FINAL DRAFT APPENDIX VOLUME

STATE ENVIRONMENTAL IMPACT STATEMENT
FEDERAL ENVIRONMENTAL ASSESSMENT

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AIRPORT MASTER PLAN
PHASE 1A & PHASE 1B IMPROVEMENTS

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appendix

ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD)

METROPOLITAN AIRPORTS COMMISSION

APPENDIX 1

INFORMATIONAL APPENDIX

INFORMATIONAL APPENDIX

This appendix analyzes the development in Phase 2 and Phase 3 (between 1990 and year 2000) of the AMP as added to Phase 1A and Phase 1B development. The arrangement and level of development of facilities to be actually accomplished during Phase 2 and Phase 3 is dependent on the level of demand for facilities at that time and the Phase 1A and Phase 1B alternative that is selected. Regulatory approval of development as described for Phase 2 and Phase 3 in the AMP is not sought in this EIS/EA. The purpose of including planned Phase 2 and Phase 3 development in this Informational Appendix is to provide a description of environmental impacts which may occur with Phase 2 and Phase 3 development as presented in this EIS/EA. If Phase 2 or Phase 3 development is other than that presented in this EIS/EA, the resulting environmental impacts may be different than those described in the Informational Appendix. The level of activity for Phase 2 and Phase 3 development is assumed to be the level of higher activity projected for the airport for year 2000 as shown on Table 2E-1 (Appendix 2E) or that which can be accommodated by the facilities shown.

For the purposes of this EIS/EA, the layout of facilities at Janes Field by year 2000 is assumed to be as described below. The Phase 2 and Phase 3 development analyzed assumes development of the airport configuration from Alternative 8, the northerly 1,655 feet of Runway 17-35 and parallel taxiway as a result of Phase 1A and Phase 1B construction will be removed and the area returfed resulting in a 3,200 foot long runway 17L-35R. A 4,855 foot long runway would be constructed 750 feet west of and parallel to the 3,200 foot long Runway 17-35. The 3,200 foot north-south runway would be named Runway 17 left 35 right (17L-35R). The new 4,855 foot runway would be numbered 17R-35L. Runway 35L threshold will be directly west of the Runway 35R threshold. A parallel taxiway would be constructed 240 feet west of Runway 17R-35L.

A 3,200 foot long runway would be constructed 700 feet north of, and parallel to the east-west runway, Runway 8-26. The southerly east-west runway would be numbered Runway 8R-26L. The 3,200 foot long east-west runway north of the existing east-west runway would be numbered Runway 8L-26R. Runway 26R threshold would be located slightly west of Xylite Street as would be Runway 26L threshold. A full length parallel taxiway would be constructed 250 feet north of Runway 8L-26R. A 45 acre building area would be constructed north of Runway 8L-26R and west of Runway 17R-35L. Access to this building area could be gained from 99th Avenue N.E. to the west and/or 101 St Avenue N.E. to the north.

Additional development proposed after Phase 1A and Phase 1B includes location of a 24 hour operating air traffic control

tower and a precision instrument approach procedure to Runway 26L. The control tower would have to be operational before parallel runways, as proposed, could be operational. For the purposes of this EIS/EA, the installation and operation of the 24 hour control tower and implementation of a precision approach procedure to Runway 26L is assumed to occur during the Phase 2 to Phase 3 time period (1990-2000). A parcel of property beneath Runway 26L and Runway 26R clear zones would be acquired to give MAC property interest in fee simple sufficient to protect Runway 26L and Runway 26R clear zones. The property to be acquired is along the abandoned railroad grade south of 101st Ave N.E. Additionally, a medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR), as described in Section 4.6.2, supplements the proposed precision approach procedure to Runway 26L. Full Phase 2 and Phase 3 development is depicted on Figure 1.1.

1.1 LDN ANALYSES

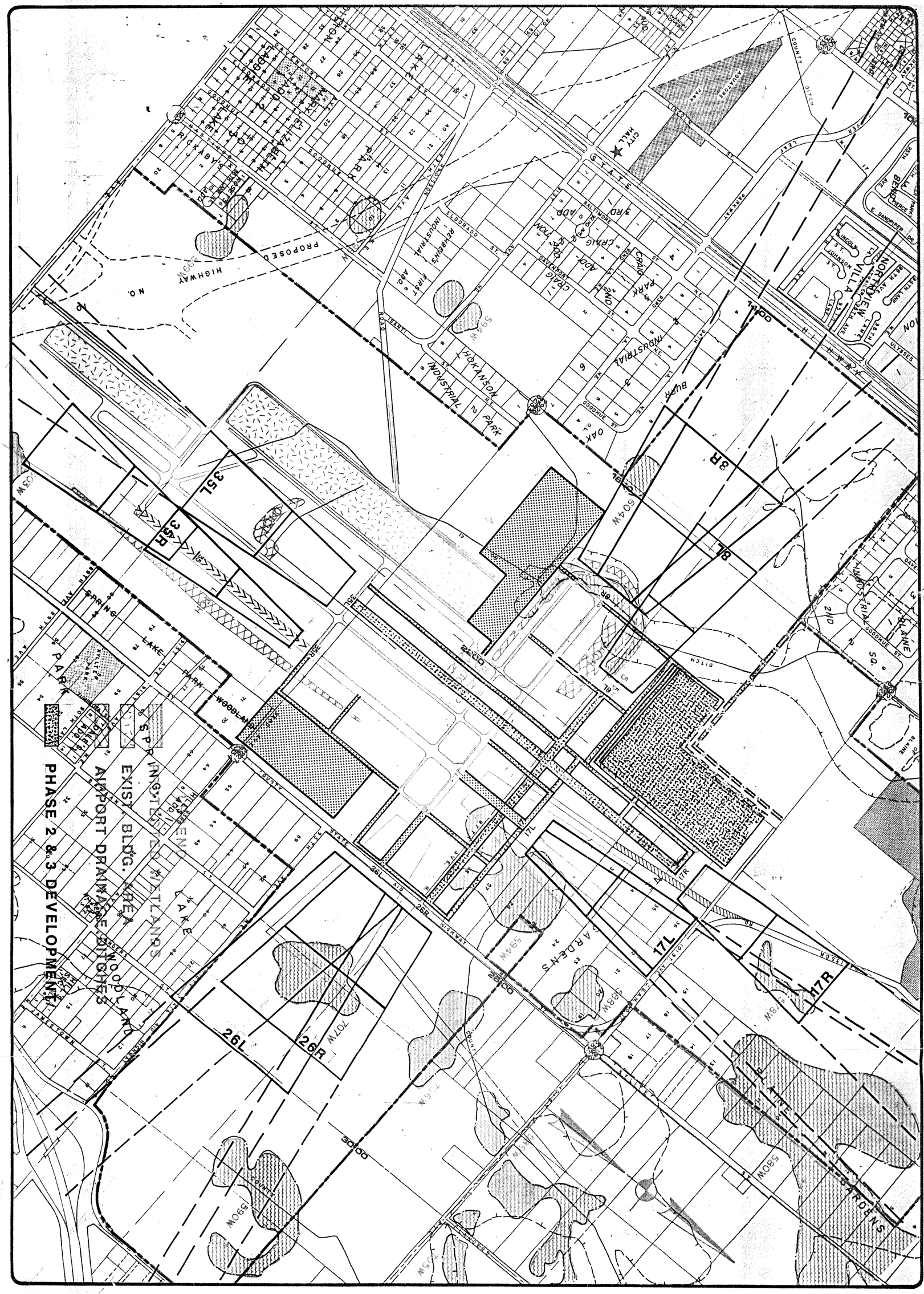
The 75, 65 and 55 Ldn noise contours generated as a result of full Phase 2 and Phase 3 development is depicted on Figure 1.2. The 75 and 65 Ldn noise contours are completely on airport property. The 55 Ldn contour extends off airport property west of Xylite Street north of 101st Ave. N.E. to 105th Ave. N.E. and west of State Highway 65. The contours were developed in the same manner as those described in Section 5.1.2 of the EIS/EA.

1.2 L_{10} ANALYSES

The $L_{10}65$ noise contours generated as a result of full Phase 2 and Phase 3 development are depicted on Figure 1.3. The number of persons within the $L_{10}65$ contours would be 607 assuming the same population density as at present.

1.3 IMPACT TO GROUNDWATER

There are two areas of concern regarding the groundwater effects of the Phase 2 and Phase 3 building areas. These have to do with the fate of contaminants accidentally spilled and with the effects of foundation drains in the building areas on nearby wetlands. This section briefly describes these effects. It should be noted that these descriptions are extrapolated from the findings of the effects of the Phases 1A and 1B building areas.



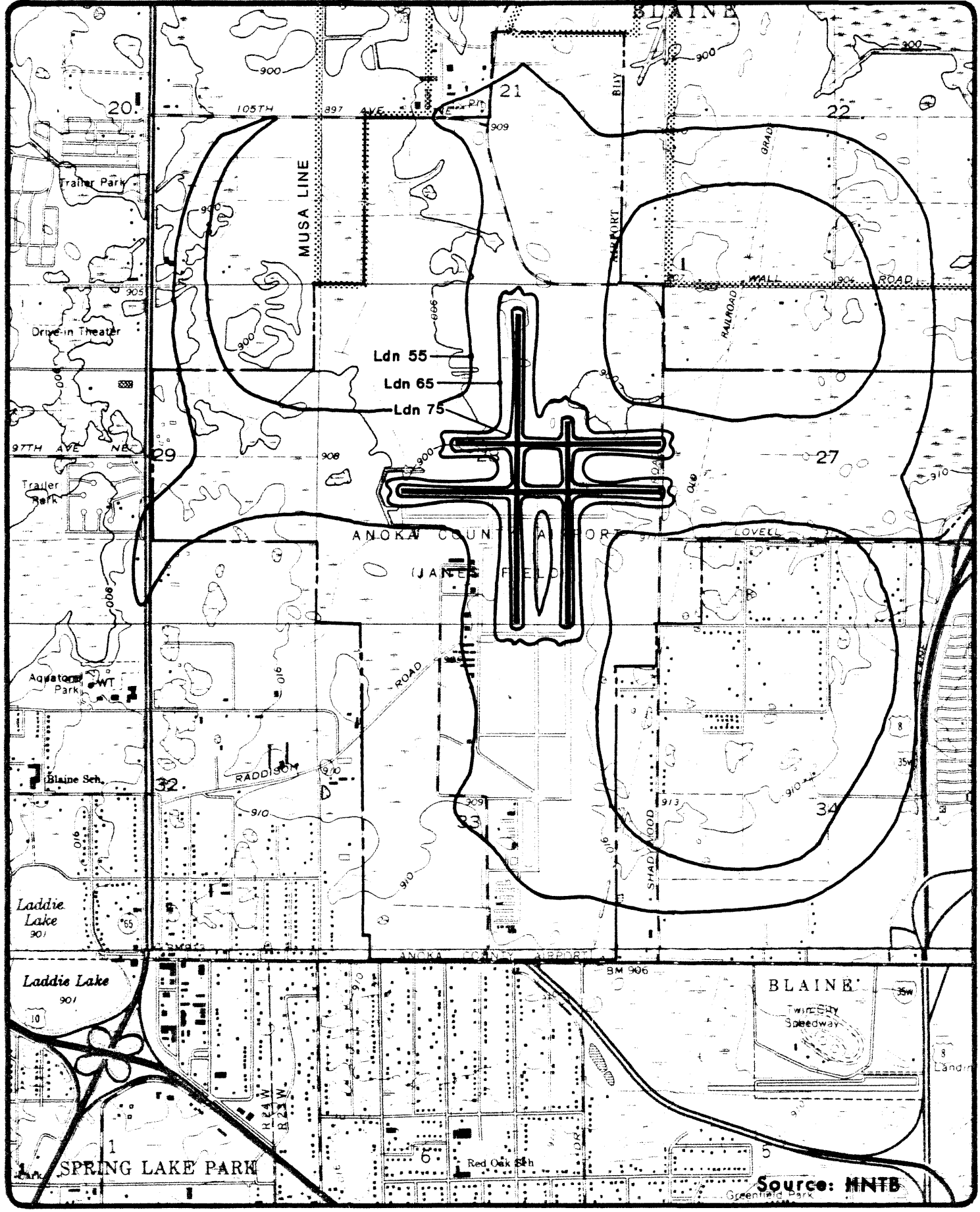
ANOKA COUNTY – BLAINE AIRPORT (JANES FIELD) EIS/EA

PHASE 2 & PHASE 3 – FULL DEVELOPMENT

HTA companies

1" = 1000'

FIGURE 1.1



ANOKA COUNTY – BLAINE AIRPORT
(JANES FIELD) EIS/EA

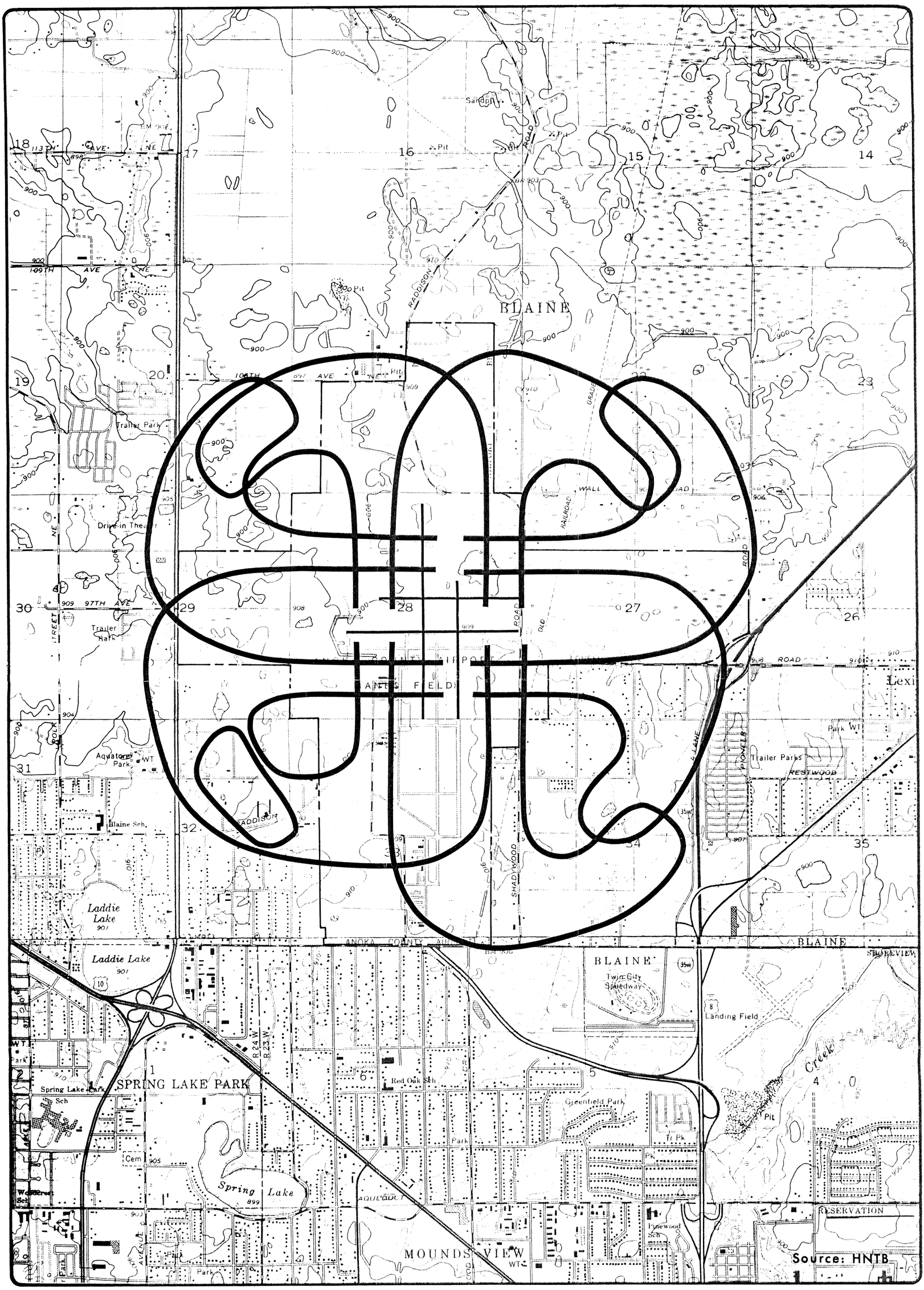
Ldn CONTOURS – PHASE 2 & PHASE 3

HTA companies

Scale: 1"=2000'

N

FIGURE 1.2



ANOKA COUNTY – BLAINE AIRPORT (JANES FIELD) EIS/EA

COMPOSITE $L_{10}65$ CONTOURS – PHASE 2 & PHASE 3

HTA companies

Scale: 1"=2000'

N

FIGURE 1.3

Figure 1.3
Composite L_{10}65 Contours

The building areas for Phase 2 and Phase 3 are located approximately 2000 and 3500 feet, respectively, from County Ditch No. 41. As a result, the Phase 2 and Phase 3 building areas are in a hydrologic setting similar to that of the Phase 1B building area. Consequently, the movement of accidental spills from these building areas will also be similar. Therefore, the discussions of contaminant movement in Section 5.2 of the EIS/EA for the corresponding Phase 1A and Phase 1B building areas should be consulted to assess the expected migration of accidental spills.

The water table is very shallow in the Phase 2 and Phase 3 building areas so that foundation drains will very likely be needed. It is expected that potentially significant adverse drawdown effects of foundation drains will be experienced by the adjacent protected wetlands, 595W and 594W. Consequently, these wetlands are likely to experience more frequent drying periods and greater annual fluctuations in water levels.

1.4 Impact to Surface Water

- **Secondary Effects from Phase 2 and Phase 3 Development to Stormwater Quality**

The effects of development of Phase 2 and 3 at Anoka County Airport (Janes Field) on stormwater quality is minimal. Most of the detrimental effects to stormwater runoff at airports occurs at the building areas, where planes are fueled, washed and deiced. The northwest building area proposed as part of the Phase 2 and 3 development will have extensive precautions against stormwater contamination. The single most controllable source of contamination is the refueling operation. This is typically done in a localized area where spills are expected and can therefore be readily contained. Aircraft washing and deicing operations, also localized to the building area are effectively treated in grassed swales as described in the Section 5.11.4 which discusses sedimentation control structures.

Impacts to stormwater quality caused by the parallel runway and taxiway system proposed in Phase 2 and 3 development are limited to contamination of runoff by urea applied to paved surfaces to prevent icing. This chemical is relatively harmless to the environment and is absorbed as a fertilizer by the grassed infields surrounding the paved areas. The nature of the layout of a parallel runway and taxiway system creates many grassed infield areas with gentle slopes. These infield areas tend to act as detention ponds, promoting stormwater treatment.

1.5 BLAINE REQUIREMENT FOR SPECIFIC HEIGHT ABOVE FLOODPLAIN

To comply with the City of Blaine requirement that all building construction at the first floor elevation be 1 foot above the 100-year flood storage level, fill will be required for the minimum floor elevation for buildings in the northwest building area to be 901' MSL.

1.6 REQUIREMENTS TO CONTROL RATE OF DISCHARGE

- Details of Design Storms Phase 2 and Phase 3

Table 1.1 lists rates of stormwater discharge in cubic feet per second at the point where stormwater runoff leaves airport property through the two county ditches shown on Figure 5-30.

1.7 IMPACTS TO WETLANDS

Wetland types and their distribution on the airport property have been described in Section 5.7.1 of the EIS/EA. Full development of Phase 2 and Phase 3 would impact approximately 6.52 acres of type 1/2 bottomland forest, 11.55 acres type 2 wet meadows, 29.8 acres of type 2/6 shrub swamp and 11.04 acres of type 3/4 shallow and deep marsh which is a total of about 58.91 acres of affected wetland. All of the type 3/4 wetland affected would be within Protected Wetlands 594W and 595W (see Section 5.7.1 of the EIS/EA). Using the U.S. Fish and Wildlife Service Habitat Evaluation Procedure (HEP) outlined in Section 5.7.3 of the EIS/EA, full Phase 2 and Phase 3 development would result in the loss of 360.8 habitat units. It is unknown what wetland conditions will exist at the time Phase 2 and Phase 3 might be actually developed. The character of wetlands directly associated with County Ditch 41 has changed since it was first built and are likely to continue changing. The large expanse of type 2/6 shrub swamp in the northwest portion of the airport property has become considerably drier over the years due to past drainage and thus portions are taking on upland characteristics. It is likely that other parts of this complex may become more upland in character.

TABLE 1.1

ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD) EIS/EA

COMPARISON OF STORMWATER DRAINAGE

CONSTRUCTION AREA	5 Year Storm				100 Year Storm			
	Discharge Before Construction		Discharge After Construction		Discharge Before Construction		Discharge After Construction	
	County Ditch #41	Lateral #2	County Ditch #41	Lateral #2	County Ditch #41	Lateral #2	County Ditch #41	Lateral #2
Northwest Building Area (Phase 2/3 Dev)	127.2	56.9	153.9	56.9	236.1	101.8	285.8	101.8
Runway 8-26 Lateral Shift (3200' Length)	127.2	56.9	125.8	60.4	236.1	101.8	233.6	108.1
2 Parallel Runways R/W 18-36 (Phase 2/3 Dev)	127.2	56.9	130.5	63.4	236.1	101.8	242.4	113.4
2 Parallel Runways R/W 17-35 (Phase 2/3 Dev)	127.2	56.9	129.8	65.0	236.1	101.8	241.1	116.3

Source: Hoyle, Tanner & Associates, Inc.

Mitigation measures for the wetland impact associated with the Phase 2 and Phase 3 development possibly could be devised within the airport boundaries; however, it is more likely that such measures would be undertaken at least partially offsite.

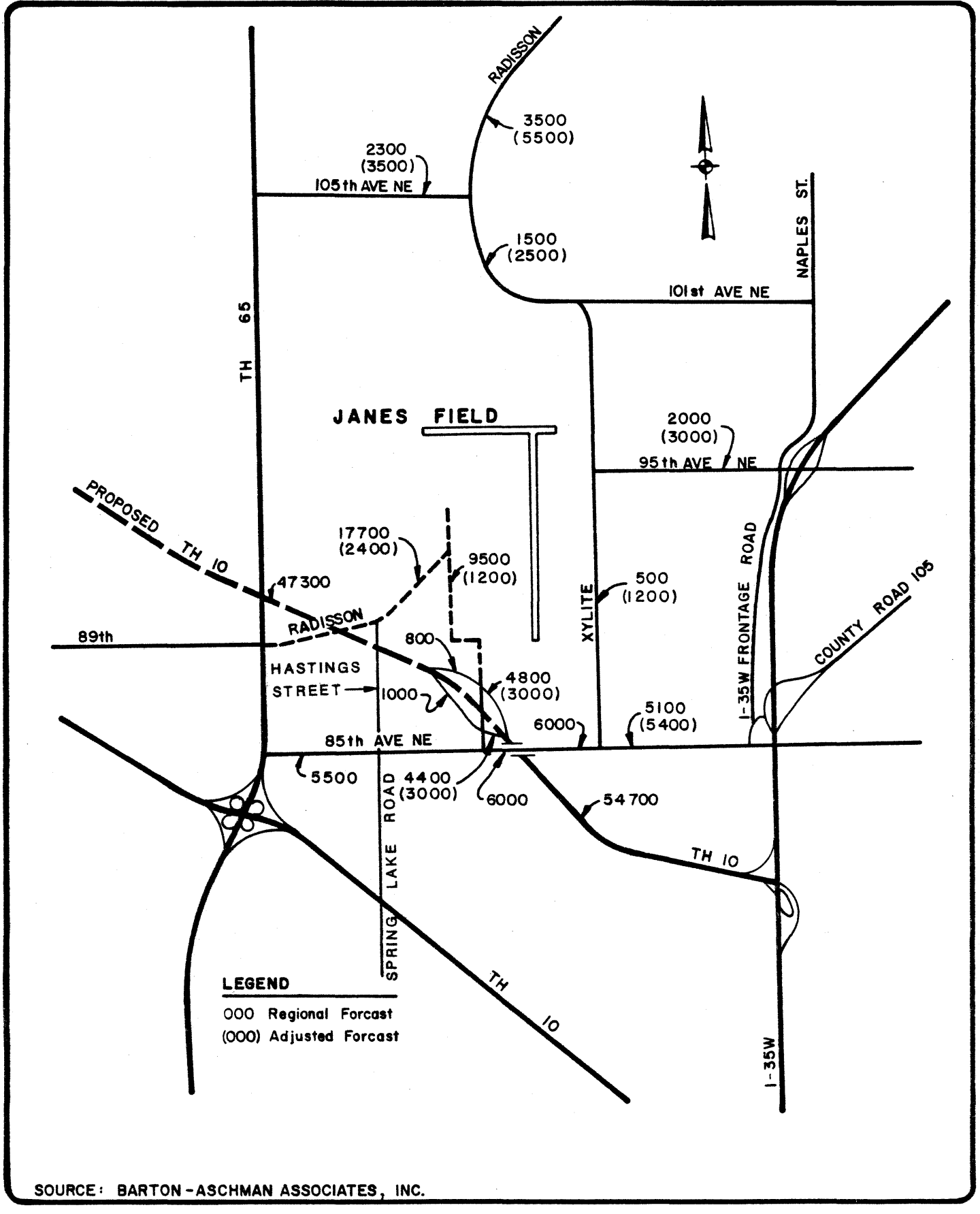
1.8 FLORA AND FAUNA

- Movements of Resident and Migratory White-Tailed Deer

It is impossible to predict deer behavior with a high level of precision under existing conditions and it is even more speculative to do so for future conditions where land uses surrounding the airport might be vastly different than at present. About all that can be said is that the density of new runways, taxiways and hangars would be expected to completely divert the southwest to northeast deer movements which presently follow the edge of the safety zone north of Runway 8-26. Sufficient space will still remain along the west airport boundary for deer to reach the northern part of the property. Access to the eastern portion of the airport property would also be affected, however, deer movements into this area could continue across non-airport property.

- Upland Wildlife Habitat

Full Phase 2 and Phase 3 development would require the use of 45.1 acres of cropland, 25.0 acres of mixed grassland, 2.1 acres of aspen and 4.1 acres of oak woods. The wildlife species that would be affected would be the same as those affected by the shifting of Runway 17-35 (see Section 5.8.2 of the EIS/EA). A substantial amount of cropland would be converted to mowed grass and pavement; however, this cropland's main value is as a food source and temporary summer cover for deer. Food is probably not the main limiting factor for deer in the airport area because of the abundance of other cropland and mast producing oak forest. Loss of summer cover would not be a major impact upon deer; however, impacts of adjacent shrub swamp (see Section 5.7.6 of this Appendix) will reduce bedding and winter cover also. The net result will probably be a slight reduction in the number of deer on the airport property. The actual magnitude of this reduction cannot be accurately predicted without knowing the future conditions of lands adjacent to the airport.



SOURCE: BARTON-ASCHMAN ASSOCIATES, INC.

ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD) EIS/EA

DAILY TRAFFIC FORECASTS YEAR 2000 ADT

HTA companies

1" = 3,000'

FIGURE 1.4

1.9 MOVEMENTS OF RESIDENT AND MIGRATORY GREAT EGRETS

Since no egret nests have been located in close proximity to the airport, no impacts on egret nesting or movements would be anticipated as a result of full development.

1.10 TRAFFIC FORECASTS

See Figure 1.4 for Year 2000 Average Daily Traffic figures for the road system and Janes Field. With construction of T.H. 10, traffic levels in the area of the airport will not be significant to create capacity problems with the road network.

1.11 APPROACH SURFACES IN RELATION TO EXISTING AND PLANNED LAND USES

As a precision approach procedure to Runway 26 is proposed during Phase 2 or Phase 3, the inner 10,000 feet of the MnDOT approach surface will incline at 50:1 and the inner width of the approach surface to Runway 26 and Runway 8 will increase from 500 in Phase 1A and Phase 1B to 1,000 feet. The clearance of the Runway 8 approach surface over airport property will not change from present conditions. With the change in slope, clearance of the Runway 26 approach slope over airport property will decrease from 148' (Phase 1A to Phase 1B) to 118' when the 50:1 precision approach surface is implemented.

1.12 INDUCED SOCIO-ECONOMIC IMPACTS

During Phase 2 and Phase 3 maximum available runway length will not change from that at present. The Phase 2 and Phase 3 building areas will better serve to accommodate long-term aviation needs, specifically of the north and northwest sections of the Metropolitan Area, but also the Metropolitan Area as a whole. As with Phase 1A and Phase 1B development, Phase 2 and Phase 3 development will be a positive stimulus that could result in additional jobs both at the airport and in surrounding areas through the provision of an improved transportation facility capable of attracting business.

1.13 EROSION

With implementation of erosion control plans discussed in Section 5.2.2 of the EIS/EA, Phase 2 and Phase 3 development will result in no erosion problems for either the short-term or long-term. Additional impervious areas created over existing Year 1985 conditions are 39.14 acres, for runway and taxiway construction and 122.78 acres for building area construction, for a total of 161.92 acres.

1.14 AIR TRAFFIC CONTROL TOWER AND PRECISION INSTRUMENT APPROACH PROCEDURE

As discussed in Section 1.1, Phase 2 and Phase 3 airfield development, namely parallel runways to Runway 17-35 and Runway 8-26, are dependent on a 24 hour air traffic control tower being operational at Janes Field. Currently, the air traffic control tower is manned on weekends by the Minnesota Air National Guard. The environmental impacts of Phase 2 and Phase 3 development have been assessed previously in this EIS/EA. Operation of a control tower would better inform pilots of airport operating regulations such as arrival runways. For example, air traffic controllers could help ensure that southerly departures turn right or left before crossing County Road J. The only additional impact of Phase 2 and Phase 3 development not previously assessed would be increased traffic levels generated specifically by control tower employees. Assuming 8-12 employees per 8 hour shift, employees from the control tower will not create noticeable increases in auto traffic levels from the airport over that presented in Section 5.9.

An Instrument Landing System (ILS) precision approach procedure to Runway 26L was proposed in the AMP during the Phase 2 and Phase 3 time period to provide a glide angle to the runway. Presently there are two non-precision approach procedures to Runway 8-26, a VOR approach to Runway 8 from the GOPHER VOR 6.5 miles to the west and a VOR/DME approach to Runway 26 beginning five miles east of Runway 26.

The current approach minimums lowest ceiling and visibility present at the airport required to execute the current VOR/DME approach to Runway 26, is a ceiling of 431 feet above ground level and 1 mile visibility. The lowest altitude which a pilot can descend on the VOR/DME approach using the Crystal Airport altimeter reading to Runway 26 is 431 feet above ground level before either sighting the airport environment or executing a missed approach at the missed approach point. If a pilot is approaching Runway 26 with the VOR/DME approach and circles,

turns away from the approach to land at another runway the approach minimums are a ceiling of 1400 feet above ground level and a visibility of one mile.

The FAA is currently changing precision approach equipment from ILS to Microwave Landing System (MLS). Whatever the equipment used, typical minimums for a precision approach procedure are a ceiling of 200 feet above ground level and visibility of 1/2 mile. The circle to land minimums from Runway 26 will be the same for a precision approach procedure as for the existing VOR/DME procedure. Therefore, with a precision approach procedure to Runway 26, aircraft circling to land on Runway 17-35 would be at the same altitude over areas north and south of the airport as with the existing Runway 26 VOR/DME approach procedure.

As mentioned in Section 4.8, most turboprop aircraft and all jet aircraft will use Runway 17-35 as the 4,000 foot length of Runway 8R-26L is inadequate to accommodate these aircraft. Therefore, the implementation of a precision approach procedure to Runway 26 would cause no significant change in the level of activity or approach procedures of turboprop or jet aircraft at Janes Field.

The precision approach procedure to Runway 26 will affect single engine piston and multi-engine piston operations at Janes Field. The single and multi-engine aircraft would have a better approach (lower minimums) with the precision approach procedure and in periods of low visibility (typically low wind speed) conditions would be less inclined to execute the circle-to-land procedure to Runway 17-35.

The current approach procedure (if the airport is not sighted at the missed approach point) for the Runway 26 VOR/DME procedure is to climb to 2700 feet MSL and proceed directly to the GOPHER VOR 7 miles west of the airport and hold there until cleared for another approach to the airport by air traffic control. This missed approach procedure is expected to be continued in the future.

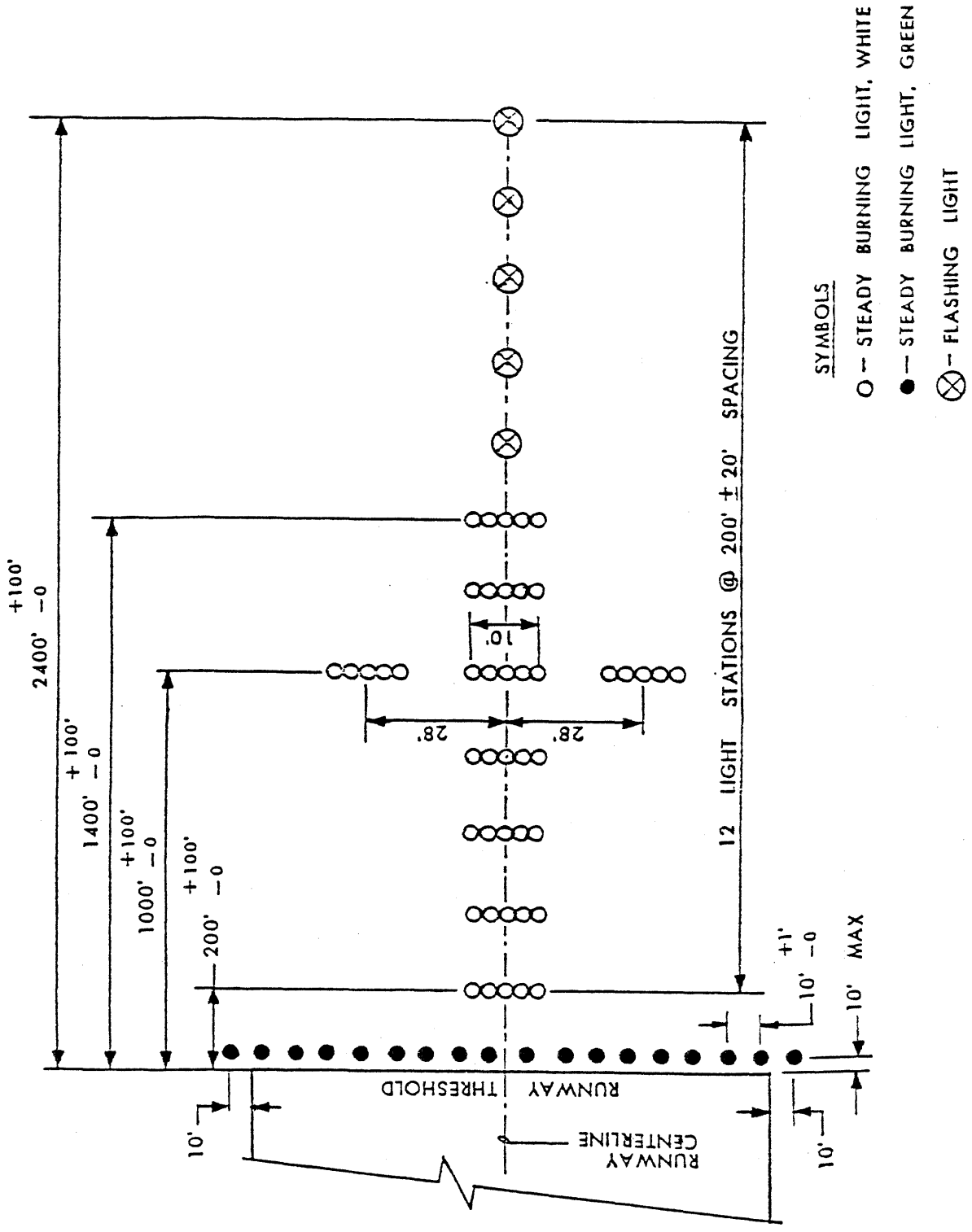
In summary, the implementation of a precision approach procedure will not significantly affect aircraft operations north or south of the airport from current conditions as pilots of business jets or most turboprop aircraft will be no more inclined to land at Janes Field (as they would have to circle-to-land to Runway 17-35) than at present. With a precision approach procedure, single engine piston, multi-engine piston and some turboprop aircraft that would use the procedure would be able to land at the Janes Field with lower ceiling and visible minimums than with the Runway 26 VOR/DME procedure. However, as with jet and most turboprop aircraft, operations by single engine piston, multi-engine piston and some turboprop aircraft over areas north and south of the airport would not change and would thus create no more impact than at present.

The feasibility and timing of construction and staffing of a 24 hour air traffic control tower and the implementation of a precision approach procedure are entirely at the discretion of the FAA since they would own both facilities.

1.15 MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATOR LIGHTS

FAA Order 8260.3B Terminal Instrument Procedures (TERPS) provides that to obtain approach visibility minimums as low as 1/2 mile for a precision approach procedure a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) is required. The MALSR proposed for Runway 26 consists of 12 light stations beginning approximately 200 feet from the Runway 26 End. The 12 light stations are approximately 200 feet apart on the extended runway centerline as shown on Figure 1.5. The complete MALSR system would extend approximately 2,400 feet beyond Runway 26 End. The seven light stations closest to the runway end have each five or 15 steady burning 150W white lights. The five outermost light stations each have a single light which flashes twice per second sequentially from the outermost light station to the eighth light station at an intensity of 60W/second. Beginning at the first light station 200 feet from Runway 8 End the approach light plane (line connecting the center of the approach light) can incline at slope of 0-+2%. The elevation of the proposed Runway 26 End is approximately 909 feet MSL. At a maximum positive slope of 1-2%, the outermost light station 2,400 feet from proposed Runway End 26 would extend a maximum of 21-43 feet above the I-35 feeder road on extended runway centerline (elevation 910'± MSL) or 1-23 feet above the bridge on 95th Avenue N.E. over I-35W (elevation 930' MSL). The flashing lighting on the outermost five light stations are aimed at 6 degrees above horizontal. The steady burning white lights at the innermost seven light stations are aimed above horizontal at varying angles depending on the profile of the approach light plane.

Due to the height of the approach light plane at the airport boundary, and that both the steady burning white lights and the flashing white lights aimed above horizontal, the beam of light generated from the approach lights will be above all land uses east of the airport. Therefore, the approach lights will not impact vehicular traffic on the I-35W feeder road, on 95th Avenue N.E. or on I-35W and will also not impact land uses east of the airport.



