357, Natural Beauty Roads, of the Natural Resources and Environmental Protection Act, P.A. 451 of 1994, as amended) empowers the county to dedicate county roads as Michigan Natural Beauty Roads. The goal of the Natural Beauty Roads program is to identify and preserve in a natural, essentially undisturbed condition, certain county roads having unusual or outstanding natural beauty by virtue of native vegetation or other natural features within or associated with the right-of-way, for the use and enjoyment of local residents and the public in general. There are a number of roads within Grosse Ile that may qualify for this due to natural wooded conditions or scenic views of the Detroit River.

To initiate the process of designating a Natural Beauty Road, at least twenty-five residents must initiate a petition for designation of a road. Within six months after the petition is received, Wayne County will hold a public hearing to consider the described road as a natural beauty road. Within 30 days after the public hearing, the county announces its decision as to whether the road will be designated as a natural beauty road. The township should work with the county on designating roadways with pristine natural features as natural beauty roads.



Based upon the guidelines prepared by the Department of Natural Resources, the objectives of the Natural Beauty Roads program are:

- To officially recognize and designate roads in the county system which meet the natural beauty criteria.
- To keep these roadsides as they presently exist insofar as possible.
- To maintain and administer these roads so that they will continue to meet the criteria and at the same time provide safe public travel.
- To mark such roads for the information of the public.

This designation will assist in ensuring that the scenic quality of these roads is protected.

Non-Motorized Paths

Non-motorized pathways add to the overall quality of life for residents. Non-motorized pathways provide a variety of benefits for township residents including:

- Providing multi-modal access throughout the community to key destinations including neighborhoods, commercial areas, civic uses, parks and open space
- Providing a source of recreation for residents that bike, jog, walk, and other activities for recreation and exercise.
- Increased social interaction between residents leading to an improved sense of community

There are a number of user groups for the pathway system including pedestrians, bicyclists, recreational/health walkers and joggers, rollerbladers and persons with disabilities. The pathway system should be designed to accommodate all of these users.

The township has developed some key pathways along Meridian and Groh Roads. The plan is to extend the path system the entire north-south length of the township and to provide east-west connections across the township at key locations. The master plan for the bike path system is shown on Map 9. The pathways system will ultimately provide connections between homes and neighborhood schools, recreation, Macomb Street and other activity centers.

When a specific segment of the pathway is being designed, the following major considerations for planning the specific pathway alignment need to be considered:

- Availability of right-of-way.
- A design that produces a minimum impact on the land and nearby landowners.
- A design that minimizes the amount of tree removal and drainageway impact along the road.
- Minimizing impact on adjacent wildlife habitat and wetlands.
- An alignment that is visually pleasing and provides a variety of views and experiences and takes advantage of the natural terrain and vegetation.

A pathway should be designed with curves that appear to have a purpose, not be placed haphazardly or regularly throughout the pathway length. An alignment which has long curves and short tangents will flow gracefully through the landscape. Environmentally sensitive areas require a careful balance between the need for the pathway and the



protection of natural resources. Occasional viewing, and seating areas can be provided along the path for resting and passive recreation activities.

Residential neighborhoods require a design that is sensitive to the community character. Nearby residents should be closely involved in the design process. Consider carefully the character of the public/private interface.

The design of pathways will need to meet standards for American Association of State Highway Transportation Officials (AASHTO). In addition, because Transportation Enhancement Grants are being used for a portion of the pathway construction, pathways will need to meet the design standards of the Michigan Department of Transportation (MDOT).

The township standards for non-motorized pathways require a width of 8 feet. Current MDOT standards require pathways to be 10 feet wide along major roadways. The widths will vary in each case depending on the width of right-of-way, natural features, drainage ditches, and other constraints. They will be constructed of 2-inch thick bituminous paving material on a 3½-inch compacted aggregate base. A minimum 2-foot wide graded area, clear from obstructions, should be maintained on both sides of the pavement. The vertical clearance to obstructions should be a minimum of 8 feet.

To provide adequate drainage, while maintaining ease of maneuverability, the path pavement super elevation should be between 2 and 5 percent. Likewise, path grades should not exceed 5 percent. Where terrain dictates, grades over 5 percent are acceptable for distances of under 500 feet.

Bicycle lanes should also be developed along East and West River Roads. These additions should be incorporated into future improvements along the corridors. These lanes will provide a safe venue for bicyclists on the pavement by offering a separate lane devoted specifically to bicycle use that is out of the stream of automobile traffic. The bicycle lanes should be a minimum of 4 feet wide.

In addition to the bike path system, there is also a sidewalk system along Macomb Street with connections planned to the adjoining residential areas. This sidewalk system contributes to the pedestrian-friendly environment desired in the Macomb Street area. There are also a few other subdivisions within the township that include sidewalks. The township subdivision ordinance now requires that all new residential development provide sidewalks.

Waterways

As an island in the Detroit River, watercraft transportation is a major mode of transit for Grosse Ile. Boat usage in Grosse Ile Township is by and large for recreational purposes. There is a township marina at the Water's Edge County Club in addition to several other private boat clubs.

Grosse Ile is bordered by the Detroit River to the east and the Trenton Channel to the west. In addition, there are a number of navigable waterways within the interior of the township. The Thorofare Canal is the main internal waterway, which traverses much of the central portion of the township. In addition, there are several waterways between the smaller islands at the southern portion of the township. These waterways are used



primarily for boat docking and access to the Detroit River by residents. Maintaining these waterways so they are open for navigation is a key concern. Construction of boat docking structures needs to be reviewed to ensure that they will not constitute an obstruction to the navigable channel.

Airport

The Grosse Ile Municipal Airport is managed under the direction of the Airport Commission, appointed by the Township Board. The airport is a former naval air base, which was transferred from the U.S. government to the Township of Grosse Ile on December 3rd 1970 via a quit claims deed. The airport serves private aviation users. A separate airport layout plan was adopted for the airport in 1997. The plan is a graphic presentation of existing and proposed airport facilities, and the pertinent clearance and dimensional information required to show conformance with applicable standards.

The airport has two runways, nine taxiways, three commercial hangers and 65 T-Hangers. Runway 4/22 is a non-precision instrument runway and is 4978 feet long and 100 feet wide. Runway 17/35 is a visual runway and is 3750 feet long and 75 feet wide. In 1994 there were a total of 63,700 annual operations with 350 operations on the busiest day. Total annual operations are projected to increase to 81,500 in 2015. The majority of aircraft are single engine propeller with a seating capacity of nine or fewer.

Map 10 illustrates the airport approach plan for the runways what establishes horizontal and angled slopes surrounding the airport. Structures or objects above these surfaces, such as towers or tall trees, constitute a hazard to aviation. There is a primary surface immediately surrounding each runway, and the angled approach surface for each runway approach. The slope of the approach varies between 20:1 and 34:1 depending on the classification of the runway. Surrounding the airport for 5000 feet is a horizontal surface 150 feet above the established airport elevation. Between the primary surface and the horizontal surface there is a transitional zone with a slope of 7:1. Surrounding the horizontal surface is a conical surface that extends upward in all directions at a slope of 20:1 extending between 150 feet and 200 feet above the established airport elevation.