Source: Aviation Lighting – Crouse Hinds Lighting

ANOKA COUNTY – BLAINE AIRPORT (JANES FIELD) EIS/EA TYPICAL MALSR INSTALLATION	HTA companies	Not to Scale	FIGURE 1.5

APPENDIX 2

GENERAL APPENDICES

APPENDICES 2A

SCOPING ENVIRONMENTAL ASSESSMENT WORKSHEET (EAW FEBRUARY, 1985

Citizen Petition - March 20, 1984
Scoping Decision Document - April 15, 1985
Public Notices
Summary of Transcript of Public Hearing

SCOPING ENVIRONMENTAL ASSESSMENT WORKSHEET (EAW)

FEBRUARY, 1985

SCOPING
ENVIRONMENTAL ASSESSMENT WORKSHEET (EAW)

for

ANOKA COUNTY - BLAINE AIRPORT
(JANES FIELD)

PHASE 1A AND PHASE 1B DEVELOPMENT

February, 1985

Minneapolis . Saint Paul
Metropolitan Airports Commission

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ERRATA SHEET

ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD)
ENVIRONMENTAL IMPACT STATEMENT
for
PHASE 1A AND PHASE 1B IMPROVEMENTS

DRAFT SCOPING DECISION DOCUMENT

April 2, 1985

Page	Element	Revision
4	2.1	7th dot point should read: "1977 Metropolitan Development Guide, Aviation Chapter and any information available from the update of this document now in process.
6	2.3	Add dot point to read: "Field observation of flight patterns to determine actual flight tracks and aircraft altitudes."
9	5.1	Delete last sentence of last dot point which reads "total of 60 calculations."
17	5.10	Insert after first sentence which ends with the word 'regulations.' "This will include the analysis of any impacts related to potential land acquisitions in the Runway 26 clearzone."
17	5.10	Insert new paragraph at the end of Element 5.10: "Concurrent with, but not incorporated in the Environmental Impact Statement, MAC will study safety records and issues at Anoka County-Blaine Airport.

E.R./# (filled in by EQB) _____

ENVIRONMENTAL ASSESSMENT WORKSHEET (EAW)

1. PROJECT NAME
   Anoka County-Blaine Airport (Janes Field)
   Phases 1A and 1B Improvements

2. PROPOSER
   Metropolitan Airports Commission

   CONTACT PERSON
   Mr. Nigel D. Finney, Director of Planning and Engineering

   ADDRESS
   6040-28th Avenue South
   Minneapolis, MN 55450

   PHONE
   (612) 726-1892

3. RGU
   Metropolitan Airports Commission

   CONTACT PERSON
   Mr. Nigel D. Finney, Director of Planning and Engineering

   ADDRESS
   6040-28th Avenue South
   Minneapolis, MN 55450

   PHONE
   (612) 726-1892

4. PROJECT LOCATION
   Section: 28, Township: TWP 31N
   Range: 23W

   a. County Name: Anoka City: Blaine

   b. Exhibit 1 - County Highway Map
      Exhibit 2 - USGS Map
      Exhibit 3 - Zoning Map and Site Plan
      Exhibit 4 - Hydrology
      Exhibit 5 - Wetlands
      Exhibit 6 - Existing Land Use
      Exhibit 7 - Soils

5. DESCRIBE THE PROPOSED PROJECT (WHAT WILL BE DONE AND HOW LONG WILL IT TAKE).
   The Anoka County-Blaine Airport (Janes Field) Master Plan, completed in September, 1983, recommends a series of facility developments for the airport to be undertaken as demand for such facilities grows. All development at the airport outlined in the Airport Master Plan (AMP)

is directed toward fulfilling the airport's role as a "Minor Airport" consistent with current state statutes and a resolution of the Metropolitan Airports Commission at their June, 1980 meeting. The primary goals of the Master Plan alternatives analysis were "...(1) to improve the compatibility of the airport with the surrounding communities to the greatest extent possible, and (2) to provide facilities that would maximize the safety of aircraft operations at the airport." In 1980 the Minnesota Legislature enacted Minnesota Statute MS 473.641 Subdivision 4 prohibiting MAC from expanding an existing metropolitan airport from Minor classification to Intermediate classification as defined by the Metropolitan Development Guide. In 1983 the Minnesota State Legislature enacted Minnesota Statute 473.653 which prohibited MAC from taking any action at an airport owned by MAC that would result in a net reduction of usable runway length at that airport. Additionally MS 473.653 provided that retention of an existing runway length shall not cause the airport to be reclassified from a Minor use to an Intermediate use airport. There appears to be a tension between M.S. 473.641 Subdivision 4 and M.S. 473.653. However, both statutes remain in full force and affect MAC's planning and operation of the Anoka County-Blaine Airport (Janes Field). The recommended development scheme presented in the Master Plan grew out of a process which focused on the above goals and on the legislation in the course of a series of public meetings and public debate.

Four phases of development are outlined in the Master Plan; Phase 1A, Phase 1B, Phase 2 and Phase 3. Phase 1A and Phase 1B include projects which change the existing airport layout by shifting Runway 17-35 to the north and by extending Runway 8-26 to the east. Phase 1A and Phase 1B also include the development of two new hangar areas which complement the existing airfield structure. The objectives of these first phase projects are to mitigate aircraft noise impacts in the residential areas bordering the airport, particularly to the south, and to provide additional hangar development areas for those who wish to build aircraft storage facilities similar to those now on the field. Phase 2 and Phase 3 of the Master Plan include additional shifting of existing Runway 17-35 to the north as well as the construction of two new runways, one parallel to and westerly of existing Runway 17-35 and one parallel to and northerly of existing Runway 8-26. Additional new aviation building areas are also included in Phase 2 and Phase 3. The objectives of these Phase 2 and Phase 3 improvements are to further mitigate aircraft noise impacts on residential areas around the airport, to further improve the margin of safety by fostering separation of itinerant and training traffic, and to provide operational capacity consistent with possible future levels of demand.

The Master Plan also contemplates two other new facilities which are not specifically included in any development phase; namely the installation of an Instrument Landing System (ILS), including an approach light system, for the Runway 26 approach, and the installation of an air traffic control tower. The ILS and control tower are not included in a development phase because such facilities will be installed, owned and operated by the Federal Aviation Administration (FAA), and not by the airport owner/operator. Accordingly, the FAA determines whether or not such facilities are needed and feasible, and if so when they will be installed.

Although the Master Plan did not put any specific time frames on the development phases, the development items included in Phase 1A and Phase 1B will be required to meet needs or demands which either exist today or are likely to exist within the next 5± years. It is expected that the development included in Phase 2 and Phase 3, as set forth in the Master Plan, will not be required within the next 5 years, and in all probability will not be required until 10 to 20 or more years from now. In fact, the development in these phases will not be undertaken at all unless future demands clearly require them. The ILS and the control tower can also be expected to be installed more than 5 years from now.

To fully appreciate the timing of the precision approach instrumentation and control tower, a short review of the FAA funding and priority programs is in order. First, the FAA would need to place an ILS system into their proposed program (The FAA has currently no plan to provide an ILS for the Airport). Several years thereafter, the FAA may place the project in their budget. The chance of this happening is becoming less likely each day. The FAA is now phasing out ILS systems in favor of Microwave Landing Systems (MLS). The MLS type system is being provided to high priority airports first. These airports are the air carrier and large general aviation types. Anoka County Airport does not fit in these categories. Currently Anoka County-Blaine Airport is listed in the 6 to 10 year period for a MLS in the National Plan of Integrated Airport Systems.

Not unlike the ILS/MLS installation, the establishment of an FAA control tower is dependent on an FAA determination of need and priority. Since the air controllers strike a few years ago, many FAA towers have become unmanned. Gradually the FAA is proceeding to reopen these facilities as personnel and budget allow. Some of the old towers which were operated on a full time basis have been brought back into service on a limited basis, operating only during peak periods. Very few new control towers have been opened since the strike. In light of these facts, it is quite clear that neither the control tower nor the precision approach instrumentation will be installed at the airport until 1990 or later.

If the FAA wishes to install a precision approach system or a control tower, they must undertake a thorough environmental analysis of such actions. Appendix 1 in FAA Order 1050.1D Policies and Procedures for Considering Environmental Impacts describes projects subject to environmental assessment. Paragraphs 4a and 4b of Appendix 1 require an environmental assessment for establishment of Airport Traffic Control Towers (ATCT) and Instrument Landing Systems (ILS) or Microwave Landing Systems (MLS) respectively. Depending on findings of the environmental assessment, the FAA will then either make a finding of no significant impact (FONSI) or proceed with the preparation of an environmental impact statement (EIS).

Considering all of the above, the only realistic "project" from the Airport Master Plan for the Metropolitan Airports Commission (MAC) to assess, at this time, is a composite of Phase 1A and Phase 1B as outlined below and as shown on Exhibit 3. In reaching this conclusion, full consideration has been given to whether or not Phase 1A and Phase 1B together with Phase 2 and Phase 3, a control tower, and the precision

approach instrumentation should be treated as a "phased action" as defined by the Environmental Quality Board (EQB). The EQB in their "Guide to the Rule of the Minnesota Environmental Review Program", 1982 edition discusses a "phased action" as follows:

> "Phased Actions. "Phased action" is defined as "two or more projects to be undertaken by the same proposer which a RGU determines: (a) will have environmental effects on the same geographic area; (b) are substantially certain to be undertaken sequentially over a limited period of time; and (c) collectively have the potential to have significant environmental effects". (3.022 B. 48.) The concept behind this term is that large projects which require a number of years for completion must not avoid Environmental Review of their cumulative impacts simply because they are developed in stages. The rules require that phased actions be considered as a single project when determining the need for an EIS. Typical examples of situations involving phased actions include highways, utility lines, or other "network" type projects and sequential development of a subdivision of a commercial/industrial complex."

Given the long term and, in some cases, speculative nature of Phase 2, Phase 3, precision approach instrumentation, and control tower projects, they clearly are not "substantially certain to be undertaken sequentially over a limited period of time", and therefore do not come within the EQB definition of a "phased action". Furthermore, the completion of the improvements included in Phase 1A and Phase 1B will not in any way commit MAC (or the FAA in the case of the control tower and/or the ILS/MLS installations) to the undertaking of the Phase 2, Phase 3 or other future projects. As pointed out above, such projects will only be pursued if and when the need for them is evident based upon demands which either exist or can be forecasted with a very high degree of reliability. In light of the foregoing, it would not be prudent to attempt a detailed assessment of these possible future projects at this time. Indeed, such an assessment can and should be undertaken only when the need for the projects, as well as the potential to accomplish them (given these current legal, environmental and funding constraints), can be addressed with far greater certainty than would be possible today.

However, to illustrate possible environmental effects of development proposed in the Anoka County-Blaine Airport (Janes Field) Master Plan beyond Phase 1A and Phase 1B, an Informational Appendix will be added to the EIS. The Informational Appendix will discuss the potential for environmental impacts from proposed development in Phase 2 and Phase 3, but no regulatory approval will be requested for Phase 2 and Phase 3.

MAC, by FAA and Minnesota Environmental Quality Board regulations, is committed to preparing pertinent environmental documentation prior to implementation or construction of any development requiring environmental review. For developments proposed in Phase 2 and Phase 3, MAC will prepare environmental documentation through the Supplemental EIS Process as defined in VI Section 3.031I of the Minnesota Environmental Quality Board Guide to the Rules of the Minnesota Environmental Review Program.

In this EAW then, the environmental consequences of all of the development included in Phase 1A and Phase 1B in the Master Plan will be addressed, except for the proposed widening of Runway 8-26 from 75 feet to 100 feet wide. The widening of runway 8-26 (from 75 feet to 100 feet) was originally proposed as part of Phase 1B construction by the AMP. This work has been deleted from this EAW since the need to widen the runway is directly related to the Instrument Landing System (described before) and would not be required until and unless the FAA provides these facilities. The development items included in Phase 1A and Phase 1B, to be addressed herein, are as follows:

- Development of the east building area, approximately 33 acres.
- Development of the west building area, approximately 33 acres.
- Extension of Runway 8-26, and its parallel taxiway, on the easterly end by 800 feet, thereby increasing the runway length from 3,200 feet to 4,000 feet.
- Abandonment of a part of Xylite Street as required by the Runway 8-26 Extension.
- Extension of Runway 17-35, and its parallel taxiway, on the northerly end by 950 feet, and relocating the Runway 35 threshold northerly by an equal amount, thereby leaving the present runway length of 4,885 feet unchanged. This will include removal and/or relocation of lighting and landing aids as appropriate from the abandoned southerly portion of the runway.
- Removal of the connector taxiway on the easterly side of Runway 17-35 at the existing Runway 35 threshold.
- Construction of new connector taxiways as required by the development items listed above.

As noted above, it is estimated that all of Phase 1A and Phase 1B development will be accomplished within the next 5 years. MAC proposes to proceed with the construction of the Runway 17-35 shift to the north, the Runway 26 extension to the east, related parallel and connector taxiways, and construction of the east building area site development as soon as feasible. The construction could proceed as soon as 1986. This will depend upon environmental studies and review, permits, approvals and funding. The development of the west building area would probably not take place until 1989 or 1990. The timing of this work will depend upon the rate at which the east building area develops.

6. REASON FOR EAW PREPARATION:

A petition by area residents was submitted to the Minnesota Environmental Quality Board (EQB or MEQB). Subsequently the EQB designated Metropolitan Airports Commission (MAC) as the Responsible Government Unit (RGU). MAC at its regular meeting of April 16, 1984, voted to undertake the EAW in response to the petition.

During development of this EAW it became increasingly clear that several potential areas of impact should be studied at a level of detail well beyond that normally undertaken in an EAW. Therefore, the MAC voted at its meeting on May 29, 1984 to proceed with a Discretionary Environmental Impact Statement (EIS) and to convert this EAW to a "Scoping EAW". At both MAC's meetings of April 16, 1984 and May 29, 1984 MAC voted to formally request the Minnesota Pollution Control Agency (MPCA) to participate in the EAW/EIS process.

The MEQB rule numbers that are applicable are as follows:
6 MCAR S 3.206 (Petition Process)
6 MCAR S 3.029-C-2 (Discretionary EIS)

As shown in Appendix 1 of this document, on June 4, 1984 the MPCA entered into a formal agreement with MAC to assist MAC with preparation of the Anoka County-Blaine Airport (Janes Field) EIS. Specifically, the MPCA will be given the opportunity to review and approve analyses related to aircraft noise impact, surface water impacts and ground water impacts prior to completion of the Scoping Decision, Draft EIS and Final EIS.

At the request of MAC, the Minnesota Environmental Quality Board on June 7, 1984, adpoted a resolution to assume responsibility for determination of the adequacy of the EIS for Anoka County-Blaine Airport (Janes Field). (See Minnesota EQB letter and resolution in Appendix 1).

7. ESTIMATED CONSTRUCTION COST
Phase 1A - $770,000
Phase 1B - $1,990,000
These are revised costs from the Airport Master Plan (AMP). Costs include an estimated 10% for engineering.

Estimates have been revised by applying the current "Engineering News Record" Construction Cost Index (ENR-CCI) of 4161 against the costs developed in the AMP. The Master Plan is based on 1982 costs. The Index for May 1982 was assumed as the AMP base index.

$$\text{Cost ratio} = \frac{\text{ENR-CCI Oct. 1984}}{\text{ENR-CCI May 1982}} = \frac{4161}{3792} = 1.10$$

Phase 1A

Item No.	Description	Estimated Cost (Oct. 1984)
1.	East Building Area Site Preparation (27.5 Acres)	$ 470,000
2.	Parallel Taxiway to Runway 17-35 (40 feet x 1850 feet)	140,000
3.	Stub Taxiways from East Building Area (2 each: 40 feet x 500 feet)	160,000
	Total Phase 1A	$ 770,000

Phase 1B

Item No.	Description	Cost (Oct. 1984)
1.	West Building Area Site Preparation (35 acres including perimeter taxiway)	$ 600,000
2.	Runway 8-26 Extension (75 feet x 800 feet)	420,000
3.	Parallel Taxiway to Runway 8-26 (40 feet x 800 feet)	200,000
4.	Stub Taxiways between R/W 8-26 and Parallel T/W (2 each: 40 feet x 350 feet) and between R/W 17-35 and Parallel T/W (2 each: 40 feet x 450 feet)	100,000
5.	Runway 17-35 Extension (75 feet x 950 feet)	400,000
6.	Parallel Taxiway to Runway 17-35 (40 feet x 950 feet)	260,000
7.	Runway 35 Threshold Relocation and Removal of Stub Taxiway at the R/W 35 End.	10,000
	Total Phase 1B	$1,990,000

8. TOTAL PROJECT (ACRES):
The land owned by MAC at the site totals 1900± acres. The area within the project limits is approximately 105.5 acres. This area includes all areas of development including pavement, buildings and graded slopes to existing ground. Approximately 3 more acres will be disturbed for mitigation purposes for loss of protected wetlands.

9. NUMBER OF RESIDENTIAL UNITS OR COMMERCIAL, INDUSTRIAL, OR INSTITUTIONAL SQUARE FOOTAGE:
There will be no residential units as part of the project. Enclosed structures to be built will be limited to aircraft hangars and fixed base operator (FBO) shops and offices. MAC does not build such structures, but only prepares the "building areas" and taxiways. Private interests are allowed to construct facilities within these prepared areas, on land leased from MAC. Consequently, the exact square footage of hangar space, shops and offices to be constructed is not known; however, a typical hangar and commercial layout has been prepared by MAC from which approximate building areas are taken. Considering past development at the airport, 50% of the area reserved for commercial development is expected for actual building construction and approximately 20% of an expansion area would be actual buildings. In the net building area (including all hangars and FBO areas) it is assumed that 90% of the building areas (exclusive of taxilanes, apron areas, etc.) will be developed with the remaining 10% for building setbacks, clearances, etc.

Based on the typical layouts for the building areas included in the Project, the following estimates of space have been developed:

Hangars and Shops	
East Building Area	305,000 S.F.
West Building Area	305,000 S.F.
Total	610,000 S.F.

10. NUMBER OF PROPOSED PARKING SPACES:

Specific auto parking spaces will be confined to the FBO areas. Sufficient parking spaces will be required to serve the commercial population (estimated in question 20). Actual numbers will be determined by individual site plans for each FBO area. Estimates for the two buildings areas are as follows:

East Building Area	174	
West Building Area	174	
Total Parking Spaces	348	Say 350 spaces

All other auto parking will be done in the hangars constructed by aircraft owners.

These numbers are probably the maximum this project could produce. No local permits for parking spaces are required since the City of Blaine does not review site plans for airport property. The project will also be exempt from filing for an indirect source permit from the Minnesota Pollution Control Agency. Per 6MCAR S 4.313A, an indirect source permit is required for a new parking facility or other new indirect source with an associated parking area which has a new parking capacity of 2,000 cars or more or a modified parking facility or modification of an associated parking area which increases parking capacity by 1,000 cars or more, or which increases total parking capacity to 2,000 cars or more. Per 6MCAR S 4.4314C, parking facilities are exempt from requiring an indirect source permit if new auto parking capacity is fewer than 1,000 cars or if parking capacity is increased by less than 500 cars. As only 350 additional auto parking spaces are proposed, an MPCA indirect source permit will not be required for development of the project.

11. LIST ALL KNOWN LOCAL, STATE AND FEDERAL PERMITS/APPROVALS/FUNDING REQUIRED.

AMP PROCESS

Permits, approvals and funding for this project involve a lengthy process which was initiated by the airport master plan process. All items addressed in this EAW are proposed in the Airport Master Plan (AMP). The AMP has been reviewed and approved by the FAA, Minnesota Department of Transportation, the Metropolitan Council and MAC. During the AMP process extensive citizen participation was sought, results of which are reported in the AMP.

MDNR

Currently MAC is preparing this EAW. During or upon completion of the environmental process MAC will file an "Application for a Permit to Work in Public Waters" and "Appropriation of Waters from the State" permits (specifically basins 594W and 595W) with the Minnesota Department of Natural Resources (MDNR).

U.S. ARMY CORPS OF ENGINEERS & MINNESOTA POLLUTION CONTROL AGENCY

Legislation was recently passed on October 5, 1984 (Federal Register Volume 49 No. 195) concerning Army Corps of Engineers, Section 404 permitting procedures. The project site is in a headwaters area. As shown by the table on page 10, 21.3 acres of wetlands would be affected. The recent legislature requires an individual permit for alteration of more than 10 acres of wetlands. Procedures for an individual permit require a public hearing and the filing of a "401 Water Quality Certification" from the Minnesota Pollution Control Agency.

FAA, MDOT, MINNESOTA STATE PLANNING AGENCY & METROPOLITAN COUNCIL

Runway and taxiway construction will be supported by Federal and MAC funding, and building area construction will be supported by State and MAC funding. Currently the FAA provides 90% of the total eligible project costs under the Airport Improvement Program (AIP). Minnesota Department of Transportation will provide between 1/2 and 2/3 of eligible building area costs. Contract documents for construction will be reviewed and approved by both agencies, in all cases. MAC will apply for funding by submitting Preapplications and Applications to both agencies. A part of this application process will include review by the Minnesota State Planning Agency and the Metropolitan Council as required under the authority of Minnesota Session 1983 Laws, Chapter 289 and Section 49 (Minnesota Statutes Chapter 116J.42 Subdivision 2).

ANOKA COUNTY

Extension of Runway 26 will require closing a portion of Xylite Street between 95th and 101st Streets. MAC will petition to Anoka County for abandonment of this portion of the County highway. The County Commissioners will need to approve this petition. The City of Blaine has in the past notified the County that they will agree with the highway abandonment. However, the passage of time and changes in City government may require a reconfirmation of that approval.

COON CREEK WATERSHED DISTRICT & CITY OF BLAINE

No local approvals will be required for the runways and taxiways. The City of Blaine does require that the building areas be constructed to 1 foot above the 100 year flood elevation. The only area affected by the 100 year floodplain is a portion of the west building area (See Exhibit 4) and a small area west of the Runway 8 End which should be graded as a safety area in accordance with FAA criteria (See Question 19). This is also an area proposed for ponding by the City of Blaine Comprehensive Storm Drainage Plan and at the same time is a protected basin (595W) by the MDNR. A permit application will be submitted to the Coon Creek

Watershed District. The District and the City of Blaine will both review the plans regarding grading, erosion control, wetland alteration, and storm water management.

RICE CREEK WATERSHED DISTRICT

The Runway extensions will be in the Rice Creek watershed. Permit application to the Rice Creek Watershed District will also be made. The permit application will include a review of all storm water facilities and wetland alteration plans. In addition to the protected wetland basins, the District has special requirements for work in wetland Classes 3, 4 and 5 (See Exhibit 5). The exact nature of requirements for work in these areas has yet to be determined.

INDIVIDUAL PERMITS

Private developers will file for plumbing and building permits in connection with building hangars and/or FBO facilities. No on-site sewage treatment will be permitted due to the high water table. Holding tanks are now used, and will be required in the future for sanitary and commercial wastes. The City of Blaine has issued permits to private developers for existing holding tanks. The City will have to issue permits on a case by case basis to private developers in the future. The City of Blaine has approved locations for disposing of sanitary and commercial wastes into the sewage collection system which transfers the wastes to the Metropolitan Wastewater Treatment Plant. Any fuel storage facilities above ground will require permits from the Minnesota Pollution Control Agency.

12. IS THE PROJECT INCONSISTENT WITH ANY:

    a. ADOPTED LAND USE ORDINANCES?
       No

    b. ADOPTED COMPREHENSIVE LAND USE PLANS?
       No

    c. LOCAL, STATE OR FEDERAL RESOURCE MANAGEMENT PLANS?
       Yes. The project does impact Minnesota Department of Natural Resources wetland basins numbered 594W and 595W. (See Exhibit Numbers 3 and 5). The project is not inconsistent with any other local, state or federal resource management plans. MAC will file an "Application for a Permit to Work in Public Waters" with MDNR as noted in Item 11. Mitigation will be provided on the airport site for work in those basins.

13. DESCRIBE CURRENT AND RECENT PAST LAND USE AND DEVELOPMENT ON AND NEAR THE SITE.
    Current and recent past land use on the site of the project has been that of an airport and will continue to be so. Land use development in the vicinity of the airport has remained relatively constant over the recent past with continued residential development in areas south and west of the Airport. This project will move approach and take off operations

away from these developing areas. Also, frequency of overflights above developed residential areas will be reduced resulting in a net decrease in noise impacts on these neighborhoods (See question 24c). See Exhibit 6 attached to this report which graphically depicts local land use as shown in the recently completed Airport Master Plan. Exhibit 3 includes the most recent zoning map information (Revised April 1984). There have been zoning changes since the April map was issued; a revised map was not available as this EAW was prepared.

14. APPROXIMATELY WHAT PERCENT OF THE SITE IS IN EACH OF THE FOLLOWING CATEGORIES? (PERCENTAGES SHOULD TOTAL 100% BEFORE AND AFTER CONSTRUCTION.)

Based upon the project limits the following areas will be effected by construction:

	Acres		Percentage	
	Before	After	Before	After
Forest/Wooded	140	137.9	7.37	7.26
Grassland	1,111	1,105.8	58.47	58.20
Wetlands	585	563.7	30.79	29.67
Impervious	64	92.6	3.37	4.87
	1,900	1,900	100%	100%

These wetland figures include approximately 3 acres of protected wetlands in basins 594W and 595W which will be mitigated on the site. Exact areas and mitigation plans will be coordinated with MDNR, Army Corps and the watershed districts. There are approximately 20 acres of unprotected wetlands affected by construction which would be converted to grasslands or Class 1 or 2 wetlands. Those wetlands (other than protected basins) of Class 3, 4 and 5 may require special treatment. Their alteration will be coordinated with the Watershed Districts. Further studies, coordination with all agencies with an interest in the wetlands and development of mitigation plans will be developed during the discretionary EIS process.

15. SHOW THE TYPE AND LOCATION OF SOILS ON THE SITE MAP. GIVE THE SCS CLASSIFICATION TYPES IF KNOWN.

Attached is Exhibit 7 which illustrates the proposed improvements and their location regarding the various soil series. There are six soils series in the areas of proposed development as follows:

Iw: Isanti fine sandy loam
LnA: Lino loam fine sand, 0%-4% slopes
Ma: Markey muck
SoA: Soderville fine sand, 0% to 4% slopes
ZmA: Zimmerman fine sand, 0% to 4% slopes
ZmB: Zimmerman fine sand, 2% to 6% slopes

The important soil characteristic for the proposed improvements is the ability to support pavement sections and building foundations. The major problem appears to be the high water table. Lowering the water table with subsurface drains is very feasible since all the soils (except for

Markey muck) are very permeable. It should be anticipated that the water table will be lowered two to three feet in areas of excavation to keep the water table out of pavement sections and building foundations.

None of these soils are listed as either suitable for prime farmlands or additional farmland of statewide importance.

16. DOES THE SITE CONTAIN PEAT SOILS, STEEP SLOPES, SINKHOLES, SHALLOW LIMESTONE FORMATIONS, ABANDONED WELLS, OR ANY GEOLOGIC HAZARDS? EXPLAIN:
No part of the site is known to have any of the features listed above.

17. WHAT IS THE APPROXIMATE DEPTH (IN FEET TO):

a. GROUNDWATER
Sixteen soil borings have been installed by Soil Exploration Company on the airport property which determined the depth to groundwater. These borings were installed in May, 1977 and June, 1981 in the southwestern portion of the airport. Depth to the water table in these borings ranged from 0.5 to 5 feet with an average depth of 2.9 feet.

Twenty-four soil borings were provided by Soil Exploration Company in the proposed east building area during April 1984. Depth to the water table in these borings ranged from 1.5 to 5 feet with an average depth of 3.4 feet.

b. BEDROCK
According to recently prepared maps to be available after January, 1985 from the Minnesota Geological Survey, the Anoka County-Blaine Airport (Janes Field) overlies a buried bedrock valley. This valley is eroded into the St. Lawrence Formation. The well log information used for these maps indicate that the elevation of the subcropping surface ranges from at least 608 to 622 feet MSL in this valley. The average land surface elevation is 905 feet MSL; therefore, the minimum and average depth to bedrock is approximately 280 and 290 feet, respectively.

To the east and west of the valley the subcropping bedrock is composed of the Jordan Sandstone and Prairie du Chien Group. There is currently insufficient information available to determine whether these rock units underlie the airport property. In addition, there is currently no published information which delineates the configuration of the valley north of the airport.

18. DOES ANY PART OF THE PROJECT AREA INVOLVE:

a. SHORELAND ZONING DISTRICT?
No.

b. DELINEATED 100-YEAR FLOOD PLAIN.
Yes. Exhibit 4 illustrates the approximate limit of the 100 year floodplain. This is also an area proposed for ponding by the Blaine Comprehensive Storm Drainage Plan (Discussed in Section 23 of this EAW).

There is no problem with flooding at the site but much further downstream the lower reaches of County Ditch No. 41 may be inadequate to handle large flows. For this reason the City of Blaine Comprehensive Storm Drainage Plan recommend holding ponds in the headwaters of County Ditch No. 41. The permit application to the Coon Creek Watershed District will include provisions for the flood plain development. Rerouting of the floodplain and ditch at the Runway 8 End may be readily constructed due to the flat topography in the area (See Question 19).

The floodplain limits were established through the National Flood Insurance Program by the Federal Emergency Management Agency (FEMA). The floodway map for the Airport which FEMA produced indicates that the floodway was developed by approximate methods. This usually means no actual field cross sections have been taken and that the flood flows and floodway were probably determined by U.S. Geological Survey methods rather than by the more complex HEC-2 computer modeling. These more approximate methods are used in areas of less flood significance. It is not anticipated that there will be major problems coordinating the floodplain work with the Coon Creek Watershed District. The coordination with the watershed district and City of Blaine including additional studies, surveys and development plans will be provided during the discretionary EIS process.

c. STATE OR FEDERALLY DESIGNATED RIVER LAND USE DISTRICT? IDENTIFY WATER BODY AND APPLICABLE STATE CLASSIFICATIONS:
No.

19. DESCRIBE ANY PHYSICAL ALTERATION (E.G. DIKES, EXCAVATION, FILL STREAM DIVERSION) OF ANY DRAINAGE SYSTEM, LAKE, STREAM, AND/OR WETLAND. ESTIMATE QUANTITY OF MATERIAL TO BE DREDGED AND INDICATE WHERE SPOILS WILL BE DEPOSITED.
The construction proposed in this project is outlined in Section 5 of this Environmental Assessment Worksheet. The construction season for each of the phases will typically be from mid-May to Mid-October. There will be approximately 227,000 cubic yards of earth excavation and 305,000 cubic yards of embankment material required. The excavated earthwork will be used in areas of required fill. The 78,000 cubic yards of additional fill required will be obtained within the airport limits and will be coordinated with the on-site mitigation plans. Granular borrow will be brought from offsite to construct sub-base and base courses for pavement structures and foundations.

The limits of Rice Creek and Coon Creek watershed basins as defined in the Comprehensive Storm Drainage Plan for the City of Blaine will remain unchanged. No significant alternations to existing drainage patterns are anticipated. Moreover, the runoff increase caused by the proposed construction will be so slight as to preclude the need for detention basins except as may be required to reduce peak flows further downstream on County Ditch No. 41.

A portion of County ditch 41 will be relocated between the west building area and existing airport access road (north of the Raddison Road intersection with the access road - see Exhibit No. 3). The relocation will route the ditch through the building area to intersect with the existing ditch which runs east-west and parallel to Runway 8-22. A culvert will be required under the taxilane connecting the two sections of the west building area.

A portion of Branch No. 1 to County Ditch No. 41 (located west of the west building area - see Exhibit No. 3) will be relocated around the building site. This work will be coordinated with the recommendations of the Comprehensive Drainage Plan.

Safety area grading for the Runway 8 End will be provided in accordance with FAA criteria. The safety area may include the provision of a culvert under the safety area. This work may be coordinated to provide for the ponding volumes recommended in the Comprehensive Drainage Plan.

Wetland mitigation will include "protected" wetlands and a portion of those defined as Classes 3-8. Wetland mitigation will be entirely on airport property. Approximately 3 acres of "protected" wetland will be affected and 20 acres of other wetlands. Exact areas requiring mitigation will be coordinated with MDNR and the Watershed Districts.

The project elements including work in the wetlands and compliance with the Comprehensive Drainage Plan will be developed with the Watershed District, City of Blaine, MDNR and other agencies during the discretionary EIS process.

20. WILL THE PROJECT REQUIRE AN APPROPRIATION OF GROUND OR SURFACE WATER? EXPLAIN (INDICATE QUANTITY AND SOURCE):

Only minor amounts of ground water would be required. The noncommercial areas are not provided with water or sanitary facilities. Developers of the commercial or FBO areas will probably develop ground water supplies.

It is difficult to predict the population density of the FBO areas, however, a typical amount of space per person at an FBO operation including hangar areas and shops is 1,000 square feet per person. This includes full-time employees as well as full-time students.

Typical water demand in such instances is 25 gallons per day (GPD)/ person.

Total commercial building area is as follows:

East building area	87,000 S.F.
West building area	87,000 S.F.
	174,000 S.F.

Predicted population at FBO areas = 174,000/1000 = 174 persons.

Predicted water requirements = 174 x 25 = 4,350, Say 5,000 gallons/day.

The source of water will be from wells drilled at the site. Plumbing permits will be required from the City for each well. City code requires that wells be drilled to a minimum depth of 65 feet or shallower if driven through an impervious stratum.

The Minnesota Department of Natural Resources (MDNR) considers construction of drainage facilities from existing bodies of water as an appropriation of surface water. MDNR requires an "Appropriation of Waters from the State" permit when appropriation of surface water by drainage or pumping exceeds 10,000 gallons per day (G.P.D.) or 1,000,000 gallons per year. Appropriation of a portion of wetlands 594W and 595W and Branch No. 1 of County Ditch No. 41 required for the proposed project will be limited to relocation rather than removal. Required appropriation is assumed to be at a rate in excess of 10,000 G.P.D. thereby requiring an "Appropriation of Waters from the State" permit.

21. WILL THE PROJECT AFFECT:

a. SURFACE WATER QUALITY (ON OR OFF THE SITE)?
There should only be a minor effect to surface water quality. Proposed runways and taxiways will have grassed safety areas surrounding the paved surfaces. Before any runoff reaches ditches runoff would traverse these areas. Slopes are very gradual within these areas limiting the amount of surface runoff. Runway safety area width for Runway 8-26 is 300 feet, and for Runway 17-35 is 240 feet and approximately 80 feet for taxiways. Cross slopes will probably be about 3% and slopes of drainage ditches (outside the safety areas) less than 1%. With this type of surface drainage system there will be a natural treatment of the sheet runoff prior to its entrance into the ditch system.

The gentle slopes at the Airport will also retard runoff of possible fuel spills allowing airport officials time to coordinate containment and clean-up operations.

There is an existing surface runoff collection and retention ponding system on the airport. This system is part of the proposed development and will provide for separation of pollutants from surface water before drainage off airport property. The AMP concludes that the proposed development will not adversely affect surface water quality. Nevertheless, additional detail relative to any potential adverse impacts on surface water quality will be developed in the EIS.

b. GROUNDWATER QUALITY (ON OR OFF SITE)?
The changes to the airport proposed by Phase 1A and Phase 1B of the Master Plan can potentially affect groundwater quality in three major ways. These are:

1. On-site disposal of treated waste water.

2. Infiltration to the water table of stormwater runoff or surface water contaminated with potentially harmful substances from the site, either directly from surface runoff or indirectly from

standing water bodies and drainage ditches receiving surface runoff or shallow groundwater discharge from the site.

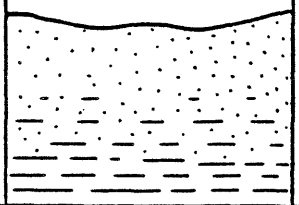
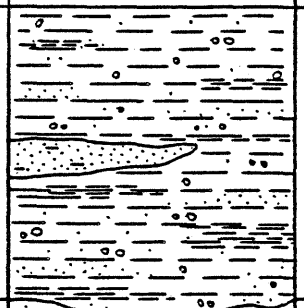
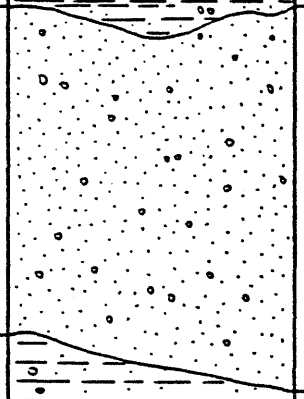
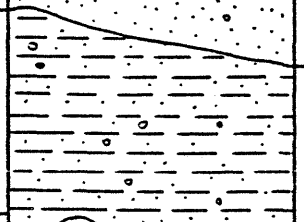
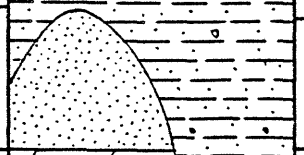
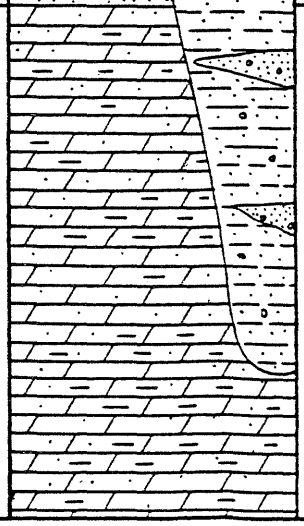
3. Leaks, spills, or inappropriate disposal of potentially harmful substances on the site.

The degree to which groundwater quality would be affected depends upon 1) the loading rates and types of substances introduced to the groundwater, 2) the configuration and volumetric flux of the flow system into which the substances are introduced, and 3) the interception of these entrained substances by wells or by environmentally sensitive areas of natural groundwater discharge. The potential loading of the shallow groundwater is addressed in large part by Questions 21a, 22, and 25 of the EAW. Because of the unpredictable nature of spills, leaks, and the potential inappropriate disposal of harmful substances, it would be difficult to predict the frequency, magnitude, and relative seriousness of such occurrences. However, the general characteristics of the hydrogeologic system by which these entrained substances would migrate can be described using published reports and the well logs in the Minnesota Geological Survey computerized data base (MGSCDB).

The bedrock is overlain (See the "Generalized Stratigraphic Column" on page 17) by a relatively thick sequence of glacial drift. These units have been described in detail by Stone (1966). the uppermost unit consists of the Fridley Formation. The upper portion of the unit consists of fine to medium sand, and the lower portion consists of clayey silt. This unit is thought to have been deposited in a lake associated with the development of the Anoka Sand Plain (Cooper, 1935; Stone, 1966). The airport is near the southern limit of the unit which extends to Rice Creek to the south, to Lino Lakes to the east, across the Mississippi River into north Minneapolis to the west (Cooper, 1935; Stone 1966; Helgesen and Lindholm, 1973; and U. S. Department of Agriculture, 1977). The sand plain into which the Fridley Formation merges extends to the northeast along the Mississippi River to St. Cloud, to the north to northern Isanti County, and to the northeast into Chicago County (Cooper, 1935; Helgesen and Lindholm, 1973; and Lindholm, 1980). The unit is continuous throughout the airport vicinity and is approximately 50 feet thick; the sandy upper Fridley is approximately 25 to 35 feet thick (Stone, 1966; Barr Engineering Co., 1981; Overtoom, 1983, and MGSCDB).

The Fridley is underlain by the Twin City Formation. This is a clayey to silty till predominantly derived form the Grantsburg Sublobe deposited in the Pine City and Bemis Phases of the Wisconsinan Period of glaciation with intermixed till from stagnant ice remnants of the Superior Lobe which had been deposited in the St. Croix Phase of the Wisconsinan and incorporated in the Grantsburg Sublobe (Cushing, 1963; Stone, 1966; and Wright, 1972). The unit appears to be continuous throughout the airport vicinity and ranges in thickness from 25 to over 60 feet (Stone, 1966; Barr Engineering Co., 1981; Overtoom, 1983; and MGSCDB).

GENERALIZED STRATIGRAPHIC COLUMN
ANOKA COUNTY - BLAINE AIRPORT VICINITY

Unit Name	Thickness(ft)	Schematic Column	Lithologic and Hydraulic Characteristics
Fridley Formation	50		fine sand, grading downward to clay and silt at base, brown; aquitard
Twin Cities Till	25-60		sandy clay with gravel, contains lenses of sand and gravel; aquitard
Hillside Sand	20-180		sand and gravel, brown; aquifer
Unnamed Till	120-180		sandy clay with gravel, grey and brown, contains lenses of silt and sand; aquittard
Jordan Sandstone	0-90		sandstone, light grey; aquifer
St. Lawrence Formation	20-65		dolostone, grey to tan, silty and sandy; aquitard

The Twin Cities Formation is underlain by the Hillside Sand. This is generally a medium-to coarse-grained outwash sand which was deposited in part by the retreating Superior Lobe and in part by the advancing Grantsburg Sublobe. It appears to be continuous in the airport vicinity and ranges in thickness from 20 to over 180 feet. This range in thickness is in part due to being overriden by the Grantsburg Sublobe; in addition, it is also locally due to further burial of bedrock valleys (Stone, 1966; Overtoom, 1983; and MGSCDB).

The Hillside Sand is underlain by an unnamed till unit. This till unit is essentially continuous south of the airport (Stone, 1966). Well Log #165899 in the valley underlying the airport indicates 180 feet of till which overlies the Franconia, Well Log #208642 at the airport itself also indicates 198 feet of unconsolidated deposits between the Hillside and the Franconia with 124 feet of clayey layers (MGSCDB).

It thus appears to be continuous in the airport vicinity. Maps of the general configuration of the water table in the Twin Cities metropolitan area, including the airport vicinity, were prepared by Larson-Higdem et al. (1975). The water table configuration for the airport vicinity was determined in this study using the surface expressions of the water table shown on the New Brighton 15' topographic map, i.e. lakes, marshes, perennial streams and ditches, and test borings in the area. This study indicates that the water table is relatively flat with an indeterminate direction of flow. Similarly, the water table information from the soil borings on the airport site (see Question 17A) indicates an indeterminate direction of groundwater flow. The average water table elevation was 900.8 and 902.5 feet MSL for the 1977 and 1981 soil borings, respectively. The difference in average elevation may be due to fluctuations in the water table between the two years. The 1977 water table data compares favorably with the water table configuration for February, 1976 in Mounds View, just south of the airport as shown in Banister, Short, Elliott, Hendrickson and Associates, Inc. (BSEHA, 1976). As indicated in this study, the water table elevation in at least the southern portion of the airport was approximately 901 feet MSL at that time and was sloping to the east toward Rice Creek. This is reinforced by topographic features in the area which indicate a general water table slope to the east.

Several low-flow discharge measurements made in the period October to December, 1976 in Rice Creek at Highway 47 were reported by Gunard and Smith (1982). The measured discharge rates ranged from 0.53 to 2.13 cfs from a stated drainage area of 149 square miles. This translates to an areal depletion of the shallow Fridley aquifer to Rice Creek of 0.12 in/yr. BSEHA (1976) estimated the average infiltration to the water table to be 5.01 in/yr. The difference between these two rates is due in part to discharge to lakes and marshes in the area and in part to downward seepage to deeper aquifers.

A downward gradient has been observed in this area from the water table to the Prairie du Chien-Jordan aquifer, the aquifer which is subcropping over much of the general vicinity of the airport and from which most of the groundwater is withdrawn that is used in the Twin Cities metropolitan area. Winter and summer measurements of the potentiometric head elevation in the Prairie due Chien-Jordan have been taken several times by the U.S. Geological Survey from 1971 to 1980. Yearly seasonal changes in head in the aquifer were observed to vary no more than 6 feet in the airport vicinity and to have stable average head values over that period. The potentiometric head configurations for the Prairie due Chien-Jordan for 1971 that are shown in Norvitch et al. (1973) can, thus, be taken as representative. The average potentiometric head in the airport vicinity is approximately 840 feet MSL, about 60 feet lower than the water table in the area; this provides the potential for downward movement from the shallow Fridley aquifer to the Prairie due Chien-Jordan aquifer.

Little is known about the head configuration in the Hillside Sand. Localized studies have been conducted in Lino Lakes (Winter and Pfannkuch, (1976), in northern eastern Fridley (Barr Engineering Co., 1981; Environmental Engineering and Management, Ltd. 1982), and in northern Arden Hills (Overtoom, 1983). However, no studies have yet been completed which would establish the flow patterns in the airport vicinity. Nevertheless, the Fridley and Arden Hills studies have indicated that in those locations the heads in the Hillside are very similar to the heads in the Prairie du Chien. Because there appears to be another till underlying the Hillside in the airport vicinity and because the Prairie du Chien-Jordan is not present in the bedrock valley under the airport except as erosional remnants, the potentiometric head in the Hillside in the airport vicinity is not necessarily similar to the Prairie du Chien-Jordan or to the Hillside heads at those study sites.

The rate at which downward movement occurs between the Fridley and Prairie due Chien-Jordan aquifers is dependent upon both the head gradient and the hydraulic resistance of the aquitards between the two aquifers. In the airport area this rate of movement is relatively low because of the presence of the Twin Cities Formation and the unnamed till in the lower drift between the Hillside Sand the subcropping bedrock. Because both of these units are thought to be continuous in the airport vicinity, the rate of vertical groundwater migration from the water table to the bedrock is dependent upon the flow rates through these till layers.

Larson-Higdem et al. (1975) completed a reconnaissance estimate of the rate of vertical migration downward from the water table and found it to be less than 1 ft/yr. BSEHA (1976) used several approaches to estimate vertical groundwater movement downward from the sand plain in Mounds View; their estimates ranged from 4 to 7 in/yr with average lateral groundwater flow to surface discharge points estimated to be less than 0.5 in/yr. Barr Engineering Co. (1981) calculated the rate of vertical migration between the upper Fridley to the subcropping Prairie du Chien for a site in northeastern

Fridley based upon laboratory permeability measurements of the resistive layers and found it to be between 0.1 and 0.2 ft/yr.

While the vertical rate of movement can be estimated, the actual flow path for groundwater leaving the airport site is a more difficult question. Significant lateral movement can take place in all of the drift aquifers before a flow path proceeds through an underlying aquitard, and the patterns of inter-aquifer flow are likely distorted by inhomogeneities in the aquitards. A further complication is that the shallow groundwater flow systems likely penetrate the drift below the Fridley. Winter and Pfannkuch (1976) found that the flow systems discharging to the lakes near Centerville, 5 miles east of the airport, penetrated deeply into the drift sequence, as deep as the unnamed lower till. Because there are no existing studies which describe the configuration of groundwater flow in the Hillside Sand, a piece of information is missing concerning the movement of groundwater to wells on the airport site and in adjoining area sand to the bedrock aquifers. Consequently, the effects on groundwater quality in the lower drift and in the bedrock cannot be adequately assessed. Similarly, because little specific information exists delineating the configuration of the water table in the airport vicinity and in the vicinity of the drainage ditches leaving the area, the effects on groundwater quality in the upper drift cannot be adequately assessed. Additional assessment of potential groundwater impacts will be undertaken during preparation of the EIS.

c. GROUNDWATER LEVELS IN ANY WELLS (ON OR OFF SITE)? EXPLAIN BOTH DURING AND AFTER CONSTRUCTION INCLUDING ANY DISCHARGE EXPECTED.

Because the airport changes proposed by Phase 1A and Phase 1B are changes in land use or the building of surficial or very shallow structures, the project will not affect the physical characteristics of the aquifers in the airport vicinity. Consequently, the only means by which the proposed changes would have any potential effects on wells in the area is by affecting the hydrology of the area. There are 2 major means by which the proposed changes would affect the hydrology of the area. One is the increase or decrease in infiltration to the water table. Infiltration can potentially be decreased by the increase in the impervious area at the airport or by any decrease in the duration of runoff storage on the site. Infiltration can potentially be increased by any increase in the duration of runoff storage on the site. Because infiltration into the soil is rapid in unpaved areas and because surface runoff is not quickly transported from the airport area by the drainage ditches, increasing the impervious surface area from 3.3% to 5.56% of the airport property should result in only minor changes in the water table fluctuations in the airport vicinity. Because the wells in the area are generally completed below the Twin Cities Formation, minor changes in the water table in the airport vicinity would cause negligible changes in the Hillside Sand and the underlying aquifers.

The foundation drains of proposed structures have been estimated to affect the water table elevation by approximately 2 feet. It is not possible to calculate the change in recharge resulting from this lowering of the water surface because of a lack of information about the thickness of the Twin Cities Formation and the head in the Hillside sand under the site. However, an estimate of the reduction in recharge based on typical thicknesses of the clayey portion of the Fridley and Twin Cities Formations and head differences found from the Barr (1981) investigations is no more than 5% for the area covered by the structures. The change in recharge to the bedrock aquifer would be negligible because of the influence of the intervening Hillside sand.

Groundwater level change can also potentially be affected by increases in groundwater appropriation at the airport. It has been estimated that completion of Phase 1A and Phase 1B would result in an increase in groundwater appropriations at the airport of 5,000 gal/day (see Question 20). Representative estimates of the hydraulic conductivity for the Hillside Sand under the site range from 3 to 300 ft/day. Taking this range in hydraulic conductivity with the range in thickness of the Hillside, the long-term drawdown interference from this increase in groundwater appropriation, if it is all taken from the Hillside, ranges from 0.05 to 32 feet at a distance of 100 feet from the point of appropriation and 0.04 to 20 feet at a distance of 1,000 feet. Using the average thickness of the Hillside from the MGSCDB well logs (41 feet) and a representative estimate of the hydraulic conductivity (30 ft/day) results in an estimated drawdown interference of less than 2 feet at a distance of 100 feet or more from the point of withdrawal.

These drawdown interferences are probably overestimated for several reasons. Water would likely be withdrawn from a number of wells at various locations in the building areas instead of a single location. Furthermore, these wells would be used intermittently rather than continuously for years as was assumed for the estimates. Therefore, the actual drawdown interferences should be less than one-third of that taken from a bedrock aquifer, the drawdown interference should be negligible. No further study of quantity recharge is warranted during the discretionary EIS process.

22. WHAT TYPE OF WASTEWATER TREATMENT WILL BE USED? DESCRIBE TYPE OF TREATMENT SYSTEM AND AMOUNT TREATMENT IN GALLONS/DAY. SHOW LOCATION OF NON-MUNICIPAL SYSTEMS ON A SITE MAP AND THE RESULTS OF PERCOLATION TEST IF WARRANTED. INDICATE IF PRETREATMENT WILL BE USED.

Municipal waste treatment will be used. The City of Blaine will not permit leaching fields due to the high water table and potential for contamination of the groundwater (See Section 15 of this EAW). Sanitary wastes from the commercial areas will run to watertight concrete holding tanks. Storage of sanitary wastes in holding tanks is allowed by issuance of a permit from the City of Blaine. In the future, construction of holding tanks by private developers for storage of sanitary and commercial wastes will be reviewed by the City of Blaine and permits issued on a case-by-case basis. These tanks will be pumped out

on a routine basis. The wastes will be deposited into the local sewerage collection system at locations which have already been approved by the City of Blaine. This system will transport those wastes to the Metropolitan Wastewater Treatment Plant.

In Question 20 it was estimated the water demand from the project to be 5,000 gallons per day. Some of the water would be lost to watering landscaped areas, consumed or other uses not requiring treatment. Therefore, less than 5,000 gallons per day are expected to be placed into the sewerage system. This is an average flow of only 3½ gallons per minute and should not be considered for further study in the discretionary EIS process.

23. DESCRIBE AND INDICATE ON A SITE MAP THE PROVISION TO CONTROL EROSION AND STORM WATER RUNOFF. INCLUDE SIZE AND LOCATION OF ANY RETENTION BASINS, AND DISCHARGE POINTS.

On Exhibit 3 a portion of the existing ponding areas affected by the proposed improvements are shown. The City of Blaine Comprehensive Storm Drainage Plan recommends that 20 acre feet of ponding capacity exist in the vicinity of wetland basin 595W (on Exhibit 3). The Storm Drainage Plan also recommends another 10.4 acre feet of ponding capacity be provided in the vicinity of the existing west building area. Existing ponding areas in these areas are shown on Exhibit 3. Volumes of the existing areas have not been determined. Other improvements are recommended (by the Storm Drainage Plan) to the ditch and culvert system in both the Coon Creek and Rice Creek watershed districts. Some of these improvements could conflict with the goal of maintaining the wetlands.

It is not expected that there will be any significant increase of runoff from this project. This increase of impervious areas (Calculated in Section 14) is only 2.19%. As explained in Section 21 of this EAW all of the runway and taxiway improvements will be surrounded by grassed safety areas. All of the soils in the area are very permeable and will readily accept sheet runoff into the surface soils. If the surface soils are saturated, of course runoff will increase but this project will not increase saturation of soils. The limited increase of impervious surface should reduce saturation of the surface soils.

No appropriated groundwater used for sanitary or commercial use in areas served by holding tanks will contribute to runoff increase as it be hauled off site (see Section 22). There is an existing surface runoff collection and retention ponding system at the airport (see Section 21a). However, an amount of appropriated groundwater used in areas not served by holding tanks (i.e., aircraft washing areas) may cause a slight increase in runoff before reaching the collection and ponding system. Any increases in runoff that may be caused by appropriated groundwater will be reviewed for drainage impacts in the EIS.

No erosion problems are expected. All the topography at the site is gentle. The Anoka County Soil Survey notes (on page 80) "Only the steep soils in Anoka County are subject to severe erosion." All finished areas not paved or built upon around the site will be either turfed or landscaped.

Final limits of drainage improvements will need to be determined. The coordination for this work will be done during the discretionary EIS process and as part of the permit process among the Rice Creek Watershed District, Coon Creek Watershed District and City of Blaine.

24. WILL THE PROJECT GENERATE:

a. AIR POLLUTION?

The EPA acknowledges that pollutants from general aviation aircraft are insignificant. It is generally known that small general aviation and most air carrier airport operations represent an insignificant portion of the overall air pollution problems in a given area. In fact, EPA removed (45 Federal Register 1420 January 7, 1980) gaseous emission standards for all opposed-piston aircraft engines and auxiliary power units and removed (47 Federal Register 58462 December 30, 1982) hydrocarbon, carbon monoxide and nitrogen oxide standards for: all gas turbine engines used only for general aviation; newly certified gas turbine engines in all rated thrust categories; newly manufactured gas turbine engines of rated thrust equal to or greater than 26.7 kilonewtons (kN) (or 5994 pounds). Federal Aviation Administration Federal Aviation Regulations (FAR) Part 25 runway requirements for turbine engined aircraft were included in the Business and Commercial Aviation B&CA 1984 Planning and Purchasing Handbook. As shown in the B&CA Handbook, FAR Part 25 runway requirements for turbine engine aircraft with more than 5,994 pounds thrust per engine would exceed the 4,885 foot maximum runway length provided by the proposed project.

Some emissions will be created at Anoka County-Blaine Airport (Janes Field) by products of internal combustion engines used in the construction process. The pollutants in these emissions will be both insignificant and temporary in nature. Aircraft using the facilities to be developed in the Project will also produce some emissions with pollutants. A "Box Model" to measure such pollutants was developed in the Airport Master Plan. (Chapter 7.2.5 page 124)

The results of the Box Model analysis for Anoka County-Blaine Airport (Janes Field) substantiated the national finding that general aviation aircraft activity has an insignificant impact on air quality. The table below shows the calculated amount of aircraft emissions taken from the Box Model for the Airport compared to Minnesota Ambient Air Quality Standards. The quantities are taken from Exhibit 7-15 of the Master Plan, P. 125, which assumed "worst case" conditions by using the high forecast demand levels for the year 2000 in the calculations.

Total Aircraft Emissions
Year 2000

Micrograms/Cubic Meter				Milligrams/Cubic Meter
Particulates	SO_2	HC	NO_x	CO
0.018	0.009	0.342	0.044	0.009
Minnesota Ambient Air Quality Standards (Primary Standard)				
75 1/	80 2/	160 3/	100 2/	10 4/

1/ geometric mean/year
2/ arithmetic mean/year
3/ maximum 3-hour concentration
4/ maximum 8 hour concentration

Aircraft Operations at Anoka County-Blaine Airport simply will not produce significant amounts of air pollutants.

The Minnesota Pollution Control Agency through MCAR does not provide threshold criteria for frequency of aircraft operations requiring an indirect source permit. However, 6 MCAR S 4.4313 C. does provide that "a new or modified airport construction which will result in the generation of more than 1,000,000 passengers per year on regularly scheduled air carriers and commercial charter flights within 10 years after completion of construction" will require an indirect source permit. Proposed development does not include adequate facilities for any regularly scheduled air carriers or commercial charter flights, let alone a quantity which would generate 1,000,000 passengers per year. 6 MCAR S 4.4314 D specifically exempts "a new or modified airport construction that will result in the generation of fewer than 500,000 passengers per year or regularly scheduled air carriers and commercial charter flights within ten years after completion of construction". Facilities for regularly scheduled air carriers are not proposed for the airport. Commercial charter operations will be limited to small aircraft consistent with the "minor" airport designation and will not operate at a frequency which will generate 500,000 passengers per year.

b. DUST?

Some dust will be generated by the Project on a temporary basis during construction. Normal mitigation techniques will be required of contractors working on the Project, by provisions in contract specifications, to minimize any temporary dust from construction operations. It is reasonable to expect that such techniques will result in confining dust to the airport property.

c. NOISE?

The Project itself will not generate any significant noise beyond the airport boundary. However, alteration of the airfield configuration by the extension of the two Runway Ends (17 and 26) will shift noise patterns created by the aircraft using the airport. Such a shift is, in fact, the prime reason for undertaking two elements of the Project. By shifting the 4855' length of Runway 17-35 to the north by

950', departures to the south and landings from the south on that runway will be that much further from the noise sensitive residential areas south of the airport. Additionally, by lengthening the cross-wind Runway, 8-26 to 4000', this runway can then be used by aircraft more often in calm and light wind conditions which allow a choice as to runway use. Such an increased use of the east-west Runway (8-26) will reduce the amount of traffic using the north-south Runway (17-35) and further alleviate aircraft noise over the noise sensitive residential neighborhoods south of the airport. In addition, the extension of Runway 8-26 to the east will allow aircraft using Runway 26 for departure to be high enough in the air to make their procedural turn before crossing the airport boundary, thereby mitigating noise in the residential areas west of State Highway 65.

Noise contours were generated as part of the Airport Master Plan to estimate the effect of the full Master Plan development on aircraft noise patterns around the airport. The Day-Night Sound Level (Ldn) metric was utilized as it is the accepted noise impact measuring technique within the FAA, major grantor for the Airport Master Plan. The Ldn analysis showed the shifting of aircraft noise using the annual averaging technique inherent in the metric. No L_{10} analysis was undertaken in accordance with the State of Minnesota approved metric. Further analysis will be needed using the L_{10} metric, the State standard currently in use, during preparation of the EIS.

The noise analysis will include a comparison of existing and future noise levels. While the MPCA currently uses an L_{10} metric, it is evaluating changes to its existing L_{10} metrics. The EIS will analyze noise impact according to the latest MPCA noise assessment standard.

Per EAW Guidelines, distance from the Project to noise sensitive receptors is to be given and any areas exceeding Minnesota noise standards are to be identified. The latter can only be developed through subsequent noise analysis as outlined above. As to distances, the most sensitive noise receptors in the area of the airport are the residential neighborhoods off the extended centerlines of Runways 8-26 and 17-35 west and south of the airport. Current distance and ultimate (after Phase 1B construction) distances from the start of take-off run to the airport boundaries directly west and south are as follows:

	Current Distance	Ultimate Distance
Departure to West	7,000 feet	7,800 feet
Departure to South	7,400 feet	8,350 feet

d. ODORS?

No odors will be generated by the project.

25. DESCRIBE THE TYPE AND AMOUNT OF SOLID WASTE AND/OR HAZARDOUS WASTE THAT WILL BE GENERATED AND THE METHOD AND LOCATION OF DISPOSAL.

FBO type operations with shops and students generate small amounts of solid waste. Most operations will pay for a private collection service. Fees for rubbish collection are normally based upon the number of "dumpsters" and rate of collections. Weight is normally not available data. It is expected that the solid waste will be less than the factors listed in the EAW guidelines for rural commercial. However, for this estimate the guideline figure of 0.4 pounds/person/day will be used.

Owners of non-commercial hangars would normally not be on-site each day of the week. The minor amount of solid waste generated from these hangars is not considered significant.

Following is the predicted solid waste using the EAW per capita guidelines and projected FBO population from Question 20:

174 persons x 0.4 pounds/person/day = 70 pounds/day or approximately 0.14 cubic yards of municipal waste per day.

Some of the FBO operations may use chemicals for paint striping work. The chemicals may need to be pretreated in accordance with municipal codes prior to disposal in the sewerage system. This need will be evaluated as part of the City's review of individual waste disposal permit applications. Development of the building areas will be undertaken by private developers and not by MAC.

No further study regarding solid and hazardous wastes is warranted in the discretionary EIS process.

26. WILL THE PROJECT INVOLVE:

a. FISH OR WILDLIFE HABITAT?

No water bodies exist on the airport site which are deep enough to support a resident fish population. There is potentially some use of Protected Water 595W by spawning Northern Pike; however, the capability of this wetland to serve this purpose will be unaffected by the project. Protected Water 594W is landlocked and provides no fish habitat.

The project area lies in an area which is overall excellent habitat for both upland and wetland wildlife. The better wildlife habitat lies toward the perimeter of the airport property.

The east building area will be constructed in a large stand of monotypic bromegrass with some patches of Aspen. This area has marginal value for nesting pheasants, songbirds and deer, however, and its relative value compared to the overall airport site is low. The east runway 26 extension will lie in a very similar area except that woody vegetation is almost entirely lacking. This area is also marginal wildlife habitat. The north runway 17 extension will mainly affect an upland area which is presently used for agriculture to prevent trees from growing into the clear zone. The east edge of runway 17 extension will encroach into Minnesota Protected Waters

549W which is a Type 4 wetland. Impacts to this basin are reflected in Section 19 of this EAW. The proposed taxiway for runway 17 extension will affect a portion of a degraded oak Savannah and some Type 2 and Type 4 wetlands. Other than wetland 594W the land directly taken by extending runway 17 and its adjacent taxiway is not unique. However, the interspersion of cropland with wetland, grassland, Savannah and mature oak woods in the area around it makes the overall value of the adjacent land for wildlife very high. A heavily used deer trail connects the undeveloped land west of the airport to the timber lying in the northeast portion of the airport property. Runway 17 extension would cross this pathway and deer are likely to continue using this trail for sometime after runway completion. Deer/aircraft collisions are not presently a problem but could become so. The EAW will discuss Movement of Any Resident or Migratory Animals, in Section 26C and analyze this situation in greater detail in the EIS and develop a mitigation plan.

The west building area will occur in a stand of interspersed oak shrub swamp and grassland. This area is excellent habitat for deer, pheasants, rabbits and other species. A ditch that runs north-south across this area does support a small beaver colony. The grassland area has some native plants but has been largely taken over by timothy, a European species. Deer use is heavy in the oak woods and shrub swamp and they appear to be wintering in this area. The proposed construction in this area will result in some reduction of the populations of the species now occupying the area but the majority will relocate to other habitat areas nearby.

Without mitigation there would be approximately 3 acres of protected wetlands lost. However, MAC proposes to recreate this area of wetlands. The details of the mitigation plan will be developed in the EIS. It appears the best areas for mitigation are the Rifle-Isanti soil association. Several areas in the north and east airport quadrants offer wetland development potential in this soil association (See Exhibits 5 and 7). Airport uplands could be converted to wetlands thereby producing larger contiguous wetland area than existing. Approximately 20 acres of unprotected wetlands would be converted to grasslands or Class I or II wetlands. Mitigation plans for protected and other wetlands, if required, will be developed during the discretionary EIS process.

In 1979, a nesting colony of Great Egrets was reported on the eastern edge of a wetland in the eastern half of Section 21 (see Appendix 2). This wetland is designated 580W as shown on Exhibit 3. Also known as Blaine Gardens, the wetland is approximately 0.8 - 1.1 miles north of Runway end 17. The nesting colony consisted of 75-80 birds and approximately 15-20 nests. However, a subsequent field check in 1981 was unable to locate any birds in this area. Due to the distance of wetland 580W north of the airport, the habitat will not be impacted by the construction activity associated with the proposed project. Since the latest observations indicate that no Egrets are currently utilizing the habitat, there will be no impact on this species. Should they return to the habitat, additional study could be

undertaken at that time. However, since the operational nature of the Airport will not change and the Great Egrets were previously nesting in the area successfully, it is unlikely there would be any impact to future colonies.

b. A RARE, ENDANGERED, THREATENED OR SPECIAL CONCERN SPECIES? (ANIMALS AND/OR PLANTS).

The United States Fish and Wildlife Service Red Book indicates no Federal threatened or endangered species are normally found on the project area or airport site. The area does lie within the migratory range of Bald Eagles (threatened) and Peregrine Falcons (endangered) but the likelihood or either species using the airport for feeding or nesting is negligible.

Mr. Lloyd Knudson of the MDNR, Area Wildlife Manager for Anoka, Washington and Ramsey Counties, in a phone conversation, said that, it is unlikely that any such vertebrate species will be found at the airport site.

Barbara Coffin and Lee Pfannmueller of MDNR Heritage Program were contacted relative to the potential presence of rare plants or invertebrates on the airport site. No legally protected species are known to exist in the vicinity of the airport. However, several uncommon butterfly and one beetle species which are of special concern to MDNR (unofficial status) use portions of the sand plain in Anoka County. Since these species rely on relatively undisturbed vegetation, they are unlikely to be found at the airport. The Heritage Program computer data base was accessed to verify the presence or absence of such priority species and Heritage Program staff scientists also reviewed the project (See Appendix 2-Letter from Karen Schmitz, MDNR, January 14, 1985). The Heritage Program search which included five square miles in the airport vicinity, yielded only one entry: a fifteen nest Great Egret colony approximately one mile north of the airport. Great Egrets are not on the Minnesota list of threatened, endangered and special concern species. However, since it is a colonial water bird, it is of interest to MDNR. The colony was observed in 1979 but was no longer active at the time of a following field trip in 1981. Thus, threatened and endangered species will not be analyzed further in the EIS.

c. MOVEMENT OF ANY RESIDENT OR MIGRATORY ANIMALS? EXPLAIN (IDENTIFY SPECIES AND DESCRIBE IMPACT):

A deer movement corridor exists north of the end of existing runway 17 and could present a problem with deer/aircraft collisions unless mitigative measures are undertaken. Such collisions are not presently a problem and deer have not been observed on the runways by airport staff. Construction in this area will not itself significantly alter the movement or habitat availability for deer. The extent to which deer movement may become a problem as well as mitigative measures will be addressed in the EIS.

Since minimal Type 3 and Type 4 wetland will be affected, habitat for herons, waterfowl and other migratory wetland birds will not be significantly affected. Heron flight patterns are dispersed through the distance of the airport from the rookeries and major feeding areas. Thus heron movements will be unaffected by the project.

27. DO ANY HISTORICAL, ARCHAEOLOGICAL OR ARCHITECTURAL RESOURCES EXIST ON OR NEAR THE PROJECT SITE? EXPLAIN (SHOW RESOURCES ON A SITE MAP AND DESCRIBE IMPACT.

The State does not list any archaeological sites at the airport nor is it likely to find any sites of historic importance according to Mr. Ted Lofstrom, Environmental Assessment Officer of the Historic Protection Office (A part of the Minnesota Historical Society).

28. WILL THE PROJECT CAUSE THE IMPAIRMENT OR DESTRUCTION OF:

a. DESIGNATED PARK OR RECREATION AREAS?
There will be no impairment or destruction of designated park or recreation areas.

b. PRIME OR UNIQUE FARMLANDS?
No. The soil types in the project areas are not listed as unique or prime.

c. ECOLOGICALLY SENSITIVE AREAS?
The DNR registered wetlands discussed in questions 12 and 19 are ecologically sensitive areas which will be impacted by the Project. As mentioned in the discussion regarding question 19, the impact will be mitigated by wetland replacement. The extent of the impact and methods for mitigation must be studied in greater detail to more precisely quantify the impact of the Project.

A 100 year flood plain is delineated around the end of Runway 8 extending south into the area to be developed as the west building area. This flood plain is part of the airport drainage ditch system in the Coon Creek Watershed Area (CCWA). Discussions between the CCWA and the MAC regarding the rerouting of this ditch will have a bearing on the status of the flood plain. Further, study of this ecologically sensitive area is warranted to better define the impact or lack of impact, the ditch relocation would have. Such studies will be undertaken during the discretionary EIS process.

The undeveloped tract of land northeast of the airport bounded by Raddison Road to the west, State Highway No. 14 to the north, State Highway No. 17 to the east and County Highway 10 to the south is undeveloped and provides wildlife habitat. The southern half of this area is zoned I-1, Light Industrial and the northern half is zoned FR-1, Farm Residence and R-F, Residential Flex, by the City of Blaine. Development of this area consistent with these zoning designations will have a more direct, overriding impact on any animal habitat then the remote overflights of aircraft from the airport.

Additional sensitive areas in the general vicinity of the site have been mentioned in prior planning efforts. These include the Carlos Avery Wildlife Management Area, the Lamprey Pass Wildlife Management Area, the Rice Lake Chain of Lakes area and an undeveloped area northeast of the airport. All these areas are located in relation to the airport in the following table and on Exhibit 1 of this EAW.

ANOKA COUNTY - BLAINE AIRPORT
ECOLOGICALLY SENSITIVE AREAS

AREA	DIRECTION FROM AIRPORT	DISTANCE FROM AIRPORT	ENVIRONMENTAL CONCERN
Rice Lake	East	5	Heron Rookery
Lamprey Pass	Northeast	12	Heron Rookery
Cedar Creek Natural History Bethel	North	17	Nature Trail
Carlos Avery Wildlife Management Area	North Northeast	8	Wildlife
Undeveloped Tract NE of Airport	Northeast	1	Wildlife Habitat

Through Policy Statement #15 the Minnesota Department of Natural Resources is working with FAA to limit the flight of aircraft over wildlife management areas, including the Carlos Avery Area, to not less than 1,000 feet above ground level (AGL) except for spraying over private lands. Such an exemption requires prior approval from the resident manager or area wildlife manager.

As shown in the MAC Anoka County Airport Operations Rules traffic pattern altitude is 1700 MSL for light and slow aircraft and 2400 MSL for higher performance aircraft. This is 800 and 1500 feet above ground level (AGL) respectively. The operations rules specify that no take-off turns can be initiated until the aircraft has attained an altitude of 400 feet AGL (1300 feet MSL). During VFR flight, standard flight, standard rates of climb on takeoff would clear ecologically sensitive areas at least 5 miles away by far more than the previously mentioned turning altitude of 400 AGL or pattern altitude of 800 AGL traffic pattern altitude. Current instrument approach procedures require aircraft to be at least 2700 feet MSL (1800' AGL) until established on the final approach course and crossing Gopher VOR 6.5 miles west of the airport on approach to runway 8 and 2600 feet MSL (1700' AGL) until on final approach course to Runway 26. On approach to Runway 26, aircraft must then remain at 2600 feet MSL (1700' AGL) until 5 miles east of the airport and 1900 feet MSL (1000' AGL) until 3 miles east.

Current VFR and IFR approach procedures result in aircraft clearing the previously mentioned ecologically sensitive areas by more than adequate altitudes so as not to affect the use of these areas.

At 5 miles from the airport, most aircraft have left their take-off orientation and are flying in the direction of their destination or as directed by air traffic control. Since air traffic is disbursing at this distance, it will not be unreasonably concentrated over any Ecologically Sensitive Areas.

Rice Lake is 5 miles east of the airport. Nesting herons are sensitive to some types of disturbance; however, they do become acclimated to noise disturbance. This is evidenced by the existence of the Pigs Eye Lake Heron Rookery in St. Paul which is exposed to large volumes of barge, railroad and air traffic. The Pigs Eye Rookery was studied extensively for the EIS on the expansion of the St. Paul Downtown Airport which lies 3 miles northwest of the Rookery. It was found that because the spatial and temporal flights of heron and aircraft were so different that they partially shared the same airspace only about 2% of the time.

The heron at Rice Lake would be even less apt to share airspace with aircraft from the Anoka County-Blaine Airport (Janes Field) due to the additional 2 miles between them and the fact that major heron feeding areas are distributed to the north and east of Rice Lake away from the airport. No further study of the affects of aircraft flight patterns and birds will be done in the EIS.

The airport property supports scattered prairie remnants dominated by Switchgrass, Indian grass or Big Bluestem. Most of the native prairie on the site has been degraded by either past disturbance or by invading European grasses. None of the locations where construction will occur has significant prairie remnants associated with them. Remnant oak savannahs also occur on the airport and portions of two such areas will be affected. Both remnants have been degraded by past human disturbance (a dumpsite at one and a farmstead at the other). The Heritage Program computer run indicated that no rare plants will be affected by the project. No further analysis of ecologically sensitive areas other than wetlands will be undertaken in the EIS.

d. SCENIC VIEWS AND VISTAS?
No scenic views or vistas will be impaired or destroyed by the Project.

e. OTHER UNIQUE RESOURCES (SPECIFY)?
No other unique resources will be impaired or destroyed by the Project.

29. WHAT ROADS WILL RECEIVE INCREASED TRAFFIC? (FOR EACH ROAD INDICATE THE CURRENT AVERAGE DAILY TRAFFIC (ADT) AND INCREASES IN ADT CONTRIBUTED BY THE PROJECT.)

Traffic Data are from State, County and Town Traffic departments. The Institute of Transportation Engineer's Trip Generation Manual was referenced to determine expected Average Daily Traffic (ADT).

The east and west building improvements are expected to have up to 174 employees which can be expected to generate an estimated 4 trips per day each, for a total of 696 ADT. The T-hangars and tie downs in the building areas could produce approximately 30 ADT for a total of 726 ADT or approximately 363 ADT from each building area.

Access to the east building area will be from Xylite Street via 85th Avenue and Lovell Road via Interstate 35W. A traffic split of 40% - 60% respectively is anticipated. This correlates to an increase of traffic on Xylite Street of 145 ADT and 218 ADT on Lovell Road.

From the west building area the major population area is south of the airport. It is anticipated 80% of the increased traffic will access the west side of the airport via 85th Avenue and Airport Road. The remainder of the increased traffic will use 89th Avenue from Highway 65. The increase in traffic on 89th Avenue and Highway 65 will be approximately 73 ADT. The traffic along Airport Road and 85th Avenue will be increased by 290 ADT.

The table below is a summary of Average Daily traffic for existing and future conditions.

Intersection	1984 ADT	Projected 1990 ADT w/o Project	Projected 1990 ADT w/Project	Increase in ADT w/Project	% Increase w/Project
Hwy 65 & 89th Ave					
Hwy 65	33,100	41,900	41,973	73	0.2%
89th Ave	2,650	3,750	3,823	73	1.9%
85th Ave & Airport					
85th Ave	11,700	14,800	15,090	290	2.0%
Airport Road	1,000	1,265	1,555	290	22.9%
85th Ave & Xylite St					
85th Ave (east)	6,600	8,350	8,378	28	0.3%
85th Ave (west)	5,600	7,100	7,217	117	1.6%
Xylite Street	1,950	2,500	2,645	145	5.8%
Lovell Road	---[1]	---[1]	---[1]	218	N.A.

[1]Data not available

Operating capacity will be affected only slightly. Interstate 35W and Hwy 10 (4 lane, limited access highways) and Hwy 65 (4 lanes) will dissipate traffic quickly. Existing traffic on Airport Road is very small and the projected increase in ADT can easily be accommodated by the road. Local feeder roads, other than those in the table which have low volumes will have traffic increases of 12% or less. No traffic congestion problems are anticipated as a result of Airport improvements. No further study is warranted in the discretionary EIS process.

30. ARE ADEQUATE ENERGY SOURCES AND UTILITIES NOW AVAILABLE TO SERVICE THE PROJECT? IF NOT, WHAT ADDITIONAL UTILITIES WILL BE REQUIRED?
Adequate energy sources and utilities are now available to service the Project.

SUMMARY OF ISSUES

Background

This EAW was developed as part of the Environmental Review process for proposed improvements to Anoka County-Blaine Airport (Janes Field). The process was initiated as a result of a petition (filed with the Minnesota EQB pursuant to 6 MCAR S3.026) by residents of neighborhoods in the vicinity of the Airport. The EQB designated the Metropolitan Airports Commission (MAC) as the Responsible Government Unit (RGU), and at its meeting of April 16, 1984, MAC voted to undertake preparation of an EAW.

During work on the EAW, it became increasingly evident that certain potential environmental impacts would require study at a level of detail well beyond that normally considered appropriate in an EAW, and therefore should be addressed through preparation of an EIS. In recognition of this fact, MAC voted at its meeting on May 29, 1984, to undertake preparation of a Discretionary EIS, pursuant to rule 6 MCAR S 3.029-C-2. As a result, this EAW was changed to a "Scoping EAW" and is to be used in accordance with EQB rules as a basis for the scoping process for the EIS.

As part of its action at both the April 16, 1984 and the May 29, 1984 meetings, MAC voted to formally request the Minnesota Pollution Control Agency (MPCA) to participate with MAC in the EAW/EIS process. As a result, MPCA staff has worked with MAC on preparation of this EAW. As shown in Appendix 1, on June 4, 1984 the MPCA entered into formal agreement with MAC which calls for MPCA staff to review and approve the analysis of the EIS related to aircraft noise impact, surface water impacts and ground water impacts prior to completion of the Scoping Decision, Draft EIS and Final EIS.

Also, at the request of MAC, the Minnesota Environmental Quality Board (EQB) on June 7, 1984 resolved to assume responsibility for determination of adequacy for the EIS. A copy of the EQB resolution is included in Appendix 1.

Environmental Impacts Not Requiring Further Assessment

Based upon work done in the preparation of this EAW, it has been concluded that the potential for significant environmental impacts does not exist in the following areas, and therefore additional study of these areas during preparation of the EIS is not anticipated:

- Consistency with adopted land use ordinances.
- Consistency with adopted comprehensive land use plans.
- Consistency with local, State or Federal resource management plans, except that impacts on wetlands and on a delineated 100 year flood plain area will be addressed further in the EIS (see below).
- Adverse soil conditions, geologic hazards, prime or unique farmlands, or other farmlands of statewide importance.
- Effects on the quantity of groundwater (recharge of aquifers); note that possible impacts on groundwater quality will be addressed further in the EIS (see below).
- Shorelands or designated rivers land use district.
- Air pollution.
- Fugitive dust emissions.
- Noise from construction operations; note that potential noise impacts from aircraft operations will be addressed further in the EIS.
- Solid waste disposal.
- Erosion.
- Appropriation of groundwater.
- Appropriation of surface water except that drainage impacts will be studied further in the EIS.
- Sewage disposal.
- Hazardous waste disposal.
- Fish or wildlife habitats, except that wetland habitat will be addressed further in the EIS. (see below).
- Rare, endangered, threatened or special concern species of plants or animals.
- Historical, archaeological or architectural resources.

- Designated parks or recreation areas.
- Ecologically sensitive areas; except impacts on wetlands and on a delineated 100 year flood plain area at the project site will be addressed further in the EIS. (see below).
- Scenic views or vistas.
- Other unique resources.
- Surface transportation impacts.
- Adequacy of energy sources and utilities.

Potential Environmental Impacts Requiring Further Assessment

Based upon the work done in the preparation of this EAW, it has been concluded that additional assessment of potential environmental impacts in the following areas is needed, and therefore will be undertaken in the preparation of the EIS:

- Impacts on wetlands on the airport site.
- Impacts on a delineated 100 year flood plain area on the airport site.
- Potential impacts on the quality of surface water and groundwater.
- Potential impacts on drainage both on the airport site and downstream of the site.
- Potential noise impacts from aircraft operations at the airport.
- Movement of resident or migratory animals.

Each of these areas of concern is discussed in more detail in the following paragraphs.

1. Wetland Impacts

As noted in the EAW, the proposed project will impact wetlands on the airport site. In the EIS, the impact on wetlands will be addressed in greater detail; coordination with all government agencies having jurisdiction through permit or other approval processes will be continued; and mitigation measures will be identified, evaluated and selected for implementation. It is expected that mitigation can be accomplished by replacement of the wetlands within the boundaries of the airport.

2. Floodplain Impact

In this EAW, it is recognized that the proposed project will impact an area delineated as being within a 100 year floodplain. This area is actually a drainage ditch near the westerly end of existing Runway 8-26. In the EIS, the impacts on this flood plain area will be addressed in greater detail; coordination with all government agencies having jurisdiction through permit or other approval processes will be continued; and mitigation measures will be identified, evaluated and selected for implementation. The 100 year flood plain area is part of the drainage system discussed in 4. below.

3. Surface and Groundwater Quality

In this EAW, potential sources of contamination of surface and or groundwater have been identified. Although prior work, particularly in the Airport Master Plan, has indicated that there should be no significant adverse impact on water quality from these sources of contamination, the potential for adverse impact will be addressed in greater detail in the EIS. Should that work indicate that mitigation measures are warranted to protect against or to minimize the potential for adverse impacts on water quality, such measures will be identified, evaluated and selected for implementation. Coordination with government agencies having jurisdiction through permits or other approval processes regarding surface waters and/or groundwater will be continued during preparation of the EIS.

4. Drainage Impacts

In this EAW, the potential for the project to effect existing drainage problems, particularly in County Ditch 41, has been identified. In the EIS, these potential effects will be further studied; coordination with government agencies having jurisdiction over or concern with the drainage problems will be continued; and appropriate design details will be developed to minimize or eliminate any adverse effects from the project on drainage systems.

5. Aircraft Noise Impacts

As noted in this EAW, analysis of aircraft noise impacts using the L_{10} metric currently required by MPCA regulations has not been accomplished. The EIS will include appropriate aircraft noise analyses using the L_{10} metric. However, as discussed in Section 24c, the EIS will include noise analyses using the latest MPCA noise metric.

Additional detail on the assessment in the EIS of the above five areas of concern will be developed during the scoping process and included in the Scoping Decision Documents.

6. Movement of Resident or Migratory Animals

In this EAW, a deer movement corridor was identified north of runway end 17. Although construction in this area will not significantly affect habitat or alter the movement of deer, the extent to which deer movement may be a problem as well as mitigative measures to create a new deer movement corridor will be addressed in the EIS.

Additional Topics to be Addressed in EIS

An EAW is basically limited to evaluating potential effects on physical conditions. In a EIS, however, the EQB rules require that several additional topics be addressed:

Alternatives to the proposed project must be identified and evaluated, including a "no action" alternative, and any prudent and feasible alternative to the proposed action which could accomplish the project objectives.

Economic, employment and sociological impacts which may be associated with the proposed project must be identified and evaluated.

Mitigation measures which can potentially act to minimize or eliminate any adverse environmental, economics, employment or sociological effects of the project must be identified and evaluated.

In the EIS, the above topics will be addressed as required by the EQB rules.

CERTIFICATION BY RESPONSIBLE
GOVERNMENTAL UNIT

I hereby certify that the information contained in this document is true and correct to the best of my knowledge and that copies of the completed EAW have been made available to all points on the official EQB distribution list.

Signature _____ Date _____

Title Director of Planning & Engineering

APPENDIX 1

CORRESPONDENCE WITH

MPCA AND MEQB

ORIGINAL TO: JWT 1
COPIES TO: JRL 1

RECEIVED

NOV 13 1984

HTA, INC.

Minnesota Pollution Control Agency

June 5, 1984

Raymond G. Glumack, Chairman
Metropolitan Airports Commission
P.O. Box 11700
Twin Cities Airport Station, Minnesota 55111

Dear Mr. Glumack:

Thank you for your letter of May 31, 1984 concerning solicitation of Minnesota Pollution Control Agency staff assistance in the preparation of the Anoka County-Blaine Airport Environmental Impact Statement (EIS). The agency staff would be pleased to assist in EIS preparation and believes that through our joint efforts, all environmental issues concerning the project will be adequately addressed. An executed copy of the agreement you provided is attached.

Agency input to this effort will be coordinated through the Office of Planning and Review. Please have your staff contact Deborah R. Pile, Director of the Office of Planning and Review, as further information on this project becomes available.

Sincerely,

Thomas Kalitowski
Executive Director

cc: T. Triplett, Chairman, EQB

Phone: 296-7301
1935 West County Road B2, Roseville, Minnesota 55113-2785
Regional Offices • Duluth Brainerd Detroit Lakes Marshall Rochester
Equal Opportunity Employer

RE: Anoka County-Blaine Airport Improvement

The Metropolitan Airports Commission has received a Citizens Petition for the above-referenced project and has made a determination that an Environmental Impact Statement should be prepared under Rule 6 MCAR § 3.029-C-2.

It is agreed that for the Environmental Impact Statement process, the Metropolitan Airports Commission and the Minnesota Pollution Control Agency shall cooperate as follows:

The MPCA Staff will be given the opportunity to review and a-prove the analysis related to aircraft noise impact, surface water impacts, and ground water impacts prior to completion of the Scoping Decision, the Draft EIS, and the Final EIS.

METROPOLITAN AIRPORTS COMMISSION

By: _____

Its: Chairman

MINNESOTA POLLUTION CONTROL AGENCY

By: _____

Its: Executive Director

June 4, 1984

Minnesota
Environmental Quality Board
100 Capitol Square Building
550 Cedar Street
St. Paul, Minnesota 55101
Phone (612) 296-2723

June 11, 1984

Ray Glumack, Chairman
Metropolitan Airports Commission
6040 28th Avenue South
Minneapolis, MN 55450

RE: Anoka County/Blaine Airport Improvements

Dear Mr. Glumack:

At its June 7, 1984 meeting, the Environmental Quality Board (EQB) under 6 MCAR 3.031 G1, assumed the responsibility for the Final Environmental Impact Statement (EIS) adequacy decision for the above-named project. The decision was unanimous (9-0).

A copy of the resolution passed by the EQB is enclosed. Questions concerning this decision and the environmental review process should be directed to Gregg Downing at (612) 296-8253.

Sincerely,

Shirley M. Dougherty

Shirley M. Dougherty
Administrator

SMD/pb

Enc.

cc: City of Mounds View
Grant Merritt
Lee Ann Sporre

AN EQUAL OPPORTUNITY EMPLOYER

Minnesota
Environmental Quality Board
100 Capitol Square Building
550 Cedar Street
St. Paul, Minnesota 55101
Phone _____

RESOLUTION OF THE
MINNESOTA ENVIRONMENTAL QUALITY BOARD
IN THE MATTER OF INTERVENTION TO ASSUME RESPONSIBILITY
FOR DETERMINATION OF ADEQUACY FOR THE EIS FOR
IMPROVEMENTS AT THE ANOKA COUNTY-BLAINE AIRPORT

Mr. Larsen moved:

WHEREAS, 6 MCAR 3.031 G.1. provides that the EQB may assume responsibility for determination of the adequacy of a final EIS; and

WHEREAS, the Metropolitan Airports Commission (MAC) has requested the EQB to assume responsibility for the determination of adequacy of this EIS; and

WHEREAS, the EQB finds that the project involves complex issues, and the project has multi-jurisdictional effects;

NOW, THEREFORE BE IT RESOLVED that the EQB hereby intervenes to assume responsibility for determining the adequacy of the final EIS for the proposed improvements at the Anoka County-Blaine airport; and

BE IT FURTHER RESOLVED that the Executive Director of EQB is directed to notify MAC of this action no later than 60 days following publication of the EIS preparation notice in the EQB Monitor; and

BE IT FURTHER RESOLVED that the Minnesota Pollution Control Agency (MPCA) staff is requested to cooperate and participate with MAC, the RGU in this proceeding, in the preparation of the EIS, and to review and approve the analysis as provided in the agreement between MAC and MPCA included in correspondence from MAC to MPCA dated May 31, 1984.

Seconded by Dr. Arneson, the motion carried unanimously with Alexander, Arneson, Brand, Braun, Hughes, Kalitowski, Larsen, Van Doren and Triplett voting aye.

ADOPTED: June 7, 1984

MAC

Minneapolis • Saint Paul
METROPOLITAN AIRPORTS COMMISSION

OFFICE OF EXECUTIVE DIRECTOR • PHONE (612) 726-1892

June 19, 1984

Mr. Tom Triplett
Chairman
Minnesota Environmental Quality Board
Room 100
Capitol Square Building
550 Cedar Avenue
St. Paul, MN 55101

Dear Mr. Triplett:

As indicated by Nigel Finney at the Environmental Quality Board meeting of June 7, 1984, the Metropolitan Airports Commission hereby requests that pursuant to 6 MCAR 3.031.G.1, the Minnesota Environmental Quality Board assume the responsibility for the determination of adequacy with regard to an Environmental Impact Statement to be prepared for proposed development at the Anoka County-Blaine Airport. This request is made in recognition of community concerns regarding preparation of this Environmental Impact Statement, the fact that the project involves complex issues, and the fact that the project will have multi-jurisdictional affects. Under these circumstances, it is our feeling that the Environmental Quality Board should make the determination of adequacy of the Environmental Impact Statement.

Should you have any questions regarding this request, feel free to contact me or Nigel Finney.

Sincerely yours,

Raymond G. Glumack
Chairman

cc: Tom Kalitowski - MPCA

APPENDIX 2

CORRESPONDENCE WITH MDNR

(NATURAL HERITAGE PROGRAM)

STATE OF MINNESOTA
DEPARTMENT OF NATURAL RESOURCES

BOX 7 . 500 LAFAYETTE ROAD • ST. PAUL, MINNESOTA • 55146

DNR INFORMATION
(612) 296-6157

January 14, 1985

Ronald P. Peterson, Senior Associate
Barton-Aschman Associates, Inc.
1610 South 6th Street
Minneapolis, Minnesota 55454

Dear Mr. Peterson:

As per your request of January 4, 1985, the Natural Heritage Program has reviewed the Anoka County Airport Expansion Project for the occurrence of rare and/or sensitive species or natural features. A search of our data base indicates that there are occurrences of sensitive ecological features within the boundaries of the project.

The Natural Heritage Program, a unit within the Section of Wildlife, Department of Natural Resources, has compiled the most complete single source of existing data on Minnesota's rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features. While this information is comprehensive, it cannot be considered a substitute for an on-site survey. Because there has not been a complete on-site survey of the biological resources of this project area it is possible that ecologically significant features exist for which we have no record.

An invoice for the cost of the work completed will be forthcoming. You are being charged for computer and map search and staff scientist review.

Billings are done on a quarterly basis in June, September, December, and March.

Sincerely,

Karen Schmitz

KAREN SCHMITZ
Natural Heritage Program
612 - 296-9782

AN EQUAL OPPORTUNITY EMPLOYER

Evaluation of Anoka County Airport Expansion
by the
Natural Heritage Program

The Natural Heritage Program (NHP)[1] has reviewed the project area for the occurrence of rare and/or sensitive species or natural features. A search of our data base indicates that there is an occurrence of a sensitive ecological feature within the boundaries of the project.

Animal Data Base

Occurrence data on approximately 50 rare Minnesota animals are maintained on the Natural Heritage data base. Included among the vertebrates are birds, mammals, reptiles and amphibians; fish records, although maintained in manual files, are currently not on the computer file. Among the invertebrates selected records on butterflies and mussels are also available.

Data on animals of special interest that are not given official state status are also kept. For example, comprehensive manual, computer and map files are maintained on over 350 colonial waterbird nesting sites. Bat caves are another feature of interest that are included.

Information compiled and entered into the data base is collected from a myriad of selected surveys, research studies and professional organizations (e.g., Minnesota Ornithologists' Union). Although considerable data are available, a comprehensive and systematic biological survey of the state has never been conducted. When a search of our data base reveals no animal records it may indicate that biological data has never been collected from the site.

Site Specific Comments

Expansion of the Anoka County Airport

We have only one record of an element occurrence in the proposed project area. In 1979 a nesting colony of Great Egrets was reported on the edge of a wetland in the eastern half of Section 21. Approximately 75-80 birds were seen and it was estimated to be a total of 15-20 nests. A subsequent field check in 1981 was unable to locate any birds in the area.

The Great Egret is not included on the official state list of Endangered, Threatened and Special Concern Species. As a colonial waterbird, however, it is a species of interest which should be monitored. The entire wetland where the egret is reported to have nested, however, should be protected from any negative impacts.

[1] The Natural Heritage Program, a unit within the Section of Wildlife, Department of Natural Resources, has compiled the most complete single source of existing data on Minnesota's rare, endangered, or otherwise significant plant and animal species, plant communities, and other natural features. While this information is comprehensive, it cannot be considered a substitute for an on-site survey. Because there has not been a complete on-site survey of the biological resources of this project area it is possible that ecologically significant features exist for which we have no record.

Barton-Aschman Associates, Inc.

1610 South Sixth Street Minneapolis, Minnesota 55454 612-332-0421

January 4, 1985

Barbara Coffin, Director
Minnesota Natural Heritage Program
Section of Wildlife, Box 6
Department of Natural Resources
500 Lafayette Blvd.
St. Paul, Minnesota 55146

Re: Data Request
Anoka County Airport Site

Dear Barbara:

Barton-Aschman Associates, Inc. has been retained as a subconsultant to Hoyle, Tanner and Associates, Inc. in preparing a Scoping EAW and DEIS for the expansion of the Anoka County Airport. As part of our work in assessing impacts to threatened, endangered and priority plant and animal species, we request that the Minnesota Natural History Program conduct a computer search for such species as indicated in the attached data request form. In the absence of data on file, we request that your staff scientists estimate the likelihood that such species exist on the project site. We have tentatively budgeted $200 for Heritage Program work; please let me know if and when actual costs are going to exceed this figure. Billing for Heritage Program services should be directed to Barton-Aschman Associates, Inc. at the address listed above.

Our deadline for determining whether threatened and endangered species will need to be carried into the DEIS process is January 18, 1985. It would be most helpful if our data search could be expedited so that we may make the determination before that date.

Please let me know if you need further information.

Sincerely,

Ronald P. Peterson
Senior Associate

RPP:kro

attachments

MINNESOTA NATURAL HERITAGE PROGRAM
DATA REQUEST FORM

Please enclose: a) A letter formally requesting information from the Natural Heritage Program
b) A map detailing the boundaries of the study area.

DATE January 4, 1985

WHO IS REQUESTING THE INFORMATION?

Agency Barton-Aschman Associates, Inc.

Name and Title Ronald P. Peterson, Senior Associate

Address 1610 South 6th Street, Mpls, MN 55454

Phone 332-0421

WHAT PROJECT OR PROGRAM IS THE INFORMATION FOR? IF THERE IS A CONTRACTING AGENCY, PLEASE GIVE NAME, ADDRESS, PHONE NUMBER OF CONTACT PERSON.

Scoping EAW for Anoka County Airport Expansion
Metropolitan Airports Commission 6040 28th Ave S. Mpls 55417
Nigel Finney, 726-1892

For which groups in your study area do you want locational information? Please check appropriate boxes.

Plants - ✓ Federal Status only
✓ State Legal Status only (endangered, threatened, or special concern)
✓ Rare species (non-legal status)

Animals - ✓ Federal Status only
✓ State Legal Status (endangered, threatened, or special concern)
✓ Rare species (non-legal)

Plant Communities - ✓

Geologic Features - ___

Managed Areas - ✓ (Scientific and Natural Areas, Natural Heritage Register Sites, Wildlife Management Areas, etc.)

Other - ___ (Please specify) _____

STUDY AREA: Twp 31N, Rng 23W, Sections 21, 22, 27, 28 and 33.

CITIZENS PETITION

MARCH 20, 1984



March 20, 1984

Environmental Quality Board
Capitol Square Building
Room 110
550 Cedar Street
St. Paul, Minnesota 55101

Dear Members of the Board:

In the intent to comply with the Minnesota Environmental Quality Board suggested rules for preparation of an Environmental Impact Statement, the Petitioners have identified the Metropolitan Airports Commission as the lead agency.

However, it is the desire of the Petitioners to request the Minnesota Pollution Control Agency to be the lead agency in preparation of the EIS. It is the opinion of the Petitioners that the obvious operating bias toward aviation of the MAC and FAA makes the suggested agency inappropriate. The preparation and editing of the EIS can best be handled by the MPCA.

Sincerely,

Duane W. McCarty
8060 Long Lake Road
Mounds View, MN 55432
Phone: 784-6074

LeeAnn M. Sporre
295 Ironton Street
Fridley, MN 55432
Phone: 786-4237

pf

P E T I T I O N

Environmental Quality Board
Capitol Square Building
Room 110
550 Cedar Street
St. Paul, Minnesota 55101

Project Description: Anoka County - Blaine Airport Project - Capital Improvements and implementation of airport Master Plan.

Project Proposer: Minneapolis/St. Paul
Metropolitan Airports Commission
P. O. Box 1700 Twin City Airport
Minnesota 55111

Co-Representatives of Petitioners:

Ms. Lee Ann Sporre
295 Ironton Street
Fridley, Minnesota 55432 - Phone: 786-4237

Mr. Duane W. McCarty
8060 Long Lake Road
Mounds View, Minnesota 55432 - Phone: 784-6074

The above referenced Anoka County - Blaine Airport Master Plan (project) evidentially poses detrimental effects of more than local significance to air quality, surface water quality, groundwater quality wildlife, ambient noise levels, park lands, ecologically sensitive areas and the aesthetic environment of residential areas.

The project does not provide adequate protection for critical groundwater recharge areas of Metropolitan significance, and, in fact, extends erroneous information regarding soils permeability in critical groundwater recharge areas of the Twin City Basin. (See Exhibits "A", "B", and "C".)

Ambient noise measurements and projections, for the project, were compiled under Federal (LDN) Noise Control guidelines, which are less restrictive, violating Minnesota State Pollution Control Agency standards (NPC-1 and NPC-2).

The project Master Plan (Exhibit D) indicates an intent to disturb Department of Natural Resource wetlands of protection classes 3, 4, and 6, in addition to floodplains. Proposer intends to produce an environmental assessment worksheet under 6 MCAR 3.021 and 6 MCAR 3.024 (B).

The addition of 950 lineal feet of new runway (number 17L-35R) in phase 1B of construction will provide in excess of 5,000 feet of useable, lighted, runway (including overrun and short landing area), which requires a mandatory EIS under 6 MCAR S 3.028 F-3 and 6 MCAR S 3.039N.

The Northwest building construction in development phase 2 (Exhibit E) encroaches upon a 100 year classed flood plain identified in the Flood Plain Insurance Map for the City of Blaine, Anoka County, as revised June 19, 1981, (Exhibit F) and as such must comply with requirement for EIS production under 6 MCAR S 3.039 S-2(b).

We the undersigned petitioners, do hereby demand that the project proposer be required to perform an Environmental Impact Statement under Minnesota Code of Agency Rules 6 MCAR S 3.021 through 6 MCAR S 3.056.

We further petition for remedies and amendments to the project plan, including but not limited to the following:

1. Restrict taxiway, runway, structural buildings and all impervious surface construction to such lengths, placement, and physical size, so as to protect wetlands and floodplains located within airport boundaries. (Exhibits F & G).
2. Restrict airport facility improvements to accommodate class D and E aircraft as described for airports of minor role classification, in compliance with Minnesota Statutes Section 473.641 Subd. 4, as described in the Metropolitan Development Guide.
3. Implement strict controls for fuel storage facilities within airport boundaries to minimize the potential for spillage or leaks into ground water tables.

P E T I T I O N E R S

NAME	ADDRESS	SIGNATURE
LeeAnn M Spoore	295 Norton St Bridley, Mn 55432	
Duane W Mc Carty	8060 Long Lake Rd. Mounds View, Mn. 55432	
Barbara J. Mc Carty	8060 Long Lake Rd Mounds View Mn 55432	
Jerry C Bradley	8255 Greenwood Dr Mpls Mn. 55432	
Judy Hultgren	7885 Greenwood Ave. Mpls Mn. 55432	
Dan Dragovich	8175 Spring LK PK Rd Mpls, Mn. 55432	
Robert Pagel	8415 Fairchild Ave Mounds View 55432	
Keith Nordstrom	8445 Sunnyside Rd Mounds View 55432	
Susan Nordstrom	8445 Sunnyside Rd Mounds View 55432	
Dick Janssen	8265 Pleasant View Dr. Mounds View 55432	
Janis Janssen	8265 Pleasant View Dr. Moundsview 55432	
Gloria Nelson	2407 Greenfield Pl. MV. 55432	
Julie Thistad	2509 Hillview Rd " "	
Linda Ann Ongberg	2065 Hillview Rd Moundsview 55112	
Harry Johansen	7801 Long Lake Rd " 55432	
Fredrick Underwood	5600 St Michael St Mounds View 55112	
Don Knutson	5600 St. Michael St. Mounds View, Mn. 55112	
Richard Folden	8395 Eastwood Rd NE Mounds View 55432	
Janice F. Folden	8395 Eastwood Rd NE Mounds View, Mn 55432	
Daryl Johnson	2104 Rustad Lane Mounds View, MN 55112	
Marcia Pagel	8415 Fairchild Ave. Mounds View Mn. 55432	
Ed Lis	7750 Silver Lk. Rd Mounds View Mn. 55432	
[illegible]	8040 NE Groveland Rd Mounds View Mn 55432	
[illegible]	8046 Long Lk Rd NE Mounds View Mn 55432	
Grace Thomas	8040 NE Groveland Rd. Mounds View, Mn. 55432	

If our data-base indicates that there are no known occurrences of rare species or sensitive natural features within the boundaries of your project area, would you like Heritage staff scientists to list species and features that may potentially occur in the area if an on-site biological survey were to be conducted?

YES ✓ NO ___ See attached section from preliminary draft EAW.

(If you are requesting information about species and features that may potentially occur within your project area, please include any information you may have about the vegetation and habitats of the area. General habitat information will increase the accuracy of the data we give you.)

BESIDES NAME, LOCATION, AND STATUS, PLEASE SPECIFY ANY ADDITIONAL INFORMATION YOU MAY REQUIRE. EXPERTS ON ANY SPECIES FOUND IN HO COULD INDICATE HOW THE PROJECT MIGHT IMPACT SUCH SPECIES.

HOW WILL THE INFORMATION BE USED? TO DETERMINE IF THREATENED, ENDANGER & PRIORITY SPECIES SHOULD BE DISCUSSED IN THE EIS OR IF THE ISSUE CAN BE RESOLVED AT THE EAW STAGE

IN WHAT FORM AND DETAIL DO YOU WISH TO PUBLISH THIS INFORMATION?

DATA WOULD BE PUBLISHED VERBATIM IN EAW AND, IF NECESSARY, THE EIS, IF PRIORITY SPECIES EXIST ON SITE, FURTHER INVESTIGATION WILL BE NEEDED FOR EIS.

The information supplied above is complete and accurate. Any material supplied by the Minnesota Natural Heritage Program will not be published without prior written permission and without crediting the Minnesota Natural Heritage Program, Minnesota Department of Natural Resources as the source of the material.

Signature [signature]

Return completed form to: Minnesota Natural Heritage Program
Section of Wildlife
Department of Natural Resources
Box 6 Centennial Office Building
St. Paul, MN 55155

Phone (612) 296-4284

EXHIBIT "A"

TRA Airport Consulting

Architecture
Engineering
Planning
Interiors

MASTER PLAN
Anoka County · Blaine Airport

Minneapolis · Saint Paul
Metropolitan Airports Commission

In summary, Alternative A would have the least direct impact to wetlands, but would require 1,400 linear feet of new runway and taxiway to be constructed in Class 3 and 4 wetlands. Alternative C would have the greatest direct impact and would require a total of 3,700 linear feet of new runway and taxiway to be constructed in Class 3, 4, and 6 wetlands. Alternative B would require a total of 3,000 linear feet of new runway to be constructed in Class 3 and 6 wetlands.

7.2.4 Hydrology and Water Quality

Surface water, originating from on-airport property, flows through two major watersheds, the Coon Creek watershed basin and the Rice Creek watershed basin. (See Exhibit 7-8.) Both watersheds ultimately drain into the Mississippi River. Most of the airport drains into Coon Creek through Sand Creek (County Ditch No. 41). Sand Creek originates southeast of Radisson Road at the airport and flows north to 116th Avenue Northeast, where it turns west and flows approximately four miles before discharging into Coon Creek.

The southeastern section of the airport drains into Rice Creek south through Judicial Ditch No. 1. Water from this channel enters Rice Creek in the vicinity of 79th Avenue Northeast.

Designated 100-year and 500-year floodplains occur on the northwest, north, and east portions of the airport property.[13] Flood potential along drainage courses in the city of Blaine is greatest during intense summer storms, while flooding of lake shorelines is usually associated with spring snowmelt runoff.

The principal source of groundwater in the area is the Prairie du Chien-Jordan aquifer. Recharge is largely by direct vertical percolation of water in places where the formations crop out or are overlaid by permeable glacial material. Exposed Prairie du Chien and Jordan formations appear south and east of the airport in the Rice Creek area. Generally, however, the area surrounding the airport is not a significant ground-

water recharge area.[14] At approximately 40 to 50 feet below the surface there are about 10 to 30 feet of interspersed clay and sandy clay layers. This controls the water level above and retards the recharge of water-bearing formations below these clay layers. The high water table in the airport vicinity is a result of the location of this subsurface layer.

Impact

Impacts to the hydrologic regime and water quality normally involves consideration of both groundwater and surface water resources. However, because of the impermeable nature of the subsurface in the airport vicinity, and because the airport area is not a significant groundwater recharge area, potential groundwater pollution is not a significant issue related to airport development. The major issue is the increase in surface water runoff that would result from airport development, and the capability of the on-airport drainage system to accommodate the added runoff without flooding to adjacent properties.

All three alternatives would cause an increase in surface water runoff in proportion to the amount of new pavement constructed for runways and taxiways. The rate of runoff may be estimated by the following formula, known as the "Rational Formula":[15]

$$Q = ACI$$

in which Q = the runoff from an area, in cubic feet per second
A = the area to be drained, in acres
C = the coefficient of runoff
I = the intensity of rainfall, in inches per hour

At the Anoka County-Blaine Airport, I = 1.75, and for paved runway and taxiway surfaces, C = 0.95.

Exhibit 7-9 indicates the estimated additional runoff associated with each alternative. While Alternative C would create the largest relative increase in runoff, the increase is insignificant compared to the total

EXHIBIT "B"

REPORT

ON

STORM WATER DRAINAGE FACILITIES

FOR

CITY of MOUNDS VIEW, MINNESOTA

AUGUST 1976

FILE NO. 1575

BONESTROO, ROSENE, ANDERLIK & ASSOCIATES, INC.
CONSULTING ENGINEERS
ST. PAUL, MINN. & CHIPPEWA FALLS, WISCONSIN



EXHIBIT 1 - E.A.W.

METROPOLITAN AIRPORTS COMMISSION

ANOKA COUNTY - BLAINE AIRPORT

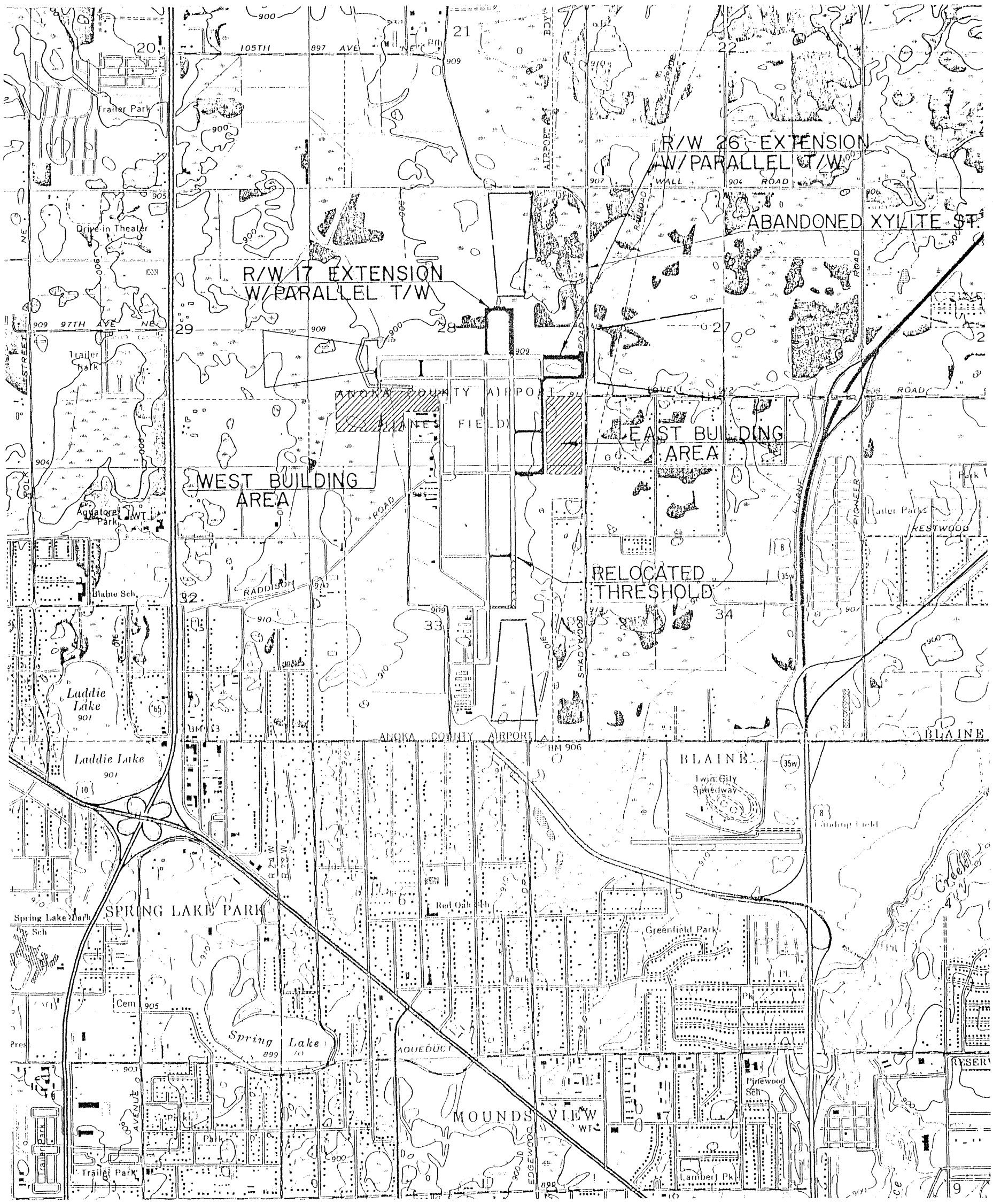
GENERAL HIGHWAY MAP

ANOKA COUNTY

MINNESOTA

HTA

FIGURE



SCALE : 1" = 2000'

U.S.G.S. SHEET

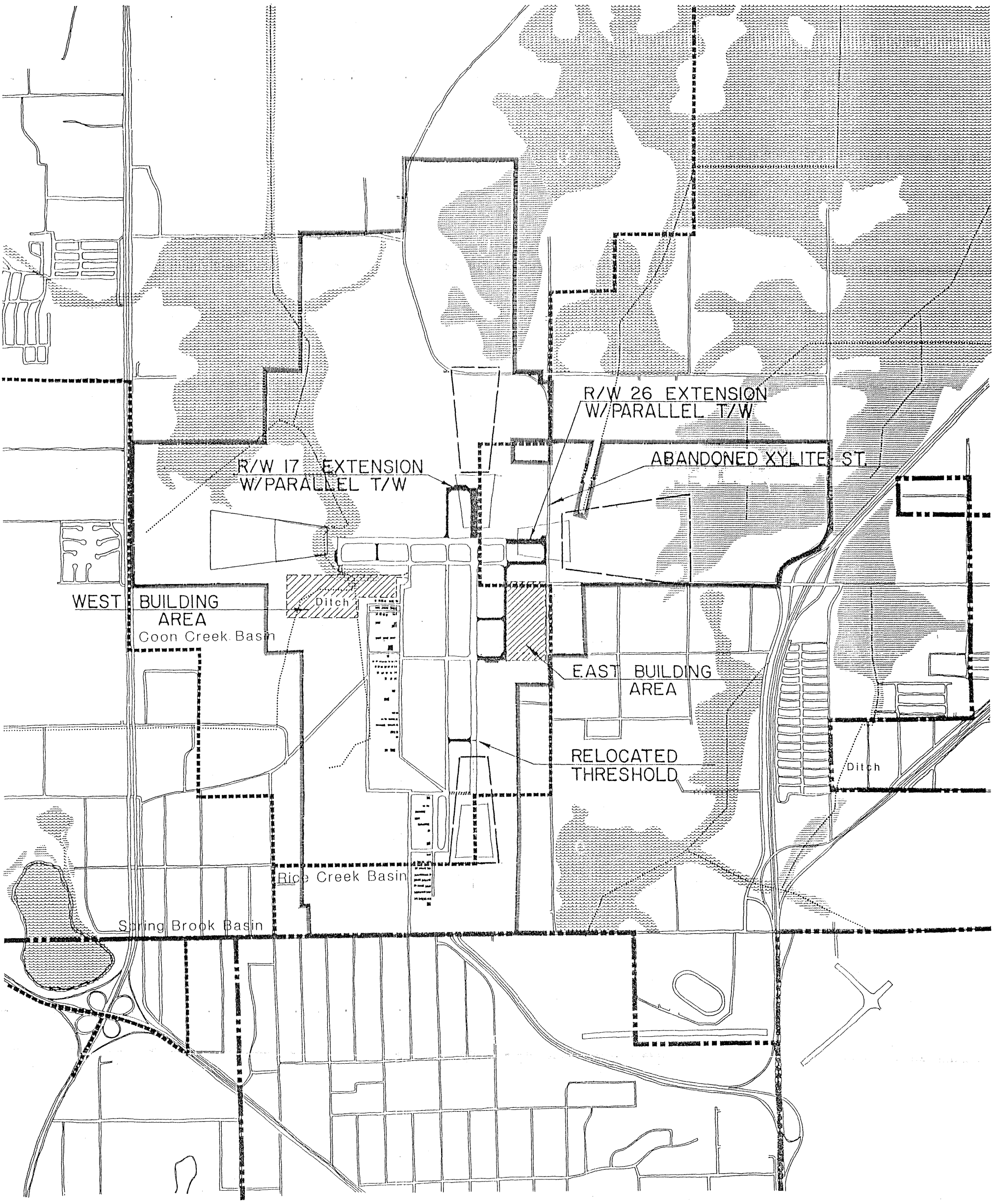
NOTE: COMPOSITE OF CIRCLE PINES AND NEW BRIGHTON QUADRANGLE SHEETS

METROPOLITAN AIRPORTS COMMISSION
ANOKA COUNTY - BLAINE AIRPORT

EXHIBIT 2 - E.A.W.

HTA

FIGURE

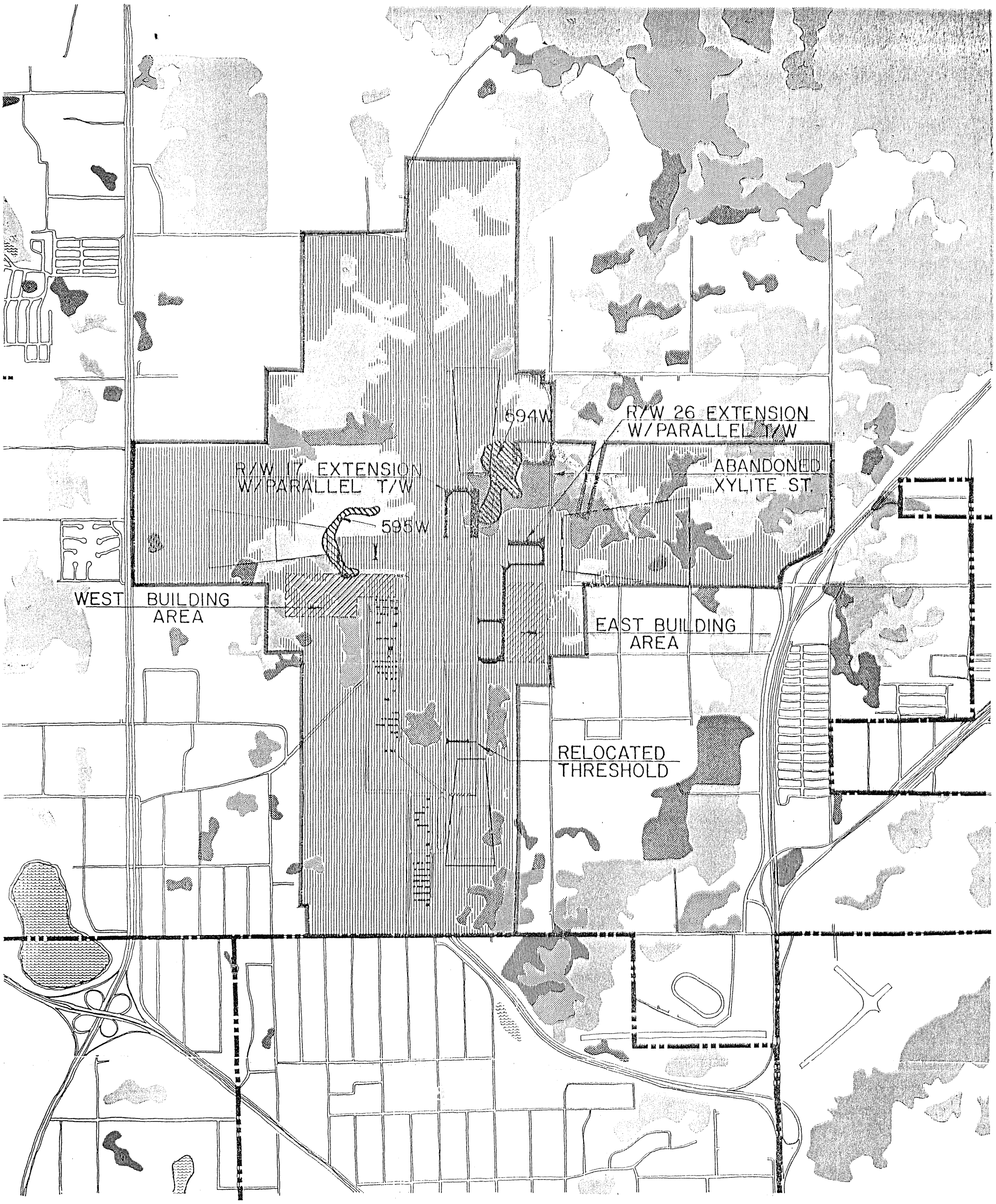


METROPOLITAN AIRPORTS COMMISSION

EXHIBIT 4 - E.A.W.
HYDROLOGY

MASTER PLAN
Anoka County-Blaine Airport
Anoka County Minnesota
TRA AIRPORT CONSULTANTS SEATTLE, WASHINGTON

feet 0 400 800 1600 2400
miles 0 1/8 1/4 3/8 1/2
acres 40 10 2.5



Class 3- Shallow Fresh Marsh

Class 4- Deep Fresh Marsh

Class 5- Open Fresh Water

Class 6- Shrub Swamp

Class 7- Wooded Swamp

Offsite Uplands

Airport Uplands

N

METROPOLITAN AIRPORTS COMMISSION

MASTER PLAN

Anoka County-Blaine Airport

Anoka County Minnesota

TRA AIRPORT CONSULTANTS SEATTLE, WASHINGTON

feet 0 400 800 1600 2400

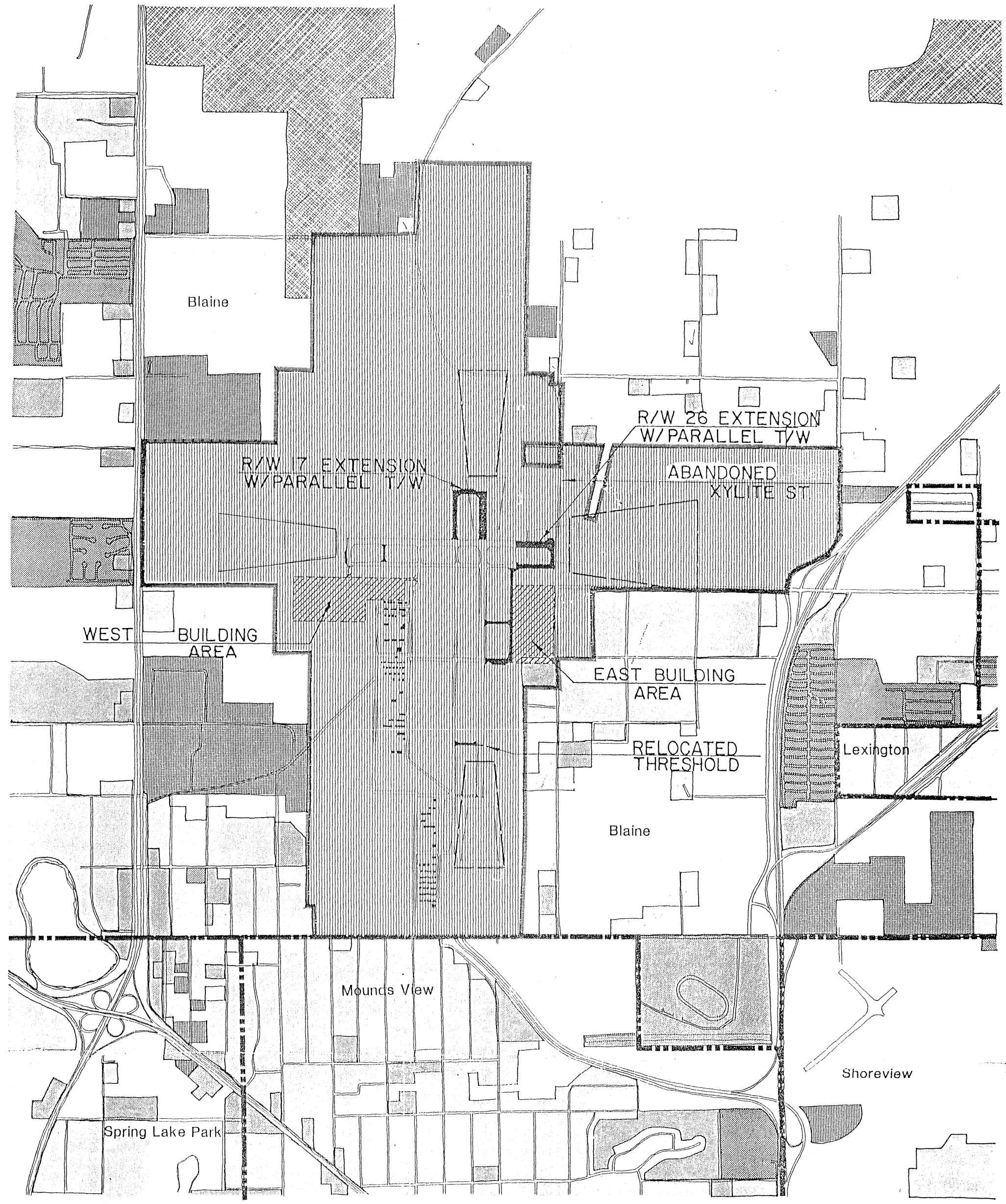
miles 0 1/8 1/4 3/8 1/2

acres 40 10 2.5

EXHIBIT 5 - E.A.W.

WETLANDS

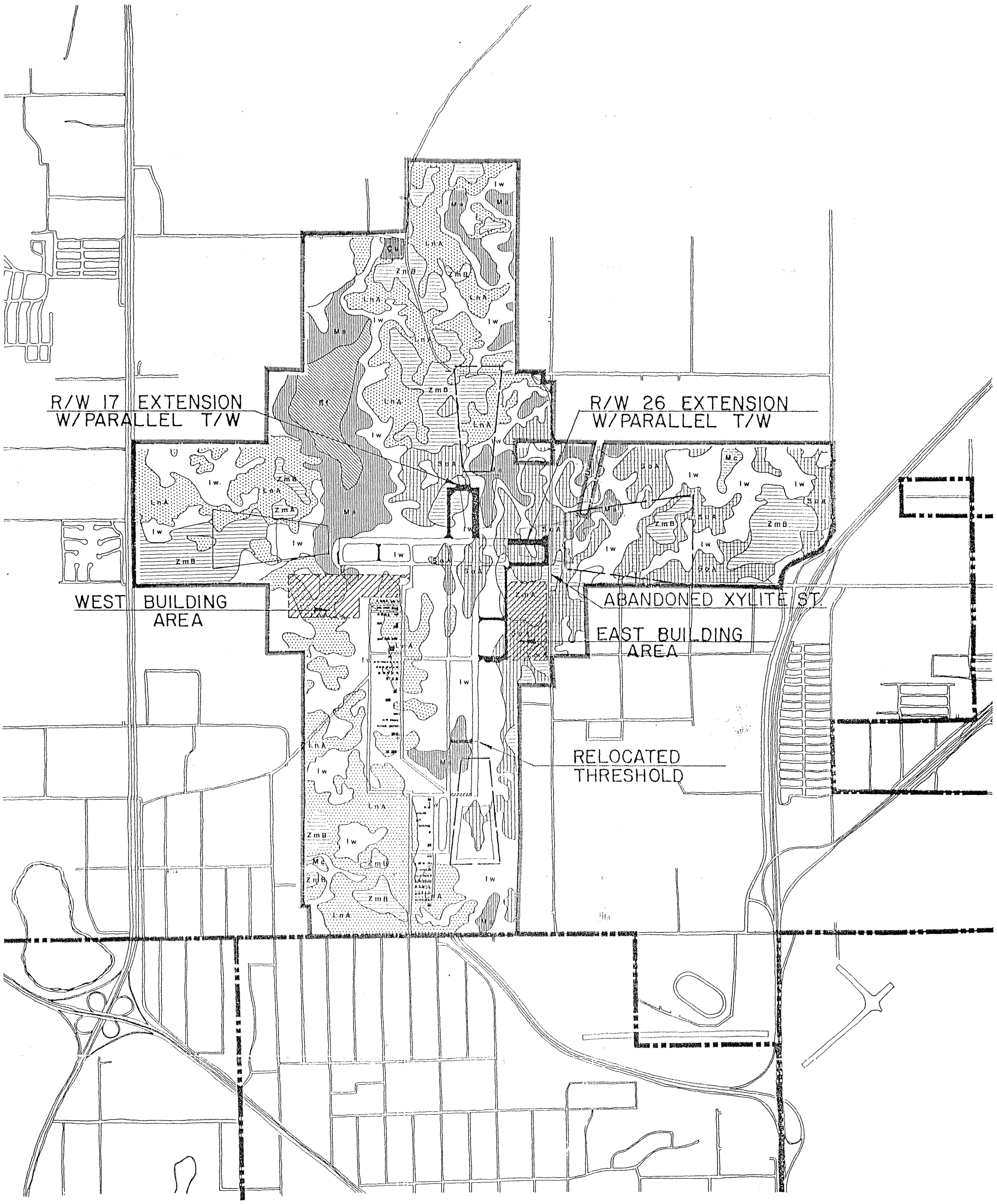
Exhibit 7-6



MASTER PLAN
Anoka County-Blaine Airport
Anoka County Minnesota
TRA AIRPORT CONSULTANTS SEATTLE, WASHINGTON

METROPOLITAN AIRPORTS COMMISSION
EXHIBIT 6 - E.A.W.
EXISTING LAND USE

Exhibit 7-27



METROPOLITAN AIRPORTS COMMISSION

MASTER PLAN
Anoka County-Blaine Airport
Anoka County Minnesota
TRA AIRPORT CONSULTANTS SEATTLE, WASHINGTON

EXHIBIT 7 - E.A.W. SOILS

Exhibit 7-1

PART 2 - BACKGROUND

AREA OF STUDY

In order to study storm water drainage within a municipality, specific drainage areas must be defined. Unfortunately, the geographic boundaries of the drainage areas do not usually follow those of the municipality. Therefore, the solution of specific drainage problems within a municipality may include areas beyond its municipal boundaries. Mounds View drains to the Mississippi River through Rice Creek. Rice Creek discharges into the Mississippi River somewhat over two miles north of the Minneapolis City limits. The Rice Creek drainage basin lies within the Rice Creek Watershed District (established 1972) and covers an area of over 200 square miles in the north-easterly portion of the Twin Cities Metropolitan area within Washington, Anoka, Ramsey, and a small portion of Hennepin Counties. Rice Creek originates in Clear Lake near the City of Forest Lake and flows about 45 miles while passing through a series of lakes and low lands to the Mississippi River.

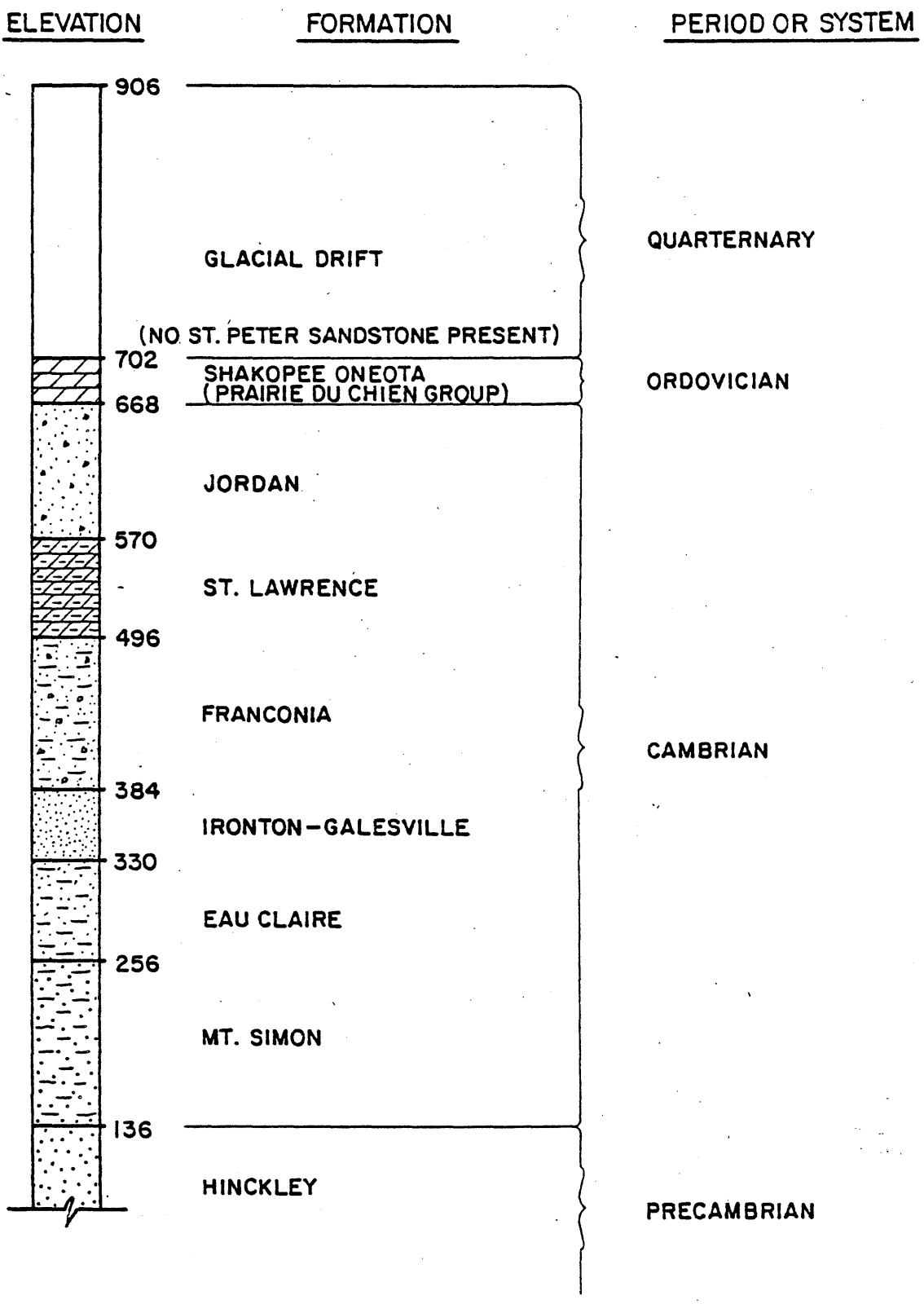
We have defined six major drainage districts in Mounds View and these are designated Hillview, Belle Lane, Edgewood, Spring Creek, Southeast and Spring Lake. All of these districts are illustrated on Drawing No. 1. The Hillview District receives drainage, through Judicial No. 1, from approximately 1670 acres in Blaine and 230 acres from the City of Lexington. The

Drawing No. 2 shows a stratigraphic column at the City of Mounds View Well No. 1 located adjacent to the municipal building. Below the Jordan Sandstone, additional stratigraphic information was inferred from data in Norvitch (1973). The following paragraphs describe the uppermost bedrock formations.

The St. Peter Sandstone is a light yellow to buff or white, fine to medium grained quartzone sandstone. Due to the lack of cementitious material, it weathers easily and also is quite permeable. The lower few feet of the formation are silty and shaley and constitute a restriction to downward movement of water.

The Prairie du Chien Group consists of the upper Shakopee Formation and the lower Oneota Dolomite. At the base of the Shakopee Formation is the New Richmond Sandstone member which may not be present in the study area. The Shakopee and Oneota Formations consist primarily of dolomitic limestone and dolomite with some interbedded shale. These strata are extensively solution weathered at depth creating numerous voids and cavities with resultant high permeability and water storage capacity. However, some beds within these formations have resisted weathering processes and are relatively impermeable.

The Jordan Sandstone is a white or yellow coarse to medium grained quartzone sandstone. This sandstone is quite permeable



MOUNDS VIEW, MINNESOTA

STRATIGRAPHIC COLUMN
AT MOUNDS VIEW WELL NO. 1

and is the most heavily used source of groundwater (in conjunction with the Prairie du Chien Group) in the Twin City Basin.

The St. Lawrence Formation is a relatively thin strata composed primarily of silty argillaceous dolomite or dolomitic siltstone. Generally the rock is buff to gray and sometimes mottled green. It is generally thought that the St. Lawrence Formation is an aquitard restricting downward flows from the Prairie du Chien-Jordan Aquifer.

The Franconia Formation contains several members being generally sandstone with some silt, shale, and dolomite.

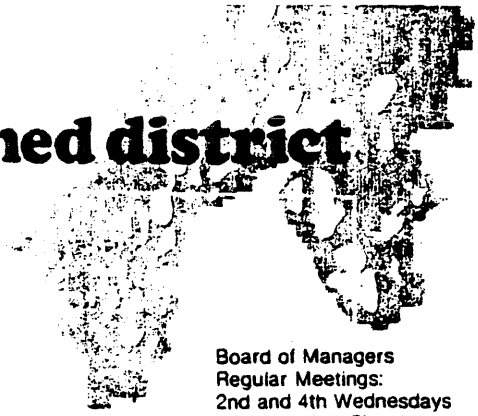
2-3.1 Bedrock Topography and Structure

In the Mounds View areas, the depth to bedrock is extremely variable due to erosion of the rock surface. Drawing No. 3 shows the uppermost bedrock formations in the City. The bedrock formations dip gently to the south towards the center of the Twin City Basin. However, they are cut by eroded valleys that expose successive bedrock formations. Relief on the bedrock surface is over 250 feet with two deep valleys crossing the City from the northeast to the southwest. The deepest passes through the southeast corner of the City and is eroded down to the Franconia Formation.

EXHIBIT "C"

Rice Creek watershed district

3585 LEXINGTON AVENUE NORTH, SUITE #177
ARDEN HILLS, MINNESOTA 55112
TELEPHONE (612) 483-0634



Board of Managers
Regular Meetings:
2nd and 4th Wednesdays
at Arden Hills City Hall

BONNIE TORPE, Admin. Ass't.

March 2, 1983

Mr. Lloyd H. Scott, Sr.
5100 Red Oak Drive
MoundsView, Minnesota 55112

Re: Anoka County Airport - Aquifer Recharge Areas

Dear Mr. Scott:

Please be advised that as a result of the Floodplain Management Study conducted by the Rice Creek Watershed District in 1981, the area of the Anoka County Airport located within the Rice Creek Watershed District is defined as an Aquifer Recharge Area for the Prairie du Chien-Jordan aquifer. Enclosed you will find Figures A through E which illustrate and support this conclusion. Figure A is a photocopy of the USGS quadrangle map showing the boundary between the Rice Creek Watershed District and the Coon Creek Watershed District as it relates to the Anoka County Airport. In the Floodplain Management Study conducted by the Rice Creek Watershed District, Aquifer Recharge Areas were defined as those areas where the surface permeability of the soil were measured at a rate greater than 2.5 inches per hour and where the sub-stratum permeability of the soil were measured at a rate greater than 5 inches per hour.

Figure B indicates those areas in the Rice Creek Watershed where the surface permeability is greater than 2.5 inches per hour. Figure C illustrates those areas in the watershed where the sub-stratum permeability is greater than 5 inches per hour. Figure D illustrates those areas in the watershed where the Prairie du Chien-Jordan formation is identified as the bedrock aquifer and finally Figure E shows those areas in the District identified as Aquifer Recharge Areas and in particular the Anoka County Airport is identified as an Aquifer Recharge Area for the Prairie du Chien-Jordan formation.

BOARD OF MANAGERS

A.J. CARDINAL, SR. ANOKA COUNTY | DIANE N. HARSTAD RAMSEY COUNTY | C.T. KING WASHINGTON CO | L.H. SCOTT, SR RAMSEY COUNTY | E.A. PETRANGELO ANOKA COUNTY

Although the work performed for the Rice Creek Watershed District Floodplain Management Study was confined to those areas within the boundary of the Rice Creek Watershed District, one could reasonably expect to discover that additional Prairie du Chien-Jordan Aquifer Recharge Areas exist on those portions of the Anoka County Airport within the Coon Creek Watershed.

Should you have additional questions, please feel free to contact me.

Very truly yours,

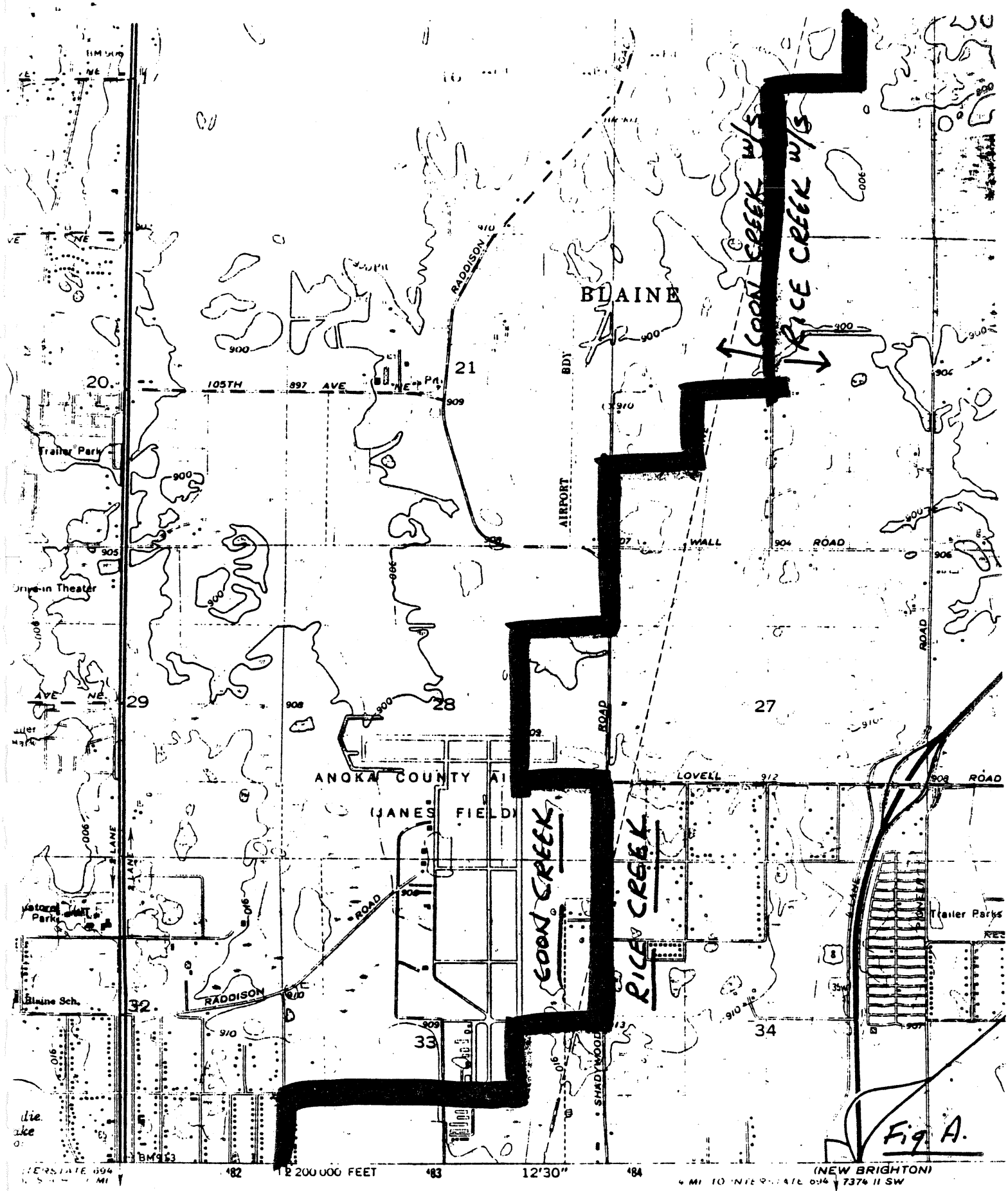
EUGENE A. HICKOK AND ASSOCIATES
Engineers for the District

William Weidenbacher /PRW

William D. Weidenbacher, P.E.
District Engineer

bt

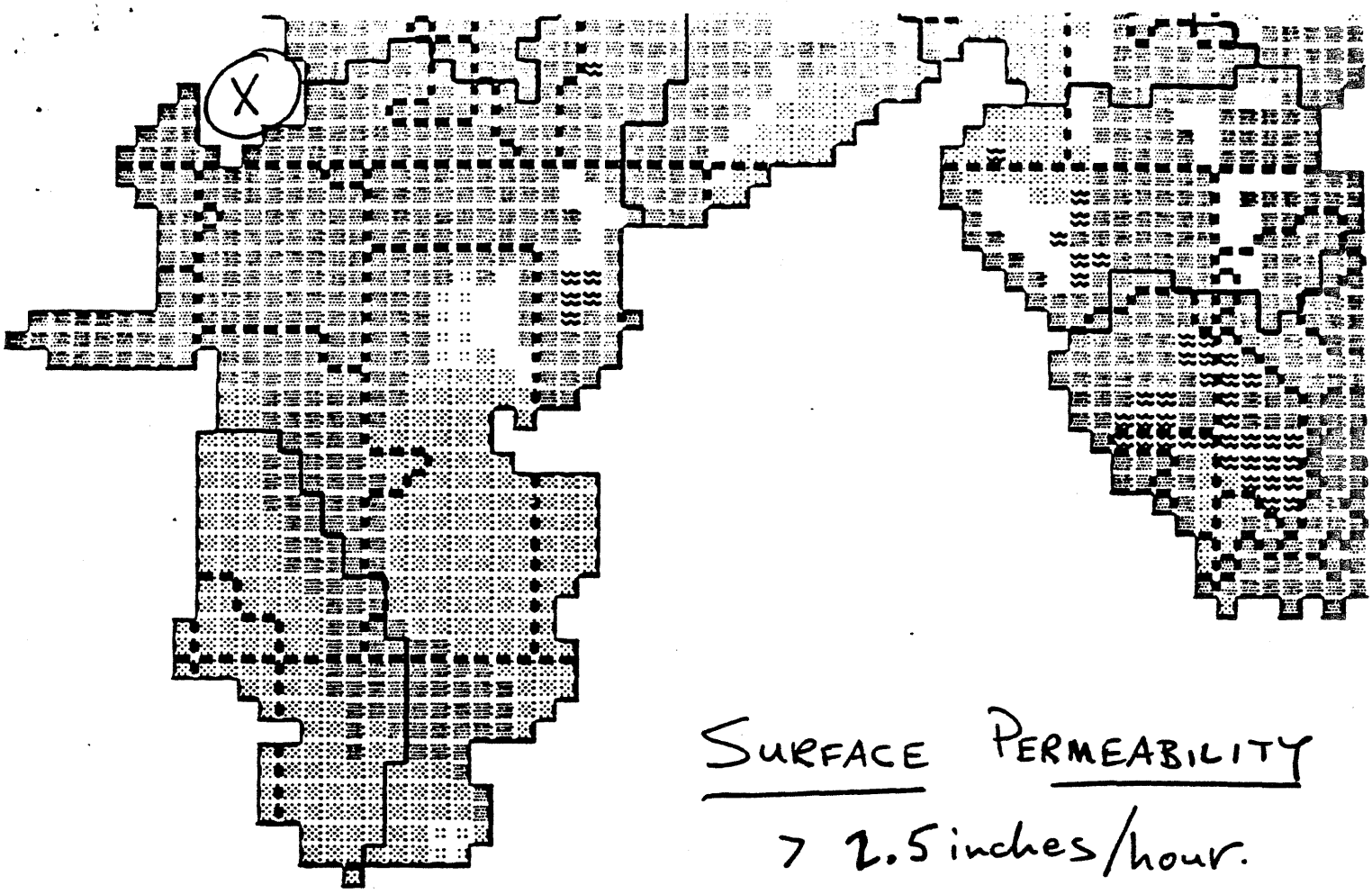
cc: District Office



nd published by the Geological Survey

SC&GS

rammetic methods from aerial photographs
ved 1955. Revised from aerial
Field checked 1967



SURFACE PERMEABILITY

> 2.5 inches/hour.

X = Airport

1981

THIS STUDY IS BEING UNDERTAKEN TO DEVELOP FLOOD PLAIN MANAGEMENT OBJECTIVES, POLICIES, AND PERMIT RULES FOR THE RICE CREEK WATERSHED DISTRICT BY E.A. HICKOK AND ASSOCIATES.

THIS STUDY WAS PREPARED WITH TECHNICAL ASSISTANCE FROM THE LAND MANAGEMENT INFORMATION CENTER (LMIC) OF THE MINNESOTA DEPARTMENT OF ENERGY, PLANNING, AND ECONOMIC DEVELOPMENT.

0 2 4
MILES

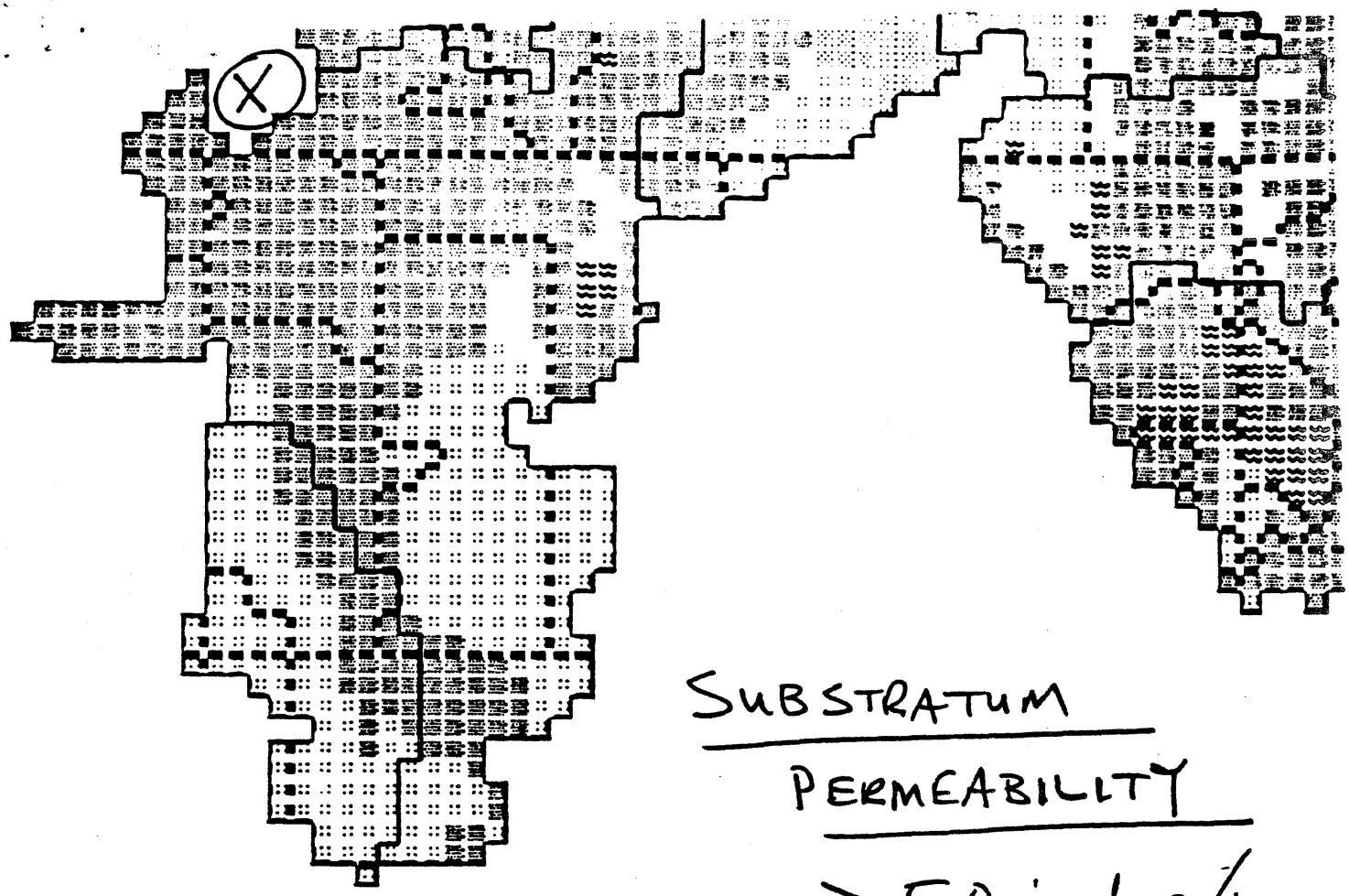
NORTH

ONE CELL= 40 ACRES

640 ACRES

Fig. B.

SYMBOL	COUNT	PERCENT	ACRES	LEGEND
1	119	4.2	4760.0	.2 - 5 INCHES / HOUR
2	584	23.9	27360.0	GREATER THAN OR EQUAL TO .8 INCHES / HOUR
3	1580	55.2	63200.0	GREATER THAN OR EQUAL TO 2.5 INCHES / HOUR
4	407	14.2	16280.0	NO RATING
5	71	2.5	2840.0	WATER (100 PERCENT OF THE PARCEL IS COVERED)



SUBSTRATUM PERMEABILITY

> 5.0 inches/hour

(X) = Airport

1981

THIS STUDY IS BEING UNDERTAKEN TO DEVELOP FLOOD PLAIN MANAGEMENT OBJECTIVES, POLICIES, AND PERMIT RULES FOR THE RICE CREEK WATERSHED DISTRICT BY E.A. HICKOK AND ASSOCIATES.

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0 2 4
MILES

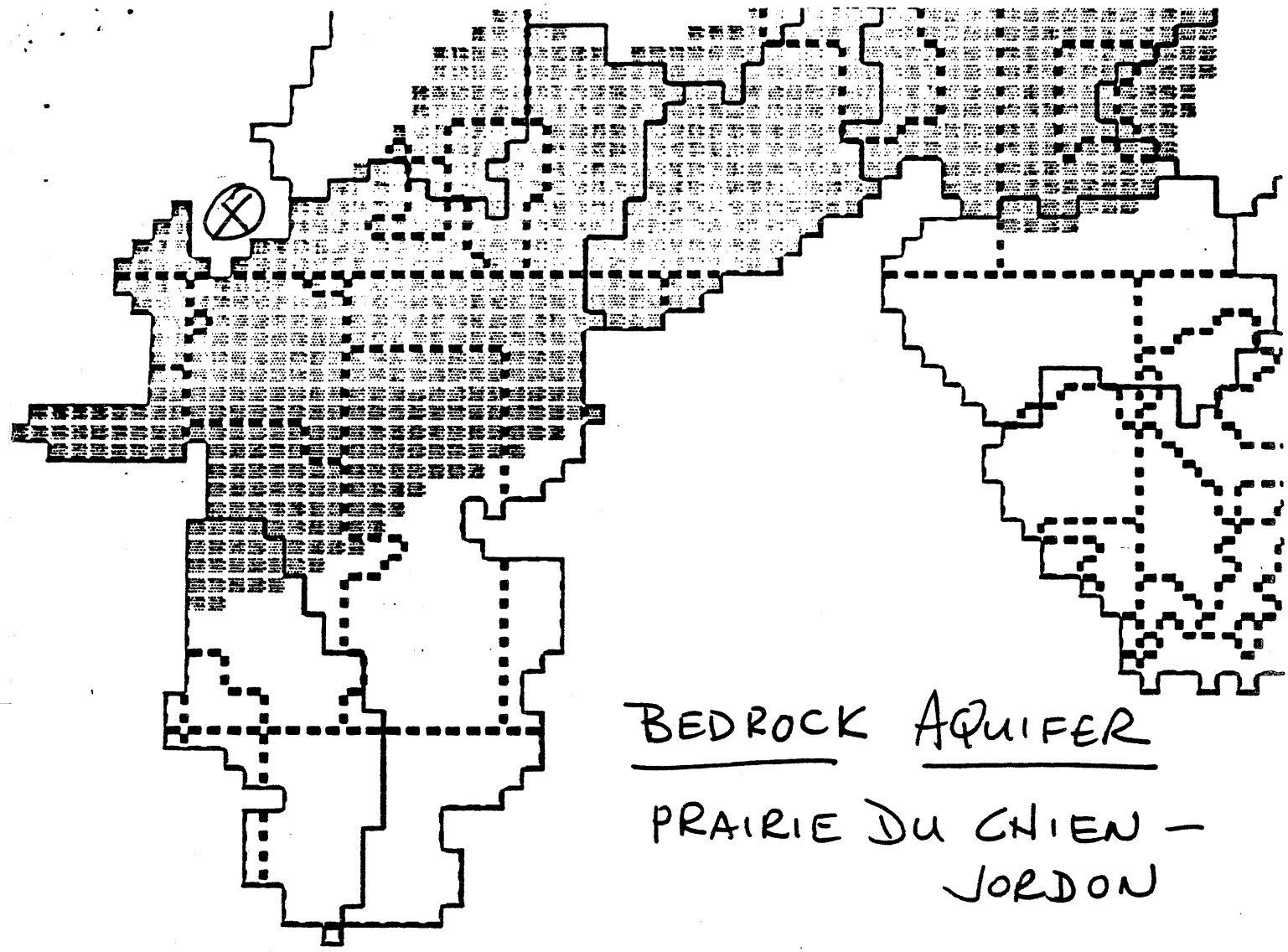
NORTH

ONE CELL= 40 ACRES

640 ACRES

Fig. C

SYMBOL	COUNT	PERCENT	ACRES	LEGEND
	1	790	27.8	31600.0 .2 - 5 INCHES / HOUR
	2	34	1.2	1360.0 GREATER THAN OR EQUAL TO .2 INCHES / HOUR
	3	1559	54.5	62360.0 GREATER THAN OR EQUAL TO 5 INCHES / HOUR
	4	407	14.2	16280.0 NO RATING
	5	71	2.5	2840.0 WATER (100 PERCENT OF THE PARCEL IS COVERE



BEDROCK AQUIFER

PRAIRIE DU CHIEN – JORDON

⊗ = Airport.

1981

THIS STUDY IS BEING UNDERTAKEN TO DEVELOP FLOOD PLAIN MANAGEMENT OBJECTIVES, POLICIES, AND PERMIT RULES FOR THE RICE CREEK WATERSHED DISTRICT BY E.A. HICKOK AND ASSOCIATES.

THIS STUDY WAS PREPARED WITH TECHNICAL ASSISTANCE FROM THE LAND MANAGEMENT INFORMATION CENTER (LMIC) OF THE MINNESOTA DEPARTMENT OF ENERGY, PLANNING, AND ECONOMIC DEVELOPMENT.

0 2 4 MILES

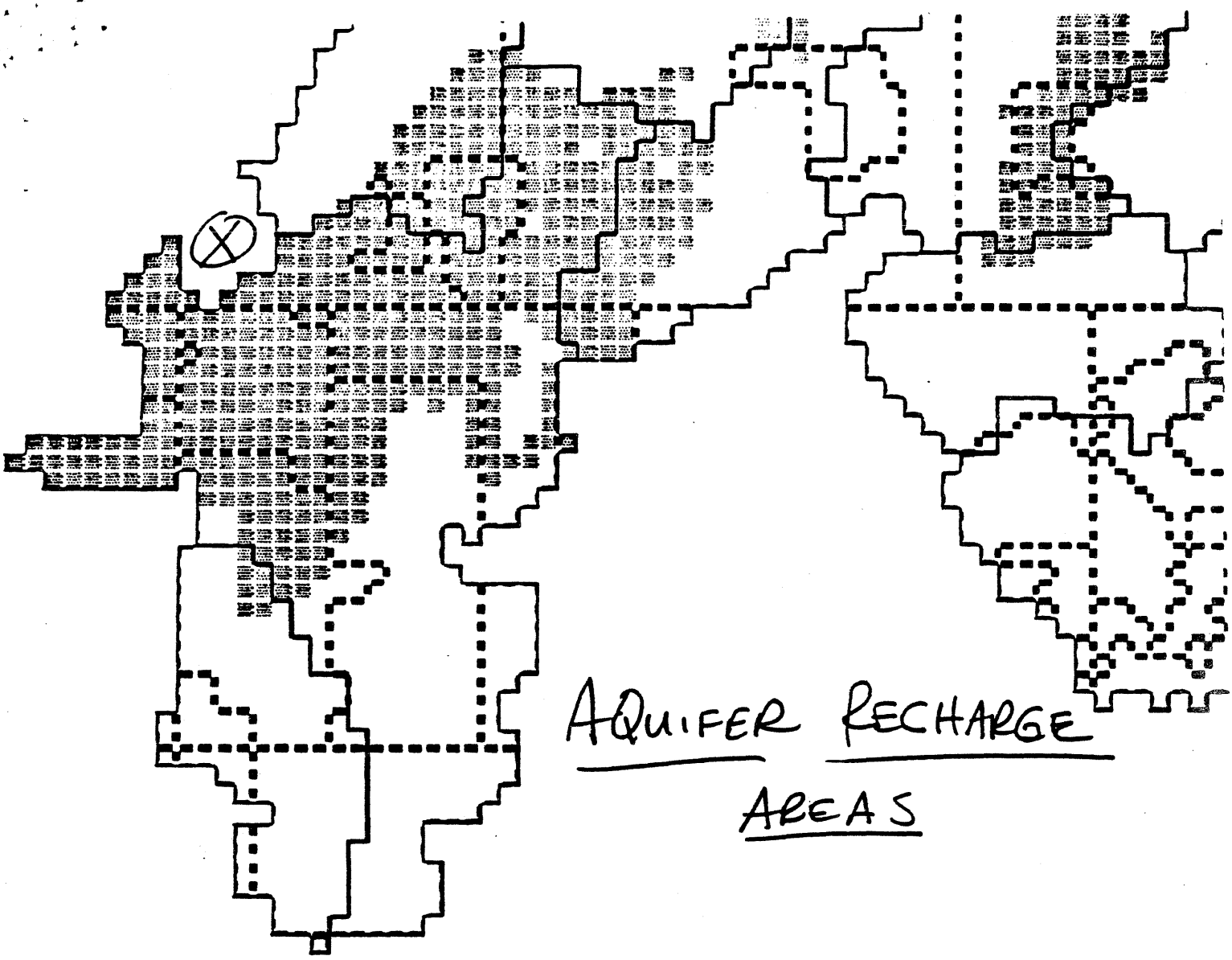
NORTH

ONE CELL= 40 ACRES

640 ACRES

Fig. D.

SYMBOL	COUNT	PERCENT	ACRES	LEGEND
1	1086	38.0	43440.0	PRAIRIE DU CHIEN - JORDAN AQUIFER
2	1775	62.0	71000.0	OTHER AQUIFERS



AQUIFER RECHARGE AREAS

1981

THIS STUDY IS BEING UNDERTAKEN TO DEVELOP FLOOD PLAIN MANAGEMENT OBJECTIVES, POLICIES, AND PERMIT RULES FOR THE RICE CREEK WATERSHED DISTRICT BY E.A. HICKOK AND ASSOCIATES.

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0 2 4
MILES

NORTH

ONE CELL= 40 ACRES

640 ACRES

Surface Perm

Subsirtum Perm

Over Prairie du C

Fig. E.

SYMBOL	COUNT	PERCENT	ACRES	LEGEND
	607	21.2	24280.0	PRARIE DU CHIEN - JORDAN AQUIFER RECHARGE AREAS

EXHIBIT "D"

TRA Airport Consulting

Architecture
Engineering
Planning
Interiors

MASTER PLAN
Anoka County · Blaine Airport

Minneapolis · Saint Paul
Metropolitan Airports Commission

CHAPTER 7
ENVIRONMENTAL ANALYSIS

7.1 INTRODUCTION

Future development of Anoka County-Blaine Airport will be subject to formal environmental review at both the federal and state levels.

Since adoption of the National Environmental Policy Act of 1969 (NEPA), all federal agencies have been required to consider environmental values and environmental impacts for any federal project or action determined to have potential for significantly affecting the environment.[1] For such actions, an environmental impact statement (EIS) is required.

The FAA will be the agency responsible for complying with NEPA, once a specific airport development program is proposed by the MAC, because future airport development may well be implemented using federal funds.

The FAA has established procedural and substantive guidelines for NEPA compliance.[2] FAA requirements for environmental documentation apply to specific development actions involving federal funding or requiring federal approval. FAA approval of a revised airport layout plan is also subject to environmental review requirements.

Airport master plans prepared with FAA planning grant assistance, such as the present study, are not considered major federal actions and are not subject to FAA environmental review requirements. However, environmental consideration should be included as an integral part of airport master planning.

Designated wetlands and floodplains occur on the airport property, and would be disturbed by the three alternative runway configurations being considered. Executive orders require environmental review of federally assisted construction within wetlands and floodplains.[3]

In summary, Alternative A would have the least direct impact to wetlands, but would require 1,400 linear feet of new runway and taxiway to be constructed in Class 3 and 4 wetlands. Alternative C would have the greatest direct impact and would require a total of 3,700 linear feet of new runway and taxiway to be constructed in Class 3, 4, and 6 wetlands. Alternative B would require a total of 3,000 linear feet of new runway to be constructed in Class 3 and 6 wetlands.

7.2.4 Hydrology and Water Quality

Surface water, originating from on-airport property, flows through two major watersheds, the Coon Creek watershed basin and the Rice Creek watershed basin. (See Exhibit 7-8.) Both watersheds ultimately drain into the Mississippi River. Most of the airport drains into Coon Creek through Sand Creek (County Ditch No. 41). Sand Creek originates southeast of Radisson Road at the airport and flows north to 116th Avenue Northeast, where it turns west and flows approximately four miles before discharging into Coon Creek.

The southeastern section of the airport drains into Rice Creek south through Judicial Ditch No. 1. Water from this channel enters Rice Creek in the vicinity of 79th Avenue Northeast.

Designated 100-year and 500-year floodplains occur on the northwest, north, and east portions of the airport property.[13] Flood potential along drainage courses in the city of Blaine is greatest during intense summer storms, while flooding of lake shorelines is usually associated with spring snowmelt runoff.

The principal source of groundwater in the area is the Prairie du Chien-Jordan aquifer. Recharge is largely by direct vertical percolation of water in places where the formations crop out or are overlaid by permeable glacial material. Exposed Prairie du Chien and Jordan formations appear south and east of the airport in the Rice Creek area. Generally, however, the area surrounding the airport is not a significant ground-

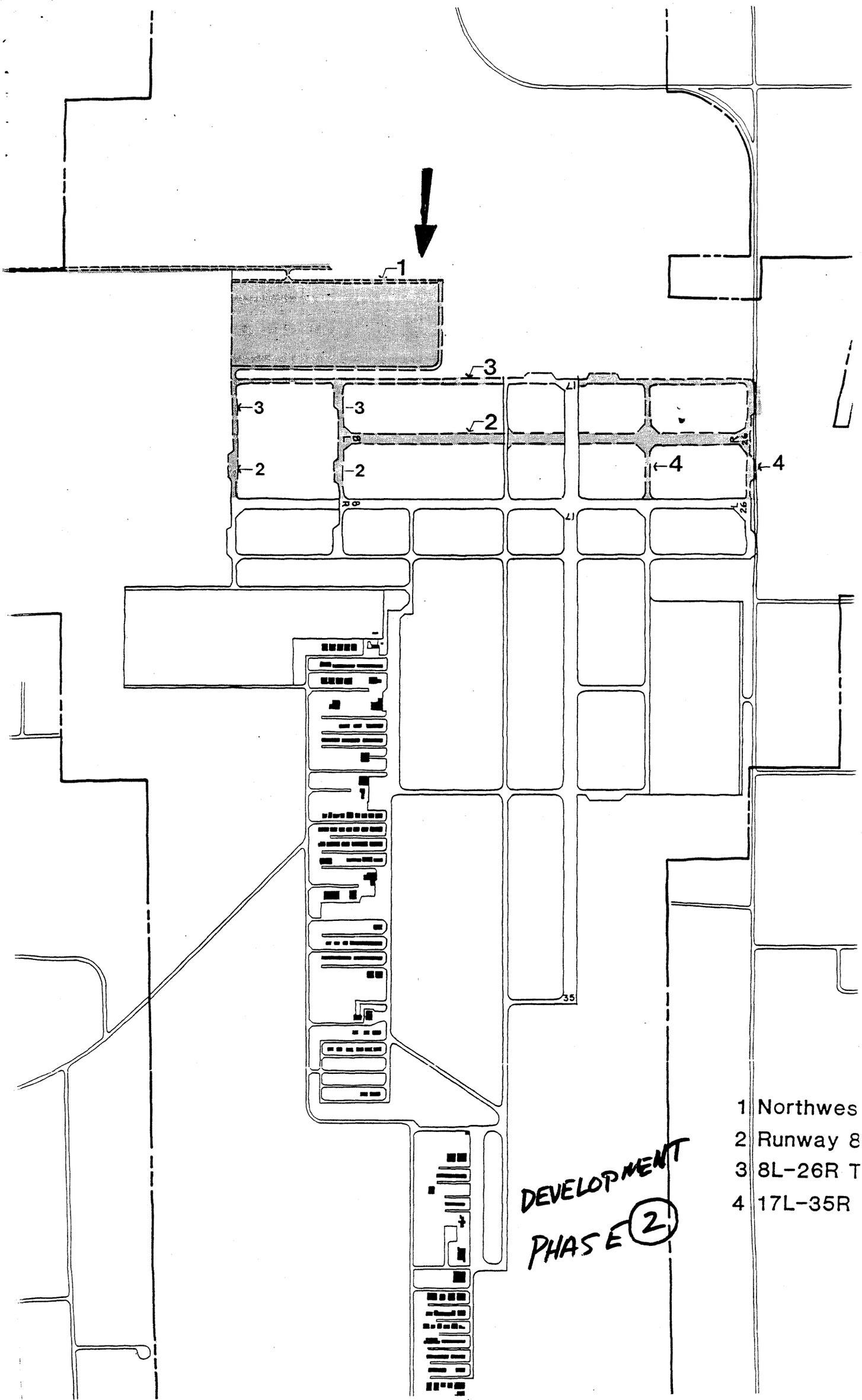
EXHIBIT "E"

TRA *Airport Consulting*

Architecture
Engineering
Planning
Interiors

MASTER PLAN
Anoka County · Blaine Airport

Minneapolis · Saint Paul
Metropolitan Airports Commission


1
3
3
3
2
2
2
4
4
17
17
26R
26L
35
DEVELOPMENT
PHASE (2)
1 Northwes
2 Runway 8
3 8L-26R T
4 17L-35R

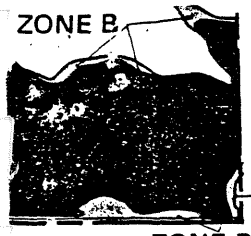


EXHIBIT "F"

Refer to the FLOOD INSURANCE RATE MAP EFFECTIVE date shown on this map to determine when actuarial rates apply to structures in the zones where elevations or depths have been established.

To determine if flood insurance is available in this community, contact your insurance agent, or call the National Flood Insurance Program at (800) 638-6620, or (800) 424-8872.

APPROXIMATE SCALE

1000 0 1000 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

CITY OF
BLAINE,
MINNESOTA
ANOKA COUNTY

PANEL 10 OF 10
(SEE MAP INDEX FOR PANELS NOT PRINTED)

- RCWD boundary

COMMUNITY-PANEL NUMBER
270007 0010 C

MAP REVISED:
JUNE 19, 1981

federal emergency management agency
federal insurance administration

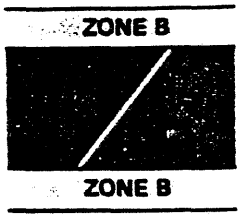
SUNSET AVENUE

KEY TO MAP

500-Year Flood Boundary

100-Year Flood Boundary

Zone Designations* With Date of Identification e.g., 12/2/74



100-Year Flood Boundary

500-Year Flood Boundary

Base Flood Elevation Line With Elevation In Feet**

513

Base Flood Elevation in Feet Where Uniform Within Zone**

(EL 987)

Elevation Reference Mark

RM7 ×

River Mile

• M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:

JUNE 28, 1974

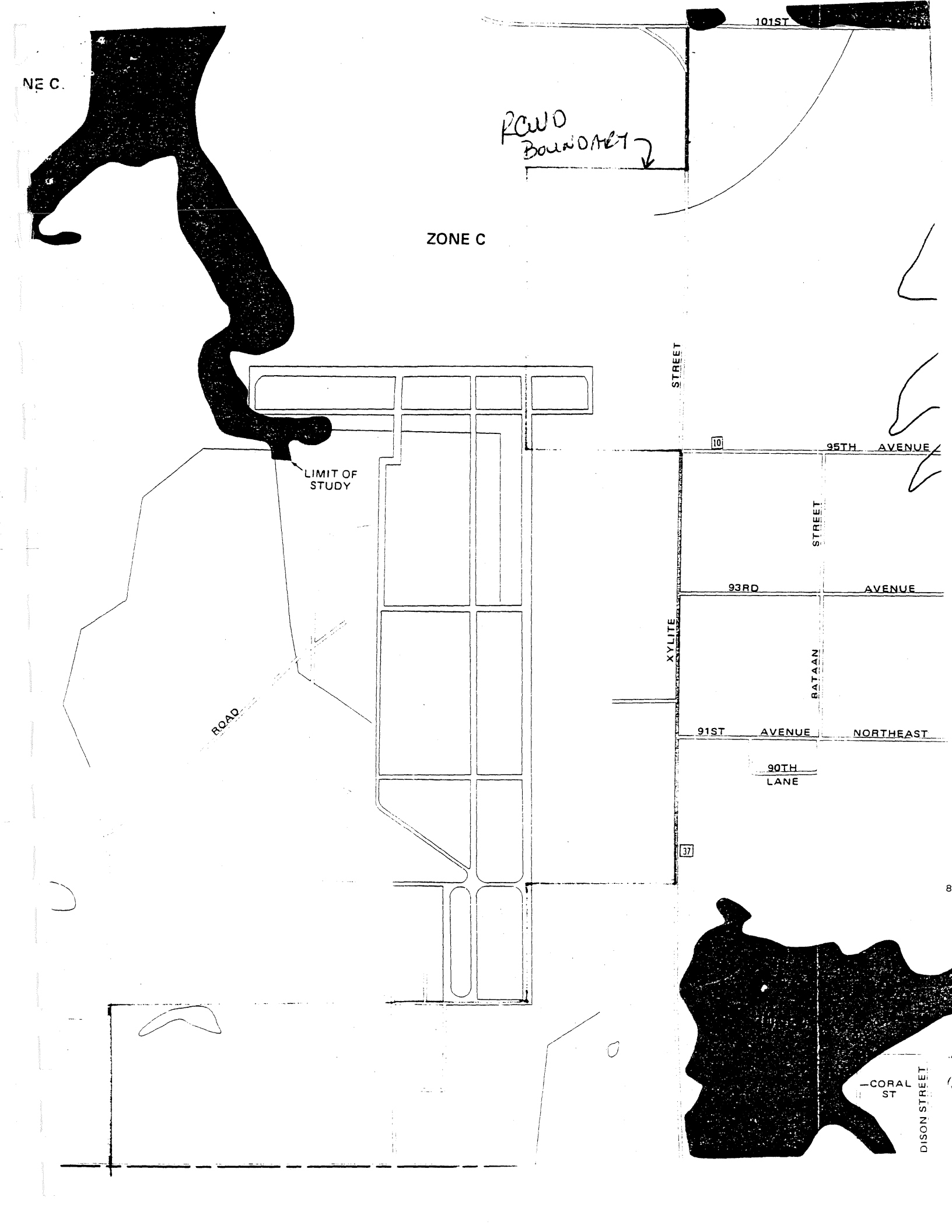

NE C.
101ST
RCWD BOUNDARY
ZONE C
STREET
10
95TH AVENUE
LIMIT OF STUDY
STREET
93RD AVENUE
XYLITE
RATAAN
ROAD
91ST AVENUE NORTHEAST
90TH LANE
37
CORAL ST
DISON STREET

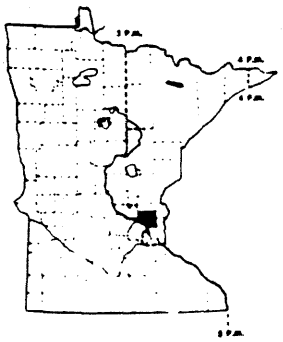
EXHIBIT "G"

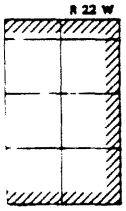
REVISED
July 9, 1982

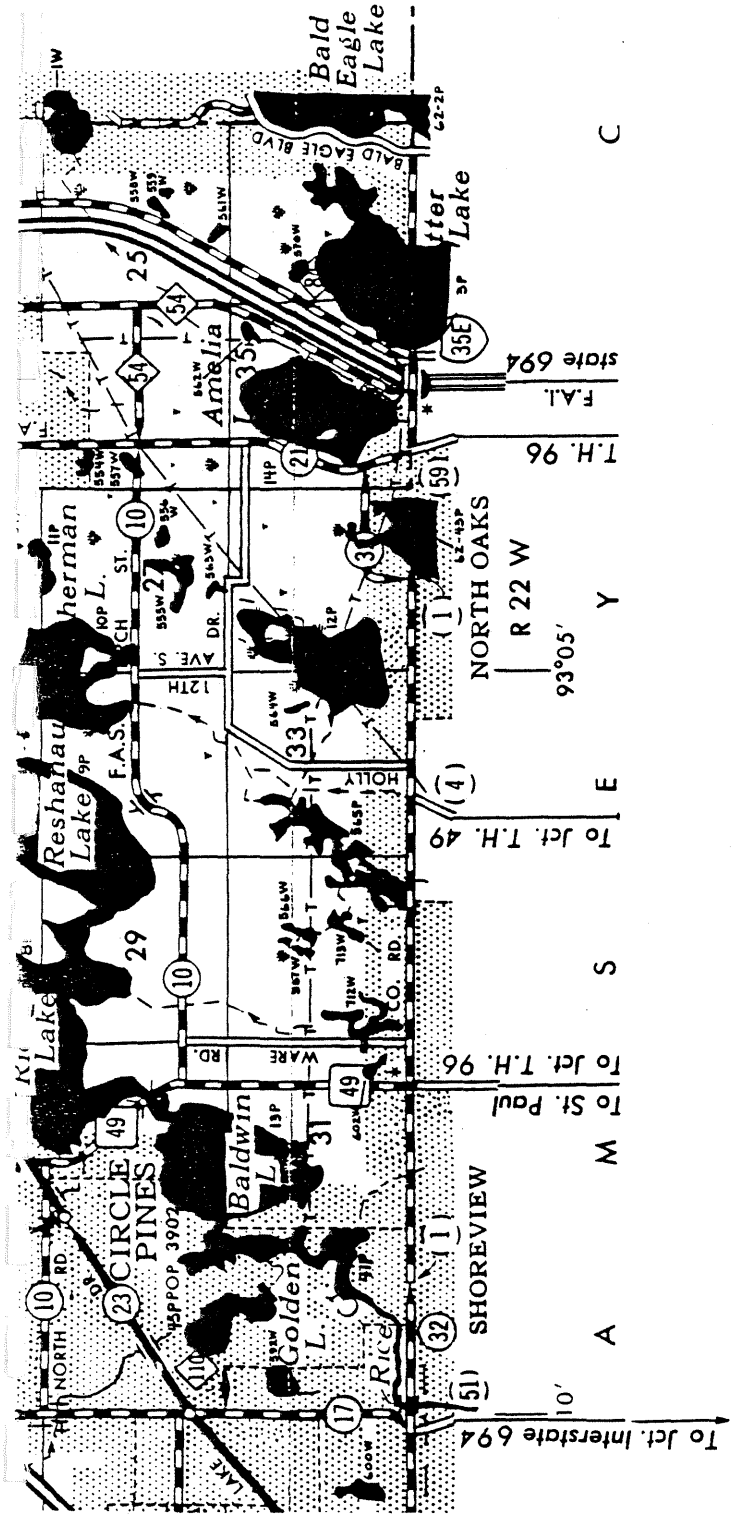
PROTECTED WATERS AND WETLANDS

ANOKA COUNTY MINNESOTA

SHEET 1 of 2







LEGEND

Protected Waters:

- Basins are identified with a number and the letter "P".
- Watercourses are identified with a heavy, dark line.
- Public ditches are identified with a dashed line.

Protected Wetlands:

- Identified with a number and the letter "W"

This map is intended for use with a separate descriptive list. The boundaries of the protected water bodies shown on this map are plotted as accurately as possible, consistent with the map scale, but are still approximate. A protected water body boundary coincides with the ordinary high water mark of the water

SCOPING DECISION DOCUMENT

APRIL 15, 1985

ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD)
ENVIRONMENTAL IMPACT STATEMENT

for

PHASE 1A AND PHASE 1B IMPROVEMENTS

SCOPING DECISION DOCUMENT

April 15, 1985

Prepared By

Minneapolis-St. Paul Metropolitan Airports Commission
6040-28th Avenue South
Minneapolis, Minnesota 55450 Tel. (612) 726-1892

INTRODUCTION

The purpose of this Scoping Decision Document is to set forth, in detail and in accordance with 6 MCAR S 3.030, the undertaking of an Environmental Impact Statement (EIS) of certain proposed airfield improvements at Anoka County-Blaine Airport (Janes Field) (ANE).

The EIS work elements set forth in this Scoping Decision Document can be directly correlated to the findings of a Scoping Environmental Assessment Worksheet (EAW) process completed in response to a petition brought in accordance with 6 MCAR S 3.026. The airport developments which were the subject of the petition and the Scoping EAW were those proposed in four phases by the Airport Master Plan (AMP) completed in 1983. The AMP Phases, known as Phase IA, Phase IB, Phase 2 and Phase 3, relate to various runway, taxiway and building area projects designed to meet forecasted airport growth and to respond to environmental concerns of those communities which surround the airport. The EAW process resulted in the focusing of the scope of the proposed EIS on those items requiring additional study to determine if an adverse impact exists and/or to identify any mitigation measures required.

The EIS scope presented will fulfill the requirements of the State of Minnesota promulgated by the Minnesota Pollution Control Agency (MPCA) and Minnesota Environmental Quality Board (MEQB). In addition, a Summary, which will be a concise report depicting evidentiary supporting data, proposed mitigation measures, description of the preferred alternative, etc., will be included in the EIS. The Summary will present a comprehensive and understandable report suitable for use by lay persons. Appendices will be incorporated into the EIS to include such items as: list of preparers; agencies/organizations contacted and their responses, etc. Inasmuch as the Scoping EAW process identified only Phase 1A and Phase 1B as the Master Plan phases to be studied by the EIS in detail, an Informational Appendix will be included in the EIS to discuss the potential for environmental impacts from proposed developments in Phase 2 and Phase 3 of the Master Plan for Anoka County-Blaine Airport. Regulatory approval of the Informational Appendix will not be sought, however.

The EIS will be accomplished in accordance with the requirements for a Minnesota EIS as stipulated in 6 MCAR S 3.031B to satisfy the Minnesota Environmental Policy Act of 1973, which specifies the conditions requiring preparation of a State EIS for a proposed action. In this regard, there will be a Public Hearing held on the completed draft version of the EIS. Concurrently with the state EIS process, a federal Environmental Assessment (EA) will be accomplished consistent with Federal Aviation Administration (FAA) orders 5050.4 and 1050.1D.

ELEMENT 1.0 - PURPOSE AND NEED OF THE PROPOSED ACTION

1.1 OVERVIEW OF THE PROPOSED ACTION

The EIS will contain a description of the proposed action. The proposed action is the accomplishment of the airport improvements proposed in the AMP as Phase 1A and Phase 1B improvements with some exceptions as noted below. More specifically, the elements which comprise the proposed action as set forth in Phase 1A and Phase 1B of the 1983 Airport Master Plan for ANE are the following:

- Development of the east building area, approximately 33 acres.
- Development of the west building area, approximately 33 acres.
- Extension of Runway 8-26, and its parallel taxiway, on the easterly end by 800 feet, thereby increasing the runway length from 3,200 feet to 4,000 feet.
- Abandonment of a part of Xylite Street as required by the Runway 8-26 Extension.
- Extension of Runway 17-35, and its parallel taxiway, on the northerly end by 950 feet, and relocating the Runway 35 threshold northerly by an equal amount, thereby leaving the present runway length of 4,855 feet unchanged. This will include removal and/or relocation of lighting and landing aids as appropriate from the abandoned southerly portion of the runway.
- Removal of the connector taxiway on the easterly side of Runway 17-35 at the existing Runway 35 threshold.
- Construction of new connector taxiways as required by the development items listed above.

In addition to these elements, the possible need for land acquisition in the Runway 26 clearzone, and the potential for any impacts therefrom, will be included in the proposed action for analysis.

The potential impacts of the additional elements proposed in the AMP, including Phase 2 and Phase 3 improvements, the addition of an instrument landing system (ILS) on Runway 8-26 and the corresponding Phase 1B widening of that runway from 75 to 100 feet, and the addition of an air traffic control tower (ATCT) will be included in an Informational Appendix to the EIS. However, no regulatory approval of these improvements will be sought.

1.2 PROJECT NEED AND JUSTIFICATION

The EIS will include documentation fully setting forth the need for the proposed project, its justification and objectives. Since the proposed action is one of the recommendations contained in the 1983 Master Plan for Anoka County-Blaine Airport (Janes Field), a review of the purpose and need information from that study must be undertaken. The EIS, however, will go beyond the AMP to completely review the role of the airport in the light of current conditions. Some of the "givens" which the EIS will work with are:

- the proposed action cannot decrease existing useable runway length per Minnesota Statute 473.653;
- aircraft landing and departing Runway 17-35 should be removed farther from noise sensitive areas to the south;
- the airport's designated role of minor airport cannot be expanded in the Metropolitan Airport System per Minnesota Statute MS 473.641, Subdivision 4.
- Building area development in Phase 1A and Phase 1B will be limited to approximately 66 acres as identified in the AMP.

As part of the review of the project need and justification, the EIS will include a discussion of the following items which are important to understanding the project at the airport:

- the efficacy of reducing N-S traffic by lengthening the E-W runway.
- the extent to which Phase 1A and Phase 1B development could affect the probability that Phase 2 and Phase 3 development will be undertaken.
- the implications of the removal of Anoka Co. - Blaine Airport (Janes Field) from the Metropolitan Airports System and/or its replacement by another airport within the Metropolitan area.

ELEMENT 2.0 - PROJECT BACKGROUND INFORMATION

2.1 COLLECTION OF RELATED PLANS, DOCUMENTS, ETC.

Appropriate background data relative to the proposed project and the state environmental review process will be compiled. Included among this data are the:

- State Environmental Regulations.
- Pertinent Environmental Reports including the 1985 Scoping EAW for the Anoka County Airport.
- 1983 Master Plan Study for Anoka County-Blaine Airport.
- 1975 Comprehensive Storm Drainage Plan for the City of Blaine.
- Anoka County Airport Operations Rules (Metropolitan Airports Commission).
- 1977 Metropolitan Airports System Plan: Aviation Chapter and any information available from the update of this document now in progress.
- Population Data.
- Comprehensive Plans, Land Use Plans and/or ordinances of communities adjacent to Anoka County-Blaine Airport (Janes Field).

Initial contact with appropriate State and Local agencies will be accomplished. This, as well as the above work, will be sufficient to document the following:

- A brief overview of the environmental process including specific state and local requirements to be met by the EIS effort.
- Permits and approvals required at all government levels to allow for project implementation.
- The relationship of Anoka County-Blaine Airport (Janes Field) and the proposed project, to airport system planning at the national, state and regional levels, including relevant details of the planning structure in the southern Anoka/northern Ramsey Counties.
- The planning process pursued to date through which the proposed development has been conceived.
- Citizen and agency involvement in the planning process to date.

2.2 REQUIRED LOCAL, STATE AND FEDERAL PERMITS/APPROVALS/FUNDING

The following processes, approvals, funding and permits listed in this section of the Scoping Decision Document are required to implement the proposed improvements at Anoka County-Blaine Airport (Janes Field). Each agency involved in the approval or permit process which will require the EIS document to respond, will be requested to make a record of decision. These agencies are indicated as part of the listing below.

No permits are being sought concurrent with preparation of the EIS. However, all necessary data will be gathered during the EIS process to allow subsequent application for permits from the following agencies:

- Minnesota Department of Natural Resources - Permit to Work in Public Waters (basins 594W and 595W). (Record of Decision requested)
- U.S. Army Corps of Engineers - Section 404. (Record of Decision requested)
- U.S. EPA National Pollution Discharge Elimination System (NPDES) Permit for stormwater runoff from the site which enters a ditch or other channelized conveyance. This will be required if regulations proposed by the EPA on March 6, 1985 are approved. (Record of Decision requested)
- Minnesota Pollution Control Agency - 401 Water Quality Certification. (Record of Decision requested)
- Conditional Use Permit - City of Blaine pursuant to Chapter 27.04 of the City of Blaine Zoning Ordinance. (Record of Decision requested)
- Coon Creek Watershed District Permit (Record of Decision requested)
- Rice Creek Watershed District Permit (Record of Decision requested)

Agency approvals as opposed to permit approvals will be sought concurrently with the EIS from the following agencies:

- Pertinent agencies as provided by MS 473.875 through MS 473.879 including the Minnesota Water Resources Board, Metropolitan Council, Rice Creek Watershed District, Coon Creek Watershed District, City of Blaine, MPCA, MDNR, Anoka County, and pertinent soil and water conservation districts.

- The Minnesota State Planning Agency and the Metropolitan Council as provided by Minnesota Session 1983 Laws Chapter 289 Section 49 (Minnesota Statutes Chapter 116J.42 Subdivision 2)

- County Commissioners regarding abandonment of a portion of Xylite Street

Prior to construction of tenant improvements in the building areas private developers will be required to obtain the following additional permits/approvals:

- plumbing and building permits (City of Blaine).
- approved locations and methods for waste disposal (City of Blaine).
- above ground fuel storage (Minnesota Pollution Control Agency).
- underground fuel storage (Resource Conservation and Recovery Act, EPA).
- Appropriation of Waters of the State (Minnesota Department of Natural Resources) for foundation drains and wells in the proposed building areas.

A Federal Environmental Assessment (EA) will be prepared concurrently with the State EIS. The Federal EA process will address all pertinent Federal environmental laws and issues according to Federal Aviation Administration orders 5050.4 and 1050.1D.

2.3 COLLECTION OF AIRCRAFT OPERATIONAL AND NOISE DATA

Additional data to be collected as developed relative to the aircraft operations and noise information associated with the proposed project will include:

- Aircraft and airport operational data from FAA, and others for current operations at Anoka County - Blaine Airport (Janes Field).

- Weather data from local, state or federal agencies for use in definition of future operational scenarios.

- Available noise data collected by MAC for the airport and its vicinity.

- Revised forecasts of future levels of aircraft activity to generate descriptions of current and unconstrained 1990 and Year 2000 traffic, including mix of aircraft types, peaking, local/itinerant split, and instrument approaches. The AMP forecasts and assumptions will be reviewed to better understand the basis for the recommendations made, but will be updated in accordance with the discussion above.

- Field monitoring of noise at locations on and off the airport, in all quadrants, with MPCA involvement, to reflect the actual aircraft pattern profiles being flown in the noise modelling effort.

- Field observation of flight patterns to determine actual flight tracks and aircraft altitudes of aircraft operating at Anoka County-Blaine Airport (Janesfield).

- Identification of noise sensitive receptors in the airport vicinity and their distance from the airport.

ELEMENT 3.0 - INITIAL EVALUATION OF ALTERNATIVES

The three development alternatives analyzed in detail in the 1983 Anoka County-Blaine Airport Master Plan, adjusted to reflect current FAA criteria, will be reviewed in detail in the EIS. A number of additional alternatives not discussed in the AMP will be studied in the EIS so as to present the limits of possible configurations at the airport which conform to the "givens" listed in Section 1.2 of this Scoping Decision Document as well as to FAA dimensional criteria. The alternatives discussion will focus on the three elements which comprise Phase 1A and Phase 1B development: 1) Runway 17-35; 2) Runway 8-26 and; 3) building areas. The alternatives will be designed to "bracket" the maximum development scenarios for each element, thereby "bracketing" the maximum environmental impacts. The maximum northerly shift of Runway 17-35 to be analysed will be 2,700 feet north of Runway 8-26. Southerly development will not be analysed for Runway 17-35. The maximum westerly shift of Runway 8-26 to be reviewed is 3,400 feet west of the existing Runway 8 threshold. The maximum easterly development of Runway 8-26 to be analysed will be 2,600 feet east of the existing Runway 26 threshold. Location of building areas will be assessed for those locations which are operationally and environmentally feasible relative to specific runway development alternatives.

A "no-build" alternative will be analyzed. The "no-build" alternative is defined as maintenance of the airport facilities as presently configured without the development items enumerated in Section 1.1.

The alternatives to be reviewed in the EIS are summarized below:

NO-BUILD

- existing airport configuration, with existing traffic levels (base case).

- existing airport configuration with future traffic levels.

Runway 17-35

- extension of Runway 17-35 and its parallel taxiway on the northerly end by 950 feet and relocating the Runway 35 threshold by an equal amount at future traffic levels (the project).

- shifting of the runway north approximately 2,700 feet (keeping the same length of 4855'), with possible lateral shifts as mitigation measures, with future traffic levels.

Runway 8-26

- extension of Runway 8-26 and its parallel taxiway to 4000' by extending the easterly end 800 feet, at future traffic levels (the project).

- shift an extended runway 8-26 (4000' long), and its parallel taxiway to the west the maximum length possible (western threshold 3,400' west of the existing western threshold) with future traffic levels.

- shift an extended runway 8-26 (4000' long) and its parallel taxiway to the east the maximum length possible (2,600') east of the existing eastern threshold with future traffic levels.

Building Areas

- Building areas will be sited in each of these runway alternatives consistent with design and environmental criteria. No alternative will include runway development, only. Any runway alternative will assume building area development is accomplished. One alternative will assume only building area development (no runway development).

ELEMENT 4.0 - AFFECTED ENVIRONMENT

The EIS will include a detailed description of the proposed project. The description will be in narrative form supported by appropriate graphics. The project description will include, but not necessarily be limited to, documentation of:

- The current use of the existing airport land that would be affected by the proposed project.

- Dimensional detail describing major features of the proposed project, with emphasis on the extent of the area that would be directly affected by construction, including earthwork, paving, etc.

- Anticipated construction methods and materials.

A detailed description of the project setting will be developed for the EIS. Such description will be sufficient to thoroughly document features of the area which are related to or may be affected by the proposed project. Documentation of the project setting will include, but not necessarily be limited to:

- Relevant history of Airport development and public involvement to date.

- Topographic and other features relevant to the items identified in the "Scoping EAW" process as requiring additional study, such as a description of surface transportation in the airport area and description of utilities at, or in proximity to the airport.

- Existing and planned land use and zoning in the airport vicinity, and the relationship of the proposed project to any existing land use or development plans such as the Metropolitan Council's "Metropolitan Development Guide", and local Comprehensive Plans and zoning ordinances.

- A brief and general description of the relevant features and characteristics of the region, within which the airport is located.

- Description of the project area by surface cover (i.e., wetland, grassland, woodland, impervious surfaces).

- A description of the relationship of the project area to ecologically sensitive areas such as the Springbrook Nature Center and other areas identified in the Scoping EAW process.

Substantial work required to prepare the project description as outlined above will be accomplished by using the 1983 Airport Master Plan materials updated to reflect current conditions and criteria.

ELEMENT 5.0 - POTENTIAL IMPACTS

5.1 NOISE IMPACTS

The following efforts will be undertaken in connection with this analysis:

- Single-event or other noise data to be collected by MAC will be identified. The acoustical data used in the computations of aircraft noise will be verified and locations and procedures for its collection recommended by coordination with MPCA staff.

- Field observations with acoustical data will be compared and any differences identified. Any operational factors such as non-standard flight tracks or approach/departure profiles which would explain discrepancies will be identified and reviewed with FAA and MPCA. The operational data inputs will be modified, if necessary.

- Calculation of Ldn noise contours using INM 3.8, for the EIS alternatives identified in Element 3.0.

- Calculation of L_{10} or (Leq) data for each of the alternative cases as necessary, (using the State standard that is available when the noise analysis is done).

- Calculation of single-event noise contour sets for landings and departures (including start-of-roll noise) of specified aircraft types, weights and operational modes, to supplement the Ldn noise analysis. A maximum of eight such single event contours will be calculated.

- Analysis of changes in aircraft noise or overflight of sensitive areas which would occur as a result of the project, identification of land uses and communities affected, noise sensitive uses affected, and residential population affected, for each alternative noise and operational condition.

- Preparation of Ldn contours for the Year 2000 assuming that Phase 2 and Phase 3 of the airport development program are constructed as planned. Text and graphics describing this noise analysis will be incorporated into the Informational Appendix.

- For each alternative, estimates of the operational implications of each will be reviewed. Except for the no-build alternative, any alternative providing a length of 4,000 feet for Runway 8-26 is assumed to include development of a total building area for Phase 1A and Phase 1B of 66 acres. The degree to which the runway configurations and availability of airport facilities (hangars) characterizing each alternative would constrain the forecasts of demand will be identified, and an operational scenario will be described for each alternative. This will include assignment of traffic to runways.

  In addition, a similar operational scenario will be provided for the Year 2000 assuming that Phase 2 and Phase 3 of the airport development program are constructed as planned and will be included in the Informational Appendix.

5.2 IMPACT TO GROUNDWATER AND SURFACE WATER

5.2.1 Impact to Ground Water

For ground water impact analysis, three study areas are envisioned. The activities anticipated for each study area and the assumptions to be used are included below.

- Monitoring Well Installation

As was noted in the Scoping EAW, the configuration of the water table and the potentiometric surface in the Hillside Sand aquifer are not determined in the vicinity of the airport. To overcome this information deficiency, six water table wells and three Hillside Sand wells will be installed on the airport property.

The water table wells will be 1¼-inch diameter PVC wells installed to an average depth of 10 feet. The Hillside Sand wells will be 2-inch diameter PVC wells installed to an average depth of 75 feet. The water table wells will be installed using a hollow stem auger. The Hillside Sand wells will be installed using hollow stem auger drilling into the Twin City Formation surface and advancing to the total depth by rotary drilling methods. These wells will be used to obtain one set of potentiometric head measurements and representative samples of the Fridley Formation, Twin Cities Formation, and Hillside Sand for further analysis.

- Determine Aquifer Characteristics

This study area will characterize the hydraulic conductivity for the Fridley Formation, Twin Cities Formation and Hillside Sand. The hydraulic conductivity of the Fridley Formation and Hillside Sand will be characterized using grain size distribution analyses of formation samples. This approach will be used because these two formations are generally regarded as being texturally uniform. The alternative approaches of slug tests and pumping tests will not be used because of their high costs and because the rapid response to pumping of these permeable aquifers make single well tests inappropriate. The hydraulic conductivity of the Twin Cities Formation will be determined by laboratory permeability tests of thin wall samples. While this unit is expected to be more heterogeneous, its thickness and relatively low permeability render the alternative, pumping tests, too costly for the level of concern being assessed.

- Hydrogeologic Analysis

The above field and laboratory data along with other existing hydrogeologic data for the airport vicinity will be analyzed to determine the configuration of the potentiometric surfaces of the Fridley Formation and Hillside Sand. In addition, the groundwater flow patterns from the airport site through the Twin Cities Formation into the Hillside Sand will be assessed in the airport vicinity. This would involve a groundwater mathematical model, either a cross sectional model or a three-layered, two-dimensional model. This approach would apply a level of rigor corresponding to the amount of data available and should satisfactorily address this question.

A compilation of groundwater useage to existing and projected conditions will determine groundwater appropriation at the airport. Loading rates and resultant concentrations of wastes to

the ground will be determined for both existing and future conditions. Flow rate and direction of acquifers beneath the airport will be used as the basis for the assessment of any potential impacts to the quantity and quality of the groundwater and drinking water of communities surrounding the airport.

The study of appropriation and quality of groundwater will be assessed in this section of the EIS relative to the proposed wells and foundation drains in the proposed building areas, and the possibility for the extension of future municipal water and sewer service to the airport.

A spills plan for the short term and long term containment of wastes from aircraft refueling and deicing operations and maintenance areas will be developed to mitigate impacts to groundwater. The spills plan will be developed by MAC concurrently with, but not included in the EIS.

5.2.2 Impact to Surface Water

Potential point and non-point sources of contamination of surface water will be identified and evaluated. The analysis of potential impacts to surface waters and the means to mitigate any impacts identified will include:

- Short term and long term point source and non-point source effects of stormwater runoff to drainage ditches.
- Short term and long term point source and non-point source sedimentation control structure(s).
- A spills plan for the short term and long term containment of run off from aircraft refueling and deicing operations and maintenance areas, to be prepared concurrently with, but not included in the EIS.
- Short term and long term effects of drainage rerouting resulting from runway modifications and construction of building areas.
- Limiting the entrance of contaminants to streams via closed conduits.
- A discussion of possible secondary effects from the increase in airport development in Phase 2 and Phase 3 as part of the Informational Appendix.
- Short term and long term effects from potential uses of the surface water downstream from the proposed impacted area.
- Potential drawdown influence on protected waters from foundation drains in the proposed building areas.

5.3 SEWAGE DISPOSAL

The EIS process will study sewage disposal at the airport relative to existing and proposed practices, volumes of sewage generated and parties responsible for operating the sewage disposal systems. The EIS process will also discuss the implications for sewage disposal relative to the possibility for the extension of municipal sewer and water lines to the airport.

5.4 HAZARDOUS WASTE

The identification of any potential hazardous waste issues at the airport will be addressed in the EIS process. If the potential for the presence of hazardous wastes is identified at the airport, existing disposal plans will be discussed, the impact to groundwater analysed and, if necessary, recommended changes to those plans will be provided. A spills plan will be developed concurrently with the EIS, but will not be included in the EIS.

5.5 IMPACTS ON 100 YEAR FLOODPLAIN

The potential for permanent loss of flood storage capacity will be addressed. Based on available topographic information, the 100 year floodplain contour will be confirmed. Any potential reduction in volume of floodplain will be addressed and methods for obtaining compensatory flood storage will be proposed. All such mitigating measures will be identified, evaluated and selected for implementation. The impact of the Blaine requirement for buildings to be a specified height above the 100 year floodplain will be reviewed.

All work will be closely coordinated with the Army Corps of Engineers and other local, State, and Federal governmental agencies having jurisdiction.

5.6 IMPACTS ON ON-SITE AND DOWNSTREAM DRAINAGE

The potential for the project to affect existing drainage problems, particularly in County Ditch 41, will be identified and further studied. The study will be coordinated with governmental agencies having jurisdiction over the drainage problems. The requirements to control the rate of discharge and to protect the quality of stormwater run off will be considered. If required, a revision to the existing stormwater management plan for the City of Blaine will be prepared. The plan will identify the project area and areas of contributing runoff; show the details for design storm(s); show the details of stormwater control structures and modes of operation; show the details of runoff treatment facilities, if required; describe surface and subsurface soils and provide hydrologic computations. This analysis will be fully coordinated with pertinent agencies as specified in MS 473.875 through 473.879.

5.7 IMPACTS TO WETLANDS

Wetlands and wetland mitigation are anticipated to be one of the major issues in this EIS since both a DNR protected waters permit and a Corps of Engineers 404 permit will be required for construction of the project. A major part of the EIS work effort will assess and resolve wetland impacts to fulfill the requirements of these permits and also comply with Executive Order 11990 Protection of Wetlands and U.S. Department of Transportation Order 5660.1A.

Specific items to be studied in the EIS are as follows:

5.7.1 Identification and Classification of Wetlands on the Project Site

All affected wetland basins will be located, classified and mapped from existing aerial photos, topographic maps and field review. Wetland maps prepared for the Scoping EAW will be used to the extent possible. Hydrologic relationships between adjacent wetlands will be determined by field review and, where necessary, through coordination with MDNR Division of Waters. Wetlands will be classified according to Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979) and Wetlands of the United States (Shaw and Fredine 1971). The dominant vegetation types in each wetland classification will be described in tabular form. Wetlands will be mapped and a graphic will be prepared showing wetland locations, types and impacts. Impacts to Minnesota protected waters, if any, will also be identified.

5.7.2 Determination of Wetland Impacts

Direct impacts to wetlands will be determined based on preliminary plans provided by MAC. Potential impacts to be studied include:

- direct encroachment.
- erosion and sedimentation during construction.
- stormwater loading of pollutants, nutrients and sediment during operations.
- stormwater related "bounce".

Impacts will be quantified using a modified version of the U.S. Fish and Wildlife Service Habitat Evaluation Procedures (HEP). This version of HEP has been defined in the Draft Wetland Mitigation Banking Guidelines developed jointly by MnDOT, U.S. Fish and Wildlife Service, Minnesota DNR and FHWA for Minnesota highway projects. The HEP review will be fully coordinated with MDNR and the U.S. Fish and Wildlife Service and other wildlife agencies as appropriate. All HEP quantified impacts will be set forth in tabular form to facilitate development of mitigation measures.

5.7.3 Comparison of Alternatives

Any alternatives addressed will be compared using HEP in the EIS to determine which would cause the least impact to wetlands. Any alternative which includes some impact to wetlands will include an analysis as to the reason such impact is unavoidable. Should the preferred alternative have greater impacts to wetlands than some other alternative, the engineering, economic and/or environmental reasons why the other alternative is not practicable will be detailed.

5.7.4 Measures to Minimize Harm

Mitigation measures will be identified for all stages of project development. Design mitigation features will be discussed. Site review for the Scoping EAW indicated that existing physical constraints (e.g. highways, homes) drastically limit design alternatives and that multiple use stormwater facilities are probably the only such features that would be feasible. The reasons why other features must be dismissed will be addressed.

If wetland impacts are serious enough, habitat replacement, either on-or off-site may be required. The presence of suitable mitigation sites will be determined during field review. Whether off-site mitigation will be needed is dependant on site characteristics and the magnitude of impacts. Habitat replacements will also be quantified with HEP and would serve to offset only the impacts incurred as a result of the project. Where possible, wetland mitigation projects would serve multiple functions including flood storage and runoff treatment.

The EIS will discuss construction measures to minimize harm including special erosion and sedimentation control measures (e.g. silt fence, temporary settling basins, check dams), restricted construction limits and appropriate construction staging.

5.7.5 Coordination

During the EIS process, coordination will take place throughout development of the wetland assessment and will be undertaken with the U.S. Fish and Wildlife Service, Minnesota DNR, U.S. Army Corps of Engineers and any appropriate watershed districts. All coordination will be documented in the report. Since Corps 404 and Minnesota DNR protected waters permits are necessary, coordination will be geared toward determining permit requirements and identifying ways in which those requirements can be satisfied.

5.7.6 Informational Appendix

A brief wetland assessment will be prepared to outline impacts that would occur if, at some future date, the Airport Master Plan were implemented beyond Phase 1A and Phase 1B. Phase 2 and Phase 3 will be described and their wetland impacts quantified in terms

of acres and HEP habitat units. An additional HEP field procedure will not be undertaken; habitat values developed in the EIS for the various wetland types will be applied to potential future impacts. No additional mitigation planning or coordination will be undertaken for the Informational Appendix.

5.8 FLORA AND FAUNA

5.8.1 Movements of Resident and Migratory White-tailed Deer

The impacts to be resolved in the EIS are those to human beings should deer/aircraft collisions occur as a result of the proposed project and whether or not the deer will use a movement corridor other than the existing east-west corridor known to exist along the edge of the Runway 17 clear zone when the latter is impacted by the proposed northerly extension to Runway 17-35.

The focus of this analysis will be to develop a mitigation plan, preferably using natural methods such as vegetation manipulation and modification of on-site agricultural practices, which will divert deer movements away from active runways. This plan would be developed through on-site coordination with the MDNR Area Wildlife Manager and a representative from the U.S. Fish and Wildlife Service.

5.8.2 Upland Wildlife Habitat

Upland wildlife habitat will be discussed in the EIS as necessary to assess white-tailed deer movements and develop a mitigation plan to divert them from active runway areas. Impacts to other upland wildlife habitat and upland species occurring on the project area will be studied in conjunction with the more detailed investigations of wetlands and white-tailed deer movements. A species list for the project site will be prepared and impacts to those species will be summarized. Analysis of plans to mitigate impact to upland wildlife habitat will include relocation of species or if necessary, creation of replacement upland wildlife habitat.

5.8.3 Movements of Resident and Migratory Great Egrets

A Great Egret colony was identified in the Scoping EAW as once observed residing one mile north of the airport in 1979, but was not present during a field trip to that site in 1981. During the Spring of 1985, wildlife biologists from the EIS team will work with MDNR and U.S. Fish and Wildlife Staff to investigate whether Great Egrets are nesting anywhere on airport property or in any suitable habitat in the airport vicinity. If a Great Egret colony is found close enough to the airport to be affected, potential impacts will be studied in the EIS.

5.8.4 Informational Appendix

A brief discussion of upland habitat, deer and Egret movement impacts will be prepared relating to Phase 2 and Phase 3 development and will be included in the Informational Appendix of the EIS.

5.9 SURFACE TRANSPORTATION IMPACTS

Surface transportation impact to the airport and communities immediately surrounding the airport will be addressed in the EIS. Analyses will address existing and future average daily and peak hour vehicular traffic generated at the airport, routes traveled and the impact, if any, to roads in the airport vicinity. Included in the analysis will be the proposed construction of Highway 10 and the proposed abandonment of Xylite Street.

5.10 SOCIAL IMPACTS

Impact to the human environment as a result of construction and use of the project will be included in the EIS process in accordance with all applicable environmental regulations. Any land use impacts related to noise will be assessed, but this will be accomplished under Element 5.1 - Noise Impact, rather than under this element.

Certain potential secondary social impacts will require limited study under this element. Specifically, the approach surfaces related to the extended runways will be reviewed in relationship to existing land uses, existing and proposed zoning, proposed future land use plans, etc. Compatibility of the proposed action will be evaluated in light of the Comprehensive Plans for the cities referenced under work task 2.1. Affect of the proposed Xylite Street abandonment and use of the airport will be assessed relative to community access and emergency vehicle response. Possible acquisition of lands beneath the proposed Runway 26 clear zone will be discussed relative to the use of those lands in relation to abutting properties.

Safety issues raised during the scoping process will be addressed in an airport operations plan to be prepared by MAC independently of the EIS.

5.11 INDUCED SOCIO-ECONOMIC IMPACTS

A generalized discussion of the benefit of the airport to the community will be included in the EIS.

5.12 EROSION

The potential for erosion during construction as a result of the addition of impervious surfaces at the airport and any necessary erosion control plans will be addressed during the EIS process.

ELEMENT 6.0 - ENVIRONMENTAL CONSEQUENCES

In the preceding elements, specific efforts for potential impacts which must be evaluated have been discussed. For each impact, the EIS process will include development of recommended actions to eliminate or minimize any adverse environmental impacts which are identified, and the final report will contain a summary of such recommended actions.

6.1 DIRECT, INDIRECT, ADVERSE OR BENEFICIAL EFFECTS

A discussion of any direct or indirect, adverse or beneficial effects will be provided for all alternatives identified in 3.0. The discussion will embody those issues considered to be potentially significant as prescribed in the Scoping EAW, public meeting and written comments. The EIS process will identify and briefly discuss any major differences of opinion concerning impacts of the proposed project and the effects the project may have on the environment. This discussion will be incorporated under each potential impact category and will be synthesized and summarized under this sub-task so that the range and magnitude of each direct or indirect, adverse or beneficial effect can be clearly understood.

6.2 MITIGATION MEASURES

Those measures that could reasonably eliminate or minimize any adverse environmental, economic, employment or sociological effects of the proposed project will be identified and discussed under each potential impact category and will be synthesized and summarized under this sub-task so that the range and magnitude of such measures can be clearly understood.

APPENDIX 2B

AVIATION POLICY

PART I: AVIATION GOALS/POLICIES

LAND USE COMPATIBILITY

Revise existing Policy 4 (p. 9) to read:

4. Land use surrounding an airport in the metropolitan airport system should be compatible with the role and function assigned to that airport; where incompatibility exists, affected agencies and jurisdictions should jointly participate in developing a program to mitigate the incompatibility. The guidelines for determining land use compatibility with aircraft noise are presented in Appendix D.

Revise "Discussion" text (pp. 9-10) to read:

> Source noise control is the primary avenue to address the problem of aircraft noise pollution. Operational measures to direct and control noise pollution are the secondary course. Source noise control and operational strategies can achieve, over the next five to seven years, their practical limits based on state-of-the-art technology. Land use compatibility planning is the final phase, or third side, of the noise-control triangle. Similarly, incompatible land use includes structures of heights that would obstruct the safe operation of the airport and homes severely affected by aircraft noise. Single-family dwellings in the vicinity of an airport do not constitute a hazard to the safe operation of the airport, but may be adversely affected by aircraft noise, especially in the vicinity of the major airport. In undeveloped rural areas, it is desirable to establish clear zones within the landing and takeoff paths near airports to preclude possible future conflicts. In the developed urban area where single-family homes exist near the ends of the runways, the primary intent of Policy 4 is to address the environmental effects of the operation of airports upon these homes, by developing a program to reduce substantially any adverse impacts. The program should include operational strategies for noise abatement such as night curfew, restriction of training flights and use of preferred runways. In those instances where an enforced noise abatement program cannot reduce the magnitude and quantity of noise to reasonable levels, then the property owners should be appropriately compensated.

D. GUIDELINES FOR LAND USE COMPATIBILITY WITH AIRCRAFT NOISE

The most significant airport issue of public concern in the Twin Cities Area is the noise generated by aircraft takeoffs and landings. This appendix to the Aviation chapter of the *Metropolitan Development Guide* includes guidelines that communities around the airports in the Area should use to discourage incompatible land uses and encourage compatible ones. The guidelines were adopted by the Metropolitan Council on March 24, 1983.

Two sets of guidelines are included in this appendix. The first set guides land uses in 11 communities around Minneapolis-St. Paul International Airport (MSP), where most noise problems have occurred. The communities are: Minneapolis to the north; St. Paul, Lilydale, Mendota, Mendota Heights, Sunfish Lake and Inver Grove Heights to the east; Eagan and Bloomington to the south; and Richfield and Edina to the west.

The first set of guidelines would also address land uses near the St. Paul Downtown Airport, located in St. Paul and South St. Paul. MSP International and St. Paul Downtown are currently operating as the major and intermediate airports, respectively, in the metropolitan airports system.

The second set of guidelines is for land uses around four minor airports in outlying parts of the Twin Cities Area. The airports and affected communities are: Lake Elmo Airport, Lake Elmo, Baytown Township and West Lakeland, Washington County; South St. Paul Municipal Airport, South St. Paul and Inver Grove Heights, Dakota County; Crystal Airport, Crystal, Brooklyn Park and Brooklyn Center, Hennepin County; and Flying Cloud Airport, Eden Prairie, Hennepin County. Guidelines would also cover the two remaining publicly owned airports in the system when their long-term development plans are completed. These airports are Anoka County-Blaine Airport and Airlake Airport in Dakota County.

Land Use Compatibility Guidelines for Infill Development and Reconstruction or Additions to Existing Structures

"Infill development" pertains to an undeveloped parcel or parcels of land proposed for development similar to or less noise-sensitive than the developed parcels surrounding the undeveloped parcel (for example, a new house in a vacant lot in a residential neighborhood, or a new industry on a vacant parcel in an established industrial area).

"Reconstruction or additons to existing structures" pertains to replacing a structure destroyed by fire, weather, age, etc., to accommodate increased demand for existing use (for example, rebuilding and modernizing an old hotel, or adding a room to a house). Decks, patios and swimming pools are considered allowable uses in all cases.

It is recognized that certain existing land uses, reconstruction projects and infill development are not consistent with the guidelines for new development and major redevelopment (Table D.2). Achievement of consistency between such uses and the noise exposure zones, as specified in Table D.3, may remain difficult or impossible in the short term. Where such consistency is impractical in the short term, interim measures will be necessary. Such interim measures may include application to the Minnesota Pollution Control Agency (MPCA) for a variance from state noise standards. The long-range achievement of compatibility should be addressed through a program of strategies that eventually will reduce or eliminate inconsistencies. This program may include acquisition, insulation, long-range planning and development, modification of airport operations and ground noise attenuation. Program costs, financing methods, prioritization and an implementation schedule should be identified as part of the process and included in the program of strategies.

2. MINOR AIRPORTS

Aircraft Noise Exposure Zones for Minor Airports

The ability to quantify the aircraft noise exposure resulting from general aviation activity at minor airports in the metropolitan airports system is different from that at the major or intermediate airports. Due to the regularity of scheduled aircraft operations and the relative consistency of day-to-day operations at the major airport, certain judgements can be made regarding expected noise exposure. At minor airports, the frequency of operation, type of aircraft operation by time of day and pilot skill vary significantly.

The noise exposure contours prepared for MSP International Airport rely on a one-hour equivalent sound level (LEQ). Due to the nature and characteristics of aircraft operations at the intermediate airport, both one-hour LEQ and annualized level-day-night (Ldn) contours were used to define the noise exposure zones. The noise exposure contours prepared for the minor airports incorporate annualized Ldn noise exposure.

Consequently, for the minor airports only *general* operating criteria can be used. The noise exposure criteria for minor airports are based almost entirely on an annualized Ldn noise exposure.

Figure D.3 through D.6 depict the noise zones at four minor airports in the system. (For an explanation of noise contours and zones, see page 2 of this document.) Communities affected by Crystal Airport are Crystal, Brooklyn Park and Brooklyn Center; Flying Cloud Airport, Eden Prairie; South St. Paul Municipal Airport, South St. Paul and Inver Grove Heights; and Lake Elmo Airport, Lake Elmo, Baytown Township and West Lakeland.

Figures D.7 and D.8 depict the remaining two publicly owned airports in the system, Anoka County-Blaine and Airlake Airports. Noise zones are not available for these airports because their long-term development plans are not completed.

Following are the various noise exposure zones for minor airports defined by the noise contours. Noise in the four zones can be described as serious, a nuisance, annoying and minimal, respectively.

Noise Exposure Zone A

Zone A is exposed to aircraft noise greater than 70 Ldn and is typically on airport property within the control of the airport operator. The area adjacent to the airport property can be generally described as having a *serious* noise problem. In addition to the noise intensity, the noise exposure



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can also be considered permanent. It is an area frequently affected by both takeoff and landing operations. In addition, the proximity of the airport operating area reduces the probability of relief resulting from future changes in the operating characteristics of either the aircraft or the airport.

Given that both the existing and expected noise intensity in this area is serious and permanent, no new development other than that dedicated to nonnoise-sensitive land uses should be considered.

Noise Exposure Zone B

Noise exposure from aircraft operations is between 65 and 70 Ldn and could be considered a *nuisance* in zone B. Residential development should be discouraged. Based on the proximity of the affected area to the airport, seriousness of the noise exposure is such that speech interference can be routinely expected. In addition, given that aircraft operations are still relatively close to the runway centerlines (extended), repeated, annoying noise exposure can be expected.

Because of the noise intensity in this area, new development should be limited to commercial and industrial uses that are not labor intensive.

Noise Exposure Zone C

Zone C is exposed to aircraft noise of 60 to 65 Ldn. Public sensitivity to aircraft in zone C may be evident in locations affected by frequent operations. Aircraft noise impact can be categorized as *annoying.* However, the intensity is such that it should be considered somewhat less than a nuisance. The noise exposure is enough to be of some concern, but common building construction makes the indoor environment acceptable for sleeping. The outdoor environment should be reasonably pleasant for recreation and play.

Multifamily dwelling units with little or no outdoor activity would be compatible.

Noise Exposure Zone D

Minimal noise exposure from aircraft operations (55 to 60 Ldn) is anticipated within zone D. In fact, in the urban environment, aircraft noise blends into the daytime noise environment where normal day-to-day activity involves greater than 60 dBA noise levels. In rural areas, however, aircraft noise could be disruptive and public awareness for new development projects should be encouraged. Therefore, Zone D applies only to areas located outside the Metropolitan Urban Service Area designated in the Council's *Metropolitan Development Guide.*

Land Use Compatibility Guidelines for Minor Airports

Although very similar to those for the major and intermediate airports, the noise exposure zones used to define the extent of land use impact at minor airports are different. For the minor airports, the noise exposure zone is expressed in terms of annualized level-day-night exposure using the Ldn noise metric instead of the hourly, LEQ noise metric.

New Development and Major Redevelopment

"New development" means a relatively large, undeveloped tract of land proposed for development (for example, a residential subdivision, industrial park or shopping center).

"Major redevelopment" means a relatively large parcel of land with all structures proposed for extensive rehabilitation or demolition, and different uses (e.g. demolition of square block of old office and hotel buildings for new housing, office, commercial uses; conversion of warehouse to office and commercial uses).

Land use compatibility guidelines for development in noise zones A through D for minor airports are given in Tables D.5 and D.6. The terms "consistent," "provisional," "conditional" and "inconsistent" land uses have the following meanings:

Consistent: Land uses that are acceptable.

Provisional: Land uses that must comply with certain land use provisions to be acceptable. These provisions are described in the following section, entitled "Provisional Land Use Requirements."

Conditional: Land uses that may be identified as conditionally acceptable in local compre-

hensive plans. The Metropolitan Council will review and authorize conditional uses incorporated in local comprehensive plan amendments for compliance with the factors set forth in the following section, entitled "Conditional Land Use Review Factors." Following the approval and adoption of local comprehensive plan amendments, individual conditional use proposals will not be reviewed by the Metropolitan Council unless indicated in the plan amendment.

Inconsistent: Land uses that are not acceptable even if acoustical treatment were incorporated in the structure and outside uses were restricted.

Provisional Land Use Requirements

Land uses that meet the following requirements are acceptable.

Structures built after December 1983 shall be acoustically constructed so as to achieve the interior sound levels described in Table D.4.

Table D.4
STRUCTURE PERFORMANCE STANDARDS[1]

Land Use	Typical Interior[2] Sound Level
Residential	45 dBA
Educational/Medical	45 dBA
Cultural/Entertainment/Recreational	50 dBA[3]
Office/Commercial/Retail Services	50 dBA
Industrial/Communication/Utility	60 dBA
Agricultural Land/Water Area/ Resource Extraction	65 dBA

[1] These performance standards do not apply to buildings, accessory buildings, or portions of buildings that are not normally occupied by people. (See Appendix D.1)

[2] The noise descriptor used to delineate the appropriate noise policy zone is annualized Ldn.

[3] Special attention is required for certain noise sensitive uses, for example, concert halls.

Each local government that has land within an airport's noise zones will be responsible for implementing and enforcing the structure performance standards (Table D.4) within its jurisdiction. The Metropolitan Council will review the adequacy of these mechanisms as part of its review of amendments to each community's comprehensive plan.

Conditional Land Use Review Factors

When a local government submits a land use plan amendment proposing the potential authorization of uses identified as conditional in these guidelines, the Metropolitan Council will use the following factors in determining whether or not to approve the provisions relating to proposed conditional uses:

1. Specific nature of the proposed use, including extent of associated outdoor activities.
2. Relationship of proposed use to other planning considerations, including adjacent land use activities, consistency with overall comprehensive planning and relation to other metropolitan systems.
3. Frequency of exposure of proposed uses to aircraft overflight.
4. Location of proposed use relative to aircraft flight tracks and aircraft on-ground operating and maintenance areas.
5. Location, site design and construction restrictions to be imposed by the community on the proposed use with respect to reduction of exterior to interior noise transmissions, and shielding of outdoor activities.
6. Method community will use to inform future occupants of proposed use of potential noise from aircraft operations.
7. Extent to which community restricts the building from having facilities for outdoor activities associated with the use.
8. Distance of proposed use from existing or proposed runways, parallel taxiways, or engine run-up areas.

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Table D.5
LAND USE COMPATIBILITY GUIDELINES FOR MINOR AIRPORTS,
NEW DEVELOPMENT AND MAJOR REDEVELOPMENT

Land Use Type[1]	Noise Exposure Zone A	B	C	D[2]
Residential				
Single/multiplex with individual entrance	INCO[3]	INCO	INCO	COND[4]
Multiplex/apartment with shared entrance	INCO	PROV[5]	PROV	PROV
Mobile Home	INCO	INCO	INCO	COND
Educational and Medical				
Schools, churches, hospitals, nursing homes	INCO	INCO	INCO	PROV
Cultural, Entertainment, Recreational				
Indoor	COND	PROV	PROV	PROV
Outdoor	COND	COND	COND	CNST[6]
Office, Commercial, Retail	COND	PROV	PROV	CNST
Services				
Transportation-passenger facilities	COND	PROV	PROV	CNST
Transient Lodging	INCO	PROV	PROV	PROV
Other medical, health and educational services	COND	PROV	PROV	CNST
Other services	COND	PROV	PROV	CNST
Industrial, Communication, Utility	PROV	CNST	CNST	CNST
Undeveloped Land, Water Area, Resource Extraction	CNST	CNST	CNST	CNST

[1] Applicable for off-airport uses only.

[2] Aircraft noise exposure zone D applies only to land uses in areas located outside the Metropolitan Urban Service Area as defined by the *Metropolitan Development Guide.*

[3] INCO means inconsistent.

[4] COND means conditional.

[5] PROV means provisional.

[6] CNST means consistent.

Table D.6
LAND USE COMPATIBILITY GUIDELINES FOR MINOR AIRPORTS,
INFILL DEVELOPMENT AND RECONSTRUCTION OR ADDITIONS TO EXISTING STRUCTURES

Land Use Type[1]	Noise Exposure Zone A	B	C	D[2]
Residential				
Single/multiplex with individual entrance	COND[3]	COND	COND	COND
Multiplex/apartment with shared entrance	COND	PROV[4]	PROV	PROV
Mobile Home	COND	COND	COND	COND
Educational and Medical				
Schools, churches, hospitals, nursing homes	COND	COND	COND	PROV
Cultural, Entertainment, Recreational				
Indoor	COND	PROV	PROV	PROV
Outdoor	COND	COND	COND	CNST[5]
Office, Commercial, Retail	PROV	PROV	PROV	CNST
Services				
Transportation-passenger facilities	COND	PROV	PROV	CNST
Transient Lodging	COND	PROV	PROV	PROV
Other medical, health and educational services	COND	PROV	PROV	CNST
Other services	COND	PROV	PROV	CNST
Industrial, Communication, Utility	PROV	CNST	CNST	CNST
Undeveloped Land, Water Area, Resource Extraction	CNST	CNST	CNST	CNST

Note: For infill, reconstruction and additions, even though certain land uses are generally inconsistent in a given zone, extenuating circumstances could justify the project and the community should address this in its plan amendment, as appropriate.

[1] Applicable for off-airport uses only.

[2] Aircraft noise exposure Zone D applies only to land uses in areas located outside the Metropolitan Urban Service Area as defined in the *Metropolitan Development Guide.*

[3] COND means conditional.

[4] PROV means provisional.

[5] CNST means consistent.



Land Use Compatibility Guidelines for Infill Development and Reconstruction or Additions to Existing Structures

"Infill development" pertains to an undeveloped parcel or parcels of land proposed for development similar to or less noise-sensitive than the developed parcels surrounding the undeveloped parcel (for example, a new house on a vacant lot in a residential neighborhood, or a new industry on a vacant parcel in an established industrial area).

"Reconstruction or additions to existing structures" pertains to replacing a structure destroyed by fire, age, etc., to accommodate the same use that existed before destruction, or expanding a structure to accommodate increased demand for existing use (for example, rebuilding and modernizing an old hotel, or adding a room to a house). Decks, patios and swimming pools are considered allowable uses in all cases.

It is recognized that certain existing land uses, reconstruction projects and infill development are not consistent with the guidelines for new development and major redevelopment (Table D.6). Achievement of consistency between such uses and the noise exposure zones, as specified in Table D.4, may remain difficult or impossible in the short term. Where such consistency is impractical in the short term, interim measures will be necessary. Such interim measures may include application to the MPCA for a variance from state noise standards. The long-range achievement of compatibility should be addressed through a program of strategies that eventually will reduce or eliminate inconsistencies. This program may include acquisition, insulation, long-range planning and development, modification of airport operations and ground noise attenuation. Program costs, financing methods, prioritization and an implementation schedule should be identified as part of the process and included in the program of strategies.

3. IMPLEMENTATION OF THE GUIDELINES

Implementation Process and Timetable

Implementation of the guidelines, as illustrated in Figure D.9, involves the following specific steps (general timing shown in parentheses):

1. Metropolitan Council transmits land use guidelines and associated information to affected local governmental units and airport operators. (March 1983)

2. Each community applies appropriate land use guidelines to its comprehensive plan and determines if a plan amendment is required. (Dec. 1983)

3. Each community prepares its comprehensive plan amendment, including interim measures for inconsistent land uses, and submits them to all affected communities and the Metropolitan Council for review. (May 1984)

4. Metropolitan Council reviews and approves each local comprehensive plan amendment or requires plan modification. Council also reviews and comments on any proposed variance requests or other interim measures to address inconsistent land uses. (May 1984)

5. Each community adopts local comprehensive plan amendment and may submit any variance requests to Minnesota Pollution Control Agency with Metropolitan Council comments.

6. Each community and airport operator prepares a detailed implementation program to reduce, prevent, or mitigate aircraft noise impacts on land uses that are inconsistent with the guidelines. (Sept. 1984)

7. Each community and airport operator submits the implementation program to the Metropolitan Council for area review and coordination. (March 1985)

8. Metropolitan Council prepares a final report of a long-term program for implementing noise control strategies on a system-wide basis. (Sept. 1985)

9. Metropolitan Council monitors implementation programs and evaluates changing conditions. (1983-87)

Figure D.9
IMPLEMENTATION PROCESS FOR LAND USE COMPATIBILITY GUIDELINES

Metropolitan Council transmits land use guidelines and associated information to affected local governmental units and airport operators.
(March 1983)

Communities apply appropriate land use guidelines to their comprehensive plans and determine if plan amendments are needed.
(Dec. 1983)

Communities prepare comprehensive plan amendments including interim measures for inconsistent uses and submit to affected communities and Metropolitan Council for review.

Metropolitan Council reviews/approves comprehensive plan amendments or requires plan modification; also reviews and comments on any proposed interim measures to address inconsistent land uses.
(May 1984)

Communities adopt local comprehensive plan amendments and may submit variance requests to Minnesota Pollution Control Agency with Metropolitan Council comments.

MPCA reviews variance requests for infill development and reconstruction or additions to existing structures.

Communities and airport operators prepare detailed implementation programs to reduce, prevent or mitigate aircraft noise impacts on land uses that are inconsistent with the guidelines.
(Sept. 1984)

Communities' and airport operators' implementation plans are submitted to the Metropolitan Council for area review and coordination.
(March 1985)

Metropolitan Council prepares a final report of a long-term program for implementing noise control strategies on a system-wide basis.
(September 1985)

Metropolitan Council monitors implementation programs and evaluates changing conditions.
(1983-1987)



AVIA
A/9

Action by Agencies and Local Governmental Units

Implementation of the guidelines in particular, and the promotion of land use compatibility in general, incluces the following actions.

Metropolitan Council

- *Encourage federal and state cooperation to reduce source noise.* Cognizant that the most effective place to reduce noise is at the source, the Metropolitan Council, along with other concerned parties, requests a firm commitment from airport operators and all federal and state agencies to reduce noise at the source. The Council, Metropolitan Airports Commission, Minnesota Pollution Control Agency, Minnesota Department of Transportation and affected municipalities should determine the most effective approach to reducing noise at the source and jointly pursue its implementation.

- *Develop specific noise zone boundaries.* The specific extent of noise zone boundaries will be established in a process involving Metropolitan Council staff and local governments. The intent is to select specific land use, zoning, topographic and other boundary conditions that best reflect land use planning and regulatory considerations, and forecasts of noise exposure.

- *Monitor implementation of airport operational plans and community noise attenuation programs.* The Council should encourage cooperation among airport operators and the affected communities to develop jointly and implement airport operations and community noise attenuation programs.

- *Provide planning assistance and coordination.* The Council should provide technical assistance and general guidance to the affected local governments in the application of the land use guidelines and the noise exposure zones.

- *Review comprehensive plans and land use agreements.* The Council will review consistency of local plans with the *Metropolitan Development Guide.*

- *Monitor and evaluate changing conditions.* The Council, in cooperation with the airport operators, local planning officials, airport user groups and other governmental agencies, should monitor and evaluate changes in land use, zoning and airport operational procedures that might affect the viability of the land use compatibility program. The evaluation function would be continued on an annual basis by the Technical Advisory Committee's Aviation Subcommittee, which coordinates activities of the airport operators, local planning officials, airlines, other governmental agencies and the public.

Metropolitan Airports Commission (MAC) and Other Airport Operators

- *Implement airport operational procedures for noise abatement.* Airport operating procedures can reduce noise both on and off an airport, while the distribution of aircraft operations can reduce the number of people affected. The MAC and other airport operators should prepare operational plans for each system airport by Dec. 31, 1983.

- *Participate in the preparation and financing of a program of strategies that will address existing incompatibilities.* MAC is expected to participate in the preparation and financing of a program to address existing incompatible land uses. In affected areas, the airport operator is expected to participate in a program to eliminate the incompatibility. This program should be reflected in the operator's next capital improvement plan.

Affected Local Governments

- *Adopt land use compatibility guidelines.* Communities affected by airport operations should adopt land use compatibility guidelines, make appropriate amendments to their comprehensive land use plans, and submit the amendments to the Council for approval by the end of 1983.

- *Develop and implement appropriate local ordinances and codes.* The communities should encourage compatible land uses near the airport by implementing the appropriate building codes and zoning ordinances.

- *Implement land use planning strategies to reduce, prevent or mitigate aircraft noise impacts.* In preparing or revising land use plans, each community should consider the following strategies,

where appropriate, to reduce or prevent incompatible uses and to mitigate the impact of excess noise exposure:

a) Insulate structures located in noise-sensitive areas.
b) Adopt building noise attenuation standards for new construction, additions or substantial rehabilitation.
c) Disclose degree of noise exposure to prospective home buyers.
d) Develop policies on the location, relocation and closing of public structures in aircraft noise impact areas.
e) Develop policies on the extension of utilities into aircraft noise impact areas.
f) Zone or rezone property.
g) Redevelop appropriate areas.

Minnesota Pollution Control Agency (MPCA)

– *Establish review process agreement with Metropolitan Council to review variance requests.* To assist local governments with reviews of local development that may require variance from the MPCA standards, the MPCA and Metropolitan Council will establish a specific process by which proposed variances will be considered.

– *MPCA Board reviews variance requests from the standards.* Requests for specific variances from the MPCA standard will be addressed by the board.

DEFINITIONS

dBA. A dB is a unit of sound measurement (decibel) measured on the "A" scale.

L-10. Noise measurement used by the Minnesota Pollution Control Agency. The L represents a noise level and the 10 represents 10 percent of the time. In Minnesota, the noise level cannot exceed 65 dB(A) more than 10 percent of the time during any one hour.

Ldn. Level-Day-Night. Method of measuring and plotting the amount of noise in a community with a severe penalty for nighttime noise. The Ldn is normally averaged over a one-year period.

LEQ. Equivalent sound level in the energy summation of the aggregate noise environment as measured in A-Weighted Sound Level.



APPENDIX D.1
TYPICAL LAND USE BY STANDARD LAND USE CODING MANUAL CODES

Type of Land Use	Code Numbers and Specific Uses	
Residential		
Single/Multi-Plex with Individual Entrance	11	Household units
	11.11	Single units - detached
	11.12	Single units - semidetached
	11.13	Single units - attached row
	11.21	Two units - side-by-side
	11.22	Two units - one above the other
Multi-Plex/Apartment with Shared Entrance	11.31	Apartments - walk up
	11.32	Apartments - elevator
	12	Group Quarters
	13	Residential hotels
Mobile Home	14	Mobile home parks or courts
Educational and Medical		
Schools, Churches, Nursing Homes	65.1	Hospitals, nursing homes
	68	Educational services
	69.1	Religious activities
	71	Cultural activities (including churches)
Cultural, Entertainment, Recreational		
Indoor	72	Public assembly
	72.1	Auditoriums, concert halls
Outdoor	74	Recreational activities (including golf courses, riding stables, water recreation)
	75	Resorts and group camps
	76	Parks
Office, Commercial, Retail Services	52	Retail trade - building materials, hardware and farm equipment
	53	Retail trade - general merchandise
	54	Retail trade - food
	55	Retail trade - automotive, marine craft, aircraft and accessories
	56	Retail trade - apparel and accessories
	57	Retail trade - furniture, home furnishings and equipment
	58	Retail trade - eating and drinking establishments
	59	Other retail trade
Transportation - passenger facilities	40	Transportation, communication and utilities
Transient Lodging	15	Transient lodging

APPENDIX 2C

MINNESOTA DOT LAND USE SAFETY ZONES

port zoning powers under Minn. Stat. §§ 360.061 to .074 may adopt airport zoning ordinances, orders, or regulations more restrictive than the minimum zoning standards set forth herein or in any other applicable law.

C. Airspace zones. The following airspace zones are established with relation to an airport and each runway:

1. Primary zone. All that land which lies directly under an imaginary primary surface as defined in 14 MCAR § 1.3015 E. 1.

2. Horizontal zone. All that land which lies directly under an imaginary horizontal surface as defined in 14 MCAR § 1.3015 E. 2.

3. Conical zone. All that land which lies directly under an imaginary conical surface as defined in 14 MCAR § 1.3015 E. 3.

4. Approach zone. All that land which lies directly under an imaginary approach surface as defined in 14 MCAR § 1.3015 E. 4.

5. Precision instrument approach zone. All that land which lies directly under an imaginary precision instrument approach surface as defined in 14 MCAR § 1.3015 E. 5.

6. Transitional zone. All that land which lies directly under an imaginary transitional surface as defined in 14 MCAR § 1.3015 E. 6.

D. Height restrictions. Except as necessary and incidental to airport operation, no structure or tree shall be constructed, altered, or allowed to grow in any airport zone so as to project above any of the imaginary airspace surfaces as established in paragraph C.

E. Land use safety zones. The following land-use safety zones are established with relation to an airport and each runway:

1. Safety Zone A. In the approach zones of a runway, Safety Zone A extends outward from the end of the primary surface a distance equal to two-thirds the runway length or planned runway length.

2. Safety Zone B. In the approach zones of a runway, Safety Zone B extends outward from Safety Zone A a distance equal to one-third the runway length or the planned runway length.

3. Safety Zone C. All that land which is enclosed within the perimeter of the horizontal zone defined in paragraph C. 2. and which is not included in Zone A or Zone B.

F. Use restrictions. In order to restrict those uses which may be hazardous to the operational safety of aircraft operating to and from an airport, and furthermore to limit population and building density in the runway approach areas, thereby creating sufficient open space so as to protect life and property

in case of accident, the following use restrictions are applied to the land use safety zones:

1. General. No use shall be made of any land in any of the safety zones which creates or causes interference with the operation of radio or electronic facilities on the airport or with radio or electronic communications between the airport and aircraft, makes it difficult for pilots to distinguish between airport lights and other lights, results in glare in the eyes of pilots using the airport, impair visibility in the vicinity of the airport, or otherwise endangers the landing, taking off, or maneuvering of aircraft.

2. Zone A. Zone A shall contain no buildings, temporary structures, exposed transmission lines, or other similar land use structural hazards, and shall be restricted to those uses which will not create, attract, or bring together an assembly of persons thereon. Permitted uses may include, but are not limited to, such uses as agriculture (seasonal crops), horticulture, raising of livestock, animal husbandry, wildlife habitat, light outdoor recreation (nonspectator), cemeteries and auto parking.

3. Zone B. Zone B shall be restricted in use as follows:

a. Each use shall be on a site whose area shall not be less than three acres.

b. Each use shall not create, attract, or bring together a site population that would exceed 15 times that of the site acreage.

c. Each site shall have no more than one building plot upon which any number of structures may be erected.

d. A building plot shall be single, uniform and noncontrived area, whose shape is uncomplicated and whose area shall not exceed the following minimum ratios with respect to the total site area:

Site Area at Least (Acres)	But Less Than (Acres)	Ratio of Site Area to Bldg. Plot Area	Building Plot Area (sq. ft.)	Max. Site Population (15 persons/A)
3		12:1	10,900	45
	4	12:1		
4		10:1	17,400	60
	6	10:1		
6		8:1	32,600	90
	10	8:1		
10		6:1	72,500	150
	20	6:1		
20	and up	4:1	218,000	300

e. The following uses are specifically prohibited in Zone B: churches, hospitals, schools, theaters, stadiums, hotels and motels, trailer courts, camp grounds, and other places of public or semipublic assembly.

4. Zone C. Zone C is subject only to the general restrictions contained in paragraph F. 1.

5. Existing residential neighborhoods. The provisions of paragraphs F. 2. and F. 3. above shall not apply to land uses, in "established residential neighborhoods in built-up urban areas." Such "established residential neighborhoods in built-up areas" shall be subject to the use restrictions contained in this paragraph F. 5.

a. Statement of purpose: Airport Safety Zoning balances the public interest involved in safety for persons on the ground, safety of persons traveling in aircraft and the public interest in maintaining existing land uses. The legislature has mandated special protection for existing land uses in "established residential neighborhoods in built-up urban areas." The provisions of paragraphs F. 1.-4. above strike the appropriate balance with regard to other land uses and areas and shall therefore be applied in those cases.

b. "Established residential neighborhoods in built-up urban areas." Each governmental authority having airport zoning powers shall determine which areas located in Safety Zones A and B of each airport within its jurisdiction are also located in "established residential neighborhoods in built-up urban areas." In making such determination, the factors enumerated in subparagraph d. below shall be considered. Such neighborhoods located in whole or part in Safety Zones A or B shall be specifically located on the airport zoning map and shall be legally-described in the airport zoning ordinance. Each governmental authority having airport zoning powers shall submit its proposed zoning map and ordinance to the Commissioner of Transportation for review and approval prior to holding a public hearing or taking other action thereon.

c. No land use in Safety Zones A or B and in an area designated as having been an "established residential neighborhood in a built-up urban area" shall be prohibited by an airport zoning ordinance except as provided in subparagraph e. below. In addition, any isolated low-density residential building lot or low-density residential structure which existed on January 1, 1978, in an "established residential neighborhood in a built-up urban area," must either be allowed to continue as a conforming use under the terms of the local zoning ordinance or must be acquired, altered or removed as provided in subparagraph e. (2) below. For this purpose, a low-density residential structure shall mean a single-family or two-family home and an isolated low-density residential building lot shall mean a single lot located in an area which is zoned for single-family or two-family residences and in which the predominant land use is such type of residences.

d. In determining what constitutes an "established residential neighborhood in a built-up urban area" the governmental unit having zoning powers shall apply and consider the following criteria in relation to the neighborhood as it existed on the effective date of these rules:

(1) location of the airport;

(2) nature of the terrain within Safety Zones A and B;

(3) existing land uses and character of the neighborhood around the airport;

(4) population of the community;

(5) that the average population density in all areas within one mile of any point on a runway be equal to or greater than one dwelling unit per acre;

(6) population density near the airport compared with population density in other areas of the community;

(7) the age and the economic, political and social stability of the neighborhood and the community as a whole;

(8) the proximity of supporting school, commercial, religious, transportation and other facilities and their degree of integration with residential land uses;

(9) presence or absence of public utilities including, but not limited to public central sanitary sewer system electric service and gas mains;

(10) whether or not the factors listed in subparagraphs (8) and (9) above tend to make the community surrounding the airport a self-sufficient unit;

(11) whether the areas within one mile of the perimeter of the airport property would be considered primarily residential in character; and

(12) Other material factors deemed relevant by the governmental unit in distinguishing the area in question as established, residential, urban and built-up.

e. Safety hazards.

(1) The following land uses if they exist in Safety Zones A or B and in an "established residential neighborhood in a built-up urban area" are considered by the Commissioner to constitute airport safety hazards so severe, either to persons on the ground or to the air-traveling public, or both, that they must be prohibited under local airport zoning ordinances:

(a) any structure which a person or persons customarily use as a principal residence and which is located entirely within Safety Zone A and within 1000 feet of the end of the primary zone:

(b) any structure which a person or persons customarily use as a principal residence and which is located entirely within Safety Zone A or B and which penetrates an imaginary approach surface as defined by 14 MCAR § 1.3015 E. 4.;

(c) any land use in Safety Zone A or B which violates any of the following standards;

(i) the land use must not create or cause interference with the operation of radio or electronic facilities on the airport or with radio or electronic communications between the airport and aircraft;

(ii) the land use must not make it difficult for pilots to distinguish between airport lights and other lights;

(iii) the land use must not result in glare in the eyes of pilots using the airport or impair visibility in the vicinity of the airport.

(d) any isolated residential building lot zoned for single-family or two-family residences on which any structure, if built, would be prohibited by subparagraphs e. (1) (a), (b) or (c) above. An "isolated" residential building lot is one located in an area in which the predominant land use is single-family or two-family residential structures; and

(e) any other land use which presents, in the opinion of the Commissioner, a material danger to the landing, taking off or maneuvering of aircraft or to the safety of persons on the ground. In making such a determination, the Commissioner shall consider the following factors:

(i) possibility that the land use may contribute to or cause a collision of two or more aircraft or an aircraft and some other object;

(ii) possibility that the land use may, in case of an aircraft accident, cause an explosion, fire or the release of harmful or noxious fumes, gases or substances;

(iii) tendency of the land use to increase the number of persons that would be injured in case of an aircraft accident;

(iv) effect of the land use on availability of clear areas for emergency landings; and

(v) flight patterns around the airport, the extent of use of the runway in question, the type of aircraft using the airport, whether the runways are lighted, whether the airport is controlled, and other similar factors.

(2) In the case of any land use prohibited by paragraph e. (1) above and which is located in an "established residential neighborhood in a built-up urban area" as defined by the local government unit and reviewed and approved by the Commissioner, the prohibited land use must be acquired, altered or removed at public expense by the governmental body which owns the airport. This may be accomplished by an exchange of land, purchase of development rights, acquisition of easements or other method to be negotiated with the landowner or by outright purchase or exercise of eminent domain, if necessary.

(3) The prohibited uses enumerated in paragraph e. (1) above are only those which present the most severe safety hazards to the air-traveling public or persons on the ground, as the case may be. Local governmental units may also prohibit other land uses in Safety Zones A and B as being unsafe to the public. The use restrictions contained in 14 MCAR § 1.3016 F. 1.-4. provide guidance as to what uses the Commissioner deems not to be public interest in these Safety Zones. See also subparagraphs e. (1) (c) and e. (1) (e) above. The local governmental unit must note the requirement of Minn. Stat. § 360.066, subd. 1a (a) and (d) (1978) that certain prohibited land uses must be acquired, altered or removed at public expense.

f. In the event that the provisions of this section F. 5., as reflected in a proposed local zoning ordinance, would require the acquisition, alteration or removal of any land use, then, in such event, at least sixty (60) days prior to the first hearing on adoption of the ordinance, the local zoning authority shall so notify the airport owner. The airport owner shall then consider the alternatives of closing a runway, runway realignment or relocation, runway extension or shortening and displaced thresholds and shall then promptly notify the local zoning authority in writing, if it proposes to take any of such alternative actions.

g. These rules shall be effective five working days after publication in the State Register, except as provided above as to isolated, low-density residential building lots and low-density residential structures.

G. Land-use noise sensitivity zones shall be established when requested by the Commissioner or by the governmental unit having airport zoning powers. The governmental unit having zoning powers, when required by the Commissioner, shall secure a study as to the boundaries of the area to be zoned for this purpose and the uses permitted therein.

Chapter Three: 14 MCAR §§ 1.3017-1.3018: Seaplane Operations.

14 MCAR § 1.3017 Seaplane operations.

A. Compliance with marine traffic rules and regulations. All seaplanes must comply with marine traffic rules and regulations to the extent that such rules and regulations do not interfere with the safe operations of aircraft.

B. Approaches and take-offs. All approaches to and take-offs from the water area shall be made in such a manner as to clear all structures on the land by at least 100 feet, and wherever the area of the body of water will permit, such landing and take-offs shall be made at a distance of not less than 300 feet, both laterally and vertically, from any boat or person on the surface of the water, or as near to 300 feet as the area of the water will permit.

14 MCAR § 1.3018 Seaplane operations within the seven-county metropolitan area.

APPENDIX 2D

IMAGINARY SURFACES

IMAGINARY SURFACES

The primary surface is an area symmetrically located on both sides of the runway and has the same elevation as the nearest point on the runway centerline. It extends 200' beyond each runway end. For utility runways with only a visual approach (Runway 17-35) it is 250' wide; with a non-precision approach, (Runway 8-26) it is 500 feet wide; with a precision approach, it is 1000 feet wide.

The transitional surfaces for runways are inclined planes parallel to the respective runway centerlines, beginning at the edges of the primary surface. They extend upward and away from the edges of the primary surface at a 7:1 slope (for every seven foot extension, there is a proportionate one foot vertical rise). These transitional surfaces provide a gradual change between the primary, horizontal and approach surfaces.

The imaginary horizontal surface is a rounded or oval shaped horizontal plane 150 feet above the airport elevation (airport elevation 909' MSL, horizontal surface 1059' MSL). In those areas that also contain the primary approach or transitional surfaces, the imaginary surface with the lower elevation is the controlling one. The horizontal surface has a perimeter comprised of arcs from the end of the primary surface of each runway end and lines tangential to those arcs. The length of the arcs are 5,000 feet for designated utility or visual runways.

The conical surface slopes upward and outward from the edge of the horizontal surface, extending out 4,000 at a 20:1 slope.

Other than that shown on Figure II-1, MnDOT imaginary surface criteria as applicable to Janes Field are similar to FAA criteria except that the horizontal surface is bounded by areas with a 6,000 foot radius rather than with the 5,000 foot radius of FAA criteria.

31. LINE-OF-SIGHT. Line-of-sight standards impose an additional restraint on surface gradients. It is desirable to provide an unobstructed line-of-sight along the entire length of an individual runway or taxiway, as well as along the entire length of an intersecting runway. The following paragraphs provide line-of-sight standards:

a. Along Individual Runways.

(1) Airports Not Having a 24-hour Control Tower. Runway grade changes shall be such that any two points 5 feet (1.5 m) above the runway centerline will be mutually visible for the entire runway length. However, if the runway has a parallel taxiway for its full length, runway grade changes may be such that an unobstructed line-of-sight will exist from any point 5 feet (1.5 m) above the runway centerline to all other points 5 feet (1.5 m) above the runway centerline within a distance of half the length of the runway.

(2) Airports Having a 24-hour Control Tower. Although it is desirable to provide the above line-of-sight for the entire runway length, adherence to longitudinal gradient standards will provide an adequate line-of-sight. However, before applying these criteria, a careful analysis must be made of forecasted airport traffic to ascertain whether the tower will remain in 24-hour operation. Visibility requirements from the airport traffic control tower to the airport surface areas used in aircraft ground movement must also be considered.

b. Between Intersecting Runways.

(1) Airports Not Having a 24-hour Control Tower. Runway grades, terrain, structures, and permanent objects must be such that there will be unobstructed line-of-sight from any point 5 feet (1.5 m) above one runway centerline to any point 5 feet (1.5 m) above an intersecting runway centerline, both points being within the area of the runway visibility zone. The runway visibility zone is an area formed by imaginary lines connecting the two runways' visibility points as shown in figure 7-4. The location of each runway's visibility points is determined in the following manner:

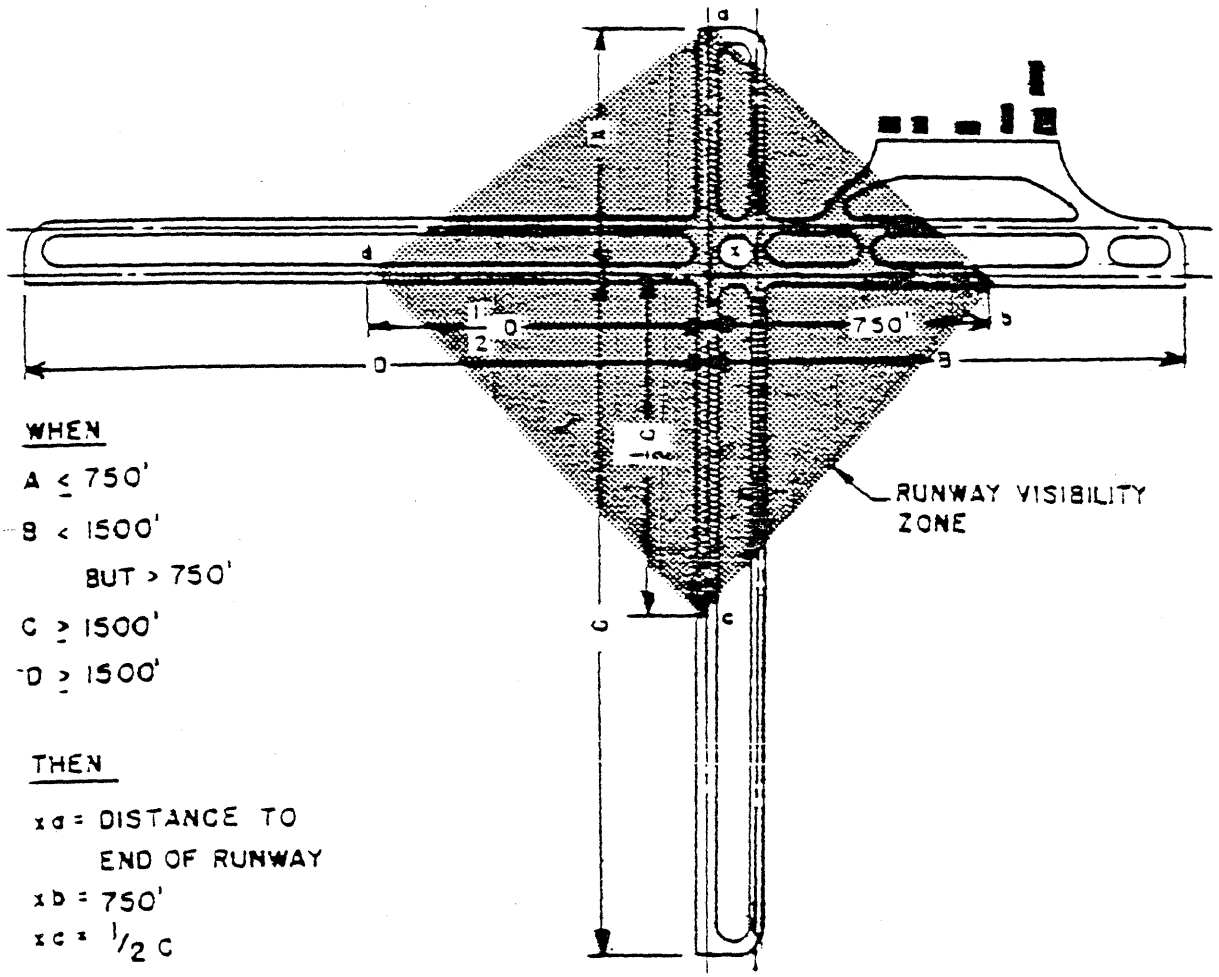
(a) when the distance from the intersection of two runway centerlines to a runway end is 750 feet (250 m) or less, the visibility point is located on the centerline at the runway end;

(b) when the distance from the intersection of two runway centerlines to a runway end is greater than 750 feet (250 m) but less than 1,500 feet (500 m), the visibility point is located on the centerline, 750 feet (250 m) from the intersection of the runway centerlines; or

(c) when the distance from the intersection of two runway centerlines to a runway end is equal to or greater than 1,500 feet (500 m), the visibility point is located on the centerline and equidistant from the runway end and the intersection of the centerlines.

(2) Airports Having a 24-hour Control Tower. Although it is desirable to provide an unobstructed line-of-sight along the entire length of an intersecting runway, there are no mandatory line-of-sight requirements between intersecting runways at these airports. However, analysis should be made of forecasted airport traffic to ascertain whether the tower will remain in 24-hour operation.

c. Taxiways. There are no specific line-of-sight requirements for taxiways. However, the sight distance along a runway from an intersecting taxiway must be sufficient to allow a taxiing aircraft to enter safely or cross the runway.



WHEN

A ≤ 750'

B < 1500'

BUT > 750'

C ≥ 1500'

D ≥ 1500'

THEN

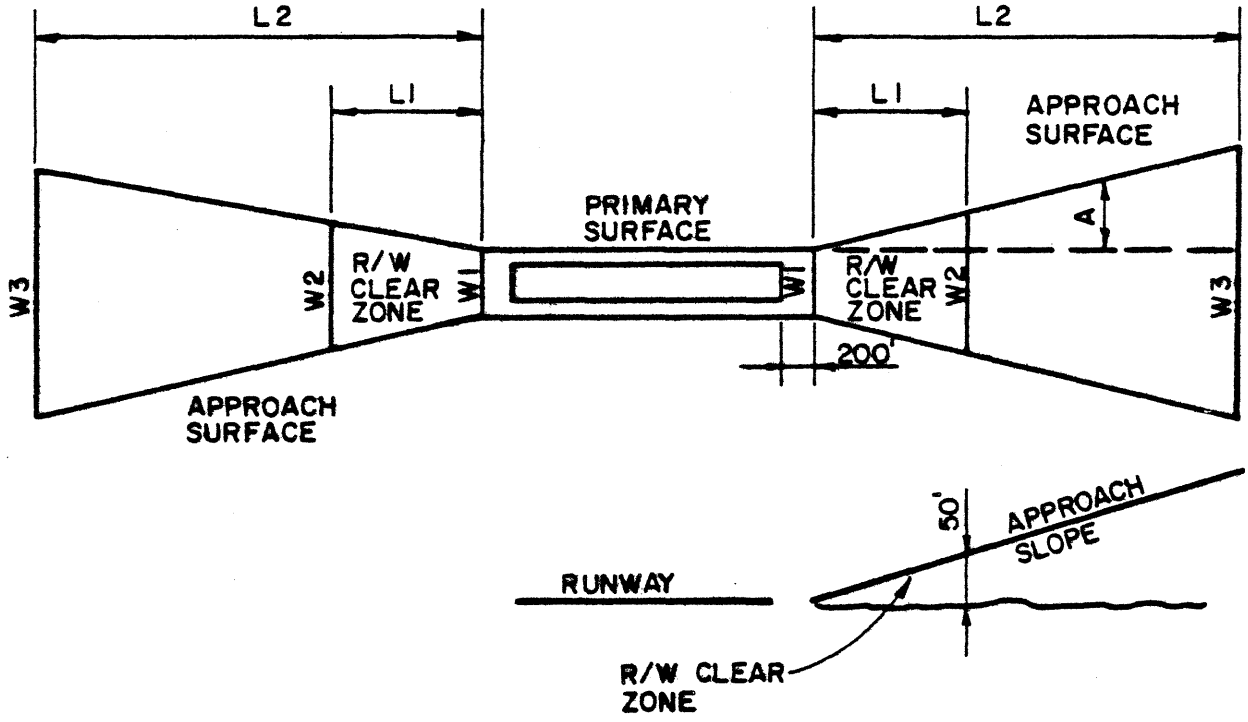
x a = DISTANCE TO END OF RUNWAY

x b = 750'

x c = 1/2 C

x d = 1/2 D

FIGURE 7-4. RUNWAY VISIBILITY ZONE



FAA DIMENSIONS

RUNWAY END		DIMENSIONS (FT)							
R/W	APPROACH	L1	L2	W1	W2	W3	SLOPE	R/W CZA	A
17	V	1,000	5,000	500	700	1,500	20:1	13.77	0.1:1
35	V	1,000	5,000	500	700	1,500	20:1	13.77	0.1:1
8	NP	1,000	5,000	500	800	2,000	20:1	14.922	0.15:1
26	NP	1,000	5,000	500	800	2,000	20:1	14.922	0.15:1

MNDOT DIMENSIONS

RUNWAY END		DIMENSIONS (FT)							
R/W	APPROACH	L1 "A"	L2	W1	W2 "A"	W3	SLOPE	R/W CZA	A
17	V	2,000	10,000	500	900	2,500	20:1	32.140 "A"	0.1:1
35	V	2,000	10,000	500	900	2,500	20:1	32.140 "A"	0.1:1
8	NP	2,000	10,000	500	1,100	3,500	20:1	36.731 "A"	0.15:1 "A"
26	NP	2,000	10,000	500	1,100	3,500	20:1	36.731 "A"	0.15:1 "A"

ABREVIATIONS USED IN THE ABOVE CHART

V = VISUAL APPROACH
NP= NON-PRECISION INSTRUMENT APPROACH
R/W CZA = RUNWAY CLEAR ZONE AREA (ACRES)

NOTES:

1. "A" CALCULATED BY HOYLE, TANNER & ASSOCIATES, INC.
2. SOURCE - FEDERAL AVIATION REGULATION PART 77
   14 MCAR S1.3015

ANOKA COUNTY-BLAINE AIRPORT
(JANES FIELD) EIS/EA
APPROACH SURFACES DIMENSIONS

HTA companies

FIGURE
2D.1

APPENDIX 2E

RUNWAY USE CHARACTERISTICS

TABLE 2E-1
ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD)
RUNWAY USE CHARACTERISTICS

1985 - EXISTING - ALTERNATIVE 1

Runway 8-26	Runway 8	Runway 26	Total
SE-P	20,000	22,400	42,400
ME-P	2,000	2,300	4,300
Turboprop	20	20	40
Jet	0	0	0
Subtotal	22,000	24,700	46,700

Runway 17-35	Runway 17	Runway 35	Total
SEP	22,500	26,100	48,600
ME-P	2,300	2,600	4,900
Turboprop	200	300	500
Jet	200	300	500
Subtotal	25,200	29,300	54,500
Helicopter			800
TOTAL			

1990 - FUTURE BUILD - ALTERNATIVE 3 - DEVELOPMENT OF BUILDING AREAS ONLY

Runway 8-26	Runway 8	Runway 26	Total
SE-P	30,300	34,000	64,300
ME-P	3,400	3,800	7,200
Turboprop	70	80	150
Jet	0	0	0
Subtotal	33,800	37,900	71,700

Runway 17-35	Runway 17	Runway 35	Total
SE-P	34,100	39,700	73,800
ME-P	3,800	4,400	8,200
Turboprop	900	1,100	2,000
Jet	600	800	1,400
Subtotal	39,400	46,000	85,400
Helicopter			1,900
TOTAL			

TABLE 2-E.1 (continued)
ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD)
RUNWAY USE CHARACTERISTICS

1990 - FUTURE NO-BUILD - ALTERNATIVE 2

Runway 8-26	Runway 8	Runway 26	Total
SE-P	30,300	34,000	64,300
ME-P	3,400	3,800	7,200
Turboprop	70	80	200
Jet	0	0	0
Subtotal	33,800	37,900	71,700

Runway 17-35	Runway 17	Runway 35	Total
SE-P	34,100	39,700	73,800
ME-P	3,800	4,400	8,200
Turboprop	900	1,100	2,000
Jet	600	800	1,400
Subtotal	39,400	46,000	85,400
Helicopter			1,900
Total			

1990 - FUTURE BUILD - BUILDING AREA AND AIRFIELD DEVELOPMENT - ALTERNATIVES 4, 5, 6 & 7

Runway 8-26	Runway 8	Runway 26	Total
SE-P	30,300	34,000	64,300
ME-P	3,400	3,800	7,200
Turboprop	400	500	900
Jet	0	0	0
Subtotal	34,100	38,300	72,400

Runway 17-35	Runway 17	Runway 35	Total
SE-P	34,100	39,700	73,800
ME-P	3,800	4,400	8,200
Turboprop	600	700	1,300
Jet	600	800	1,400
Subtotal	39,100	45,600	84,700
Helicopter			1,900
TOTAL			86,600

TABLE 2-E.1 (continued)
ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD)
RUNWAY USE CHARACTERISTICS

FUTURE NO-BUILD
2000

Runway 8-26	Runway 8	Runway 26	Total
SE-P	36,300	40,700	77,000
ME-P	4,200	4,700	8,900
Turboprop	100	100	200
Jet	0	0	0
Subtotal	40,600	45,500	86,100
Runway 17-35	**Runway 17**	**Runway 35**	**Total**
SE-P	40,800	47,400	88,200
ME-P	4,700	5,500	10,200
Turboprop	1,700	2,000	3,700
Jet	900	1,000	1,900
Subtotal	48,100	55,900	104,000
Helicopter			2,900
Total			

Note: Numbers may not add due to rounding.

Source: Hoyle, Tanner & Associates, Inc.

TABLE 2-E.1 (continued)

2000 - BUILDING AREA AND AIRFIELD DEVELOPMENT PHASE 2 AND PHASE 3

	Runway 8R-26L (4,000' Long)			Runway 8L-26R (3,200' Long)			
	Runway 8R	Runway 26L	Total	Runway 8	Runway 26R	Total	Total
SE-P	20,900	23,400	44,300	20,800	23,400	44,200	88,500
ME-P	2,400	2,700	5,100	2,400	2,700	5,100	10,200
Turboprop	800	900	1,700	0	0	0	1,700
Jet	0	0	0	0	0	0	0
Subtotal	24,100	27,000	51,100	23,200	26,100	49,300	100,400
	Runway 17R-35L (4,855' Long)			Runway 17L-35R (3,200' Long)			
	Runway 17R	Runway 35L	Total	Runway 17L	Runway 35R	Total	Total
SE-P	16,400	19,100	35,500	30,400	35,600	66,000	101,500
ME-P	1,900	2,200	4,100	3,500	4,100	7,600	11,700
Turboprop	1,200	1,400	2,600	0	0	0	2,600
Jet	1,000	1,200	2,200	0	0	0	2,200
Subtotal	20,500	23,900	44,400	33,900	39,700	73,600	118,100
Helicopter							3,300
Total							221,800

Source: Hoyle, Tanner & Associates, Inc.

APPENDIX 2F

NOISE MONITORING LOGS & INM INPUT DATA

INM INPUT DATA

1985 Conditions

```
00160BEGIN
00170SETUP:
00180TITLE <ANE LDN CONTOUR-1985 BASE CASE >
00190AIRPORT <ANOKA COUNTY-BLAINE AIRPORT,JAMES FIELD>
00200ALTITUDE 909 TEMPERATURE 60 F
00210 RUNWAYS
00220   RW 17-35     0     0  TO 0  4855  HEADING=175
00240   RW 08-26   -2600    0  TO 600   0  HEARING=84
00250AIRCRAFT:
00260  TYPES
00300  AC CONSEP
00320  AC CONTEP
00340  AC DHC6
00360  AC GALQTF
00380  AC GALTF
00400  AC GAMTF
00420FT:
00440 PROFILES APPROACH
00460  PF GA6B SEGMENTS=4
00480          DISTANCES 50000  10000  7111  -500
00500          ALTITUDES   800   800   800    0
00520             SPEEDS FINSP   FINSP FINSP FINSP
00540           THRUSTS 3DLND  3DLND 3DLND
00560TAKEOFFS BY FREQUENCY:
00570FT,
00590  TRACK TR1 RWY 35 STRAIGHT 50000
00610    OPER CONSEP STAGE 1 D=3.39 N=0.18
00630    OPER CONTEP STAGE 1 D=0.34 N=0.02
00640
00650    OPER DHC6   STAGE 1 D=0.38 N=0.02
00670    OPER GALQTF STAGE 1 D=0.16 N=0.01
00690    OPER GALTF  STAGE 1 D=0.12 N=0.01
00710    OPER GAMTF  STAGE 1 D=0.12 N=0.01
00740  TRACK TR2 RWY 35 STRAIGHT 7000 RIGHT 90 R 1500 STRAIGHT 50000
00760    OPER CONSEP STAGE 1 D=3.40 N=0.18
00780    OPER CONTEP STAGE 1 D=0.33 N=0.02
00810  TRACK TR3 RWY 17 STRAIGHT 6000 RIGHT 90 R 1500 STRAIGHT 50000
00830    OPER CONSEP STAGE 1 D=2.93 N=0.15
00850    OPER CONTEP STAGE 1 D=0.30 N=0.02
00880  TRACK TR4 RWY 17 STRAIGHT 50000
00900    OPER CONSEP STAGE 1 D=7.92 N=0.16
00920    OPER CONTEP STAGE 1 D=0.30 N=0.010
00930
00940    OPER DHC6   STAGE 1 D=0.24 N=0.010
00960    OPER GALQTF STAGE 1 D=0.10 N=0.010
00980    OPER GALTF  STAGE 1 D=0.08
01000    OPER GAMTF  STAGE 1 D=0.08
01030  TRACK TR5 RWY 26 STRAIGHT 50000
01050    OPER CONSEP STAGE 1 D=2.91 N=0.16
01070    OPER CONTEP STAGE 1 D=0.3  N=0.01
01080
01090    OPER DHC6   STAGE 1 D=0.05
01120  TRACK TR6 RWY 26 STRAIGHT 5500 RIGHT 90 R 1500 STRAIGHT 50000
01140    OPER CONSEP STAGE 1 D=2.92 N=0.15
01160    OPER CONTEP STAGE 1 D=0.30 N=0.02
01190  TRACK TR7 RWY 08 STRAIGHT 50000
01210    OPER CONSEP STAGE 1 D=2.61 N=0.13
01230    OPER CONTEP STAGE 1 D=0.26 N=0.02
01240
01250    OPER DHC6   STAGE 1 D=0.05
01280 TRACK TR8 RWY 08 STRAIGHT 5500 RIGHT 90 R 1500 STRAIGHT 50000
01300    OPER CONSEP STAGE 1 D=2.60 N=0.14
01320    OPER CONTEP STAGE 1 D=0.26 N=0.01
01340LANDINGS BY FREQUENCY:
01390 TRACK TR9 RWY 17 STRAIGHT 50000
01410    OPER CONSEP PROF=GA6D  D=5.85 N=0.31
01430    OPER CONTEP PROF=GA6D  D=0.60 N=0.03
01440
01450    OPER DHC6   PROF=GA6D  D=0.24 N=0.01
01470    OPER GALQTF PROF=STD3D D=0.10 N=0.01
01490    OPER GALTF  PROF=STD3D D=0.08
01510    OPER GAMTF  PROF=STD3D D=0.08
01540 TRACK TR10 RWY 35 STRAIGHT 50000
01560    OPER CONSEP PROF=GA6D  D=6.79 N=0.36
01580    OPER CONTEP PROF=GA6D  D=0.67 N=0.04
01590
```

10/14/85

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01360LANDINGS BY FREQUENCY:
01390 TRACK TR9 RWY 17 STRAIGHT 50000
01410    OPER COMSEP PROF=GA6D  D=5.85 N=0.31
01430    OPER COMTEP PROF=GA6D  D=0.60 N=0.03
01440
01450    OPER BNC6   PROF=GA6D  D=0.24 N=0.01
01470    OPER GALQTF PROF=STD3D D=0.10 N=0.01
01490    OPER GALTF  PROF=STD3D D=0.08
01510    OPER GAMTF  PROF=STD3D D=0.08
01540 TRACK TR10 RWY 35 STRAIGHT 50000
01560    OPER COMSEP PROF=GA6D  D=6.79 N=0.36
01580    OPER COMTEP PROF=GA6D  D=0.67 N=0.04
01590
01600    OPER BNC6   PROF=GA6D  D=0.30 N=0.02
01620    OPER GALQTF PROF=STD3D D=0.16 N=0.01
01640    OPER GALTF  PROF=STD3D D=0.11 N=0.01
01660    OPER GAMTF  PROF=STD3D D=0.11 N=0.01
01690 TRACK TR11 RWY 08 STRAIGHT 50000
01710    OPER COMSEP PROF=GA6D  D=5.21 N=0.27
01730    OPER COMTEP PROF=GA6D  D=0.52 N=0.03
01740
01750    OPER BNC6   PROF=GA6D  D=0.05
01780 TRACK TR12 RWY 26 STRAIGHT 50000
01800    OPER COMSEP PROF=GA6D  D=5.83 N=0.31
01820    OPER COMTEP PROF=GA6D  D=0.60 N=0.03
01830
01840    OPER BNC6   PROF=GA6D  D=0.05
01880TOUCHDOWNS BY FREQUENCY:
01910 TRACK TR13 RWY 35 STRAIGHT 6500 LEFT 90 D 1500 STRAIGHT 2000
01920  LEFT 90 D 1500 STRAIGHT 6900 LEFT 90 D 1500 STRAIGHT 2000
01930  LEFT 90 D 1500 STRAIGHT 2400
01950    OPER COMSEP STAGE 1 PROF=GA6D  D=13.59 N=0.71
01970    OPER COMTEP STAGE 1 PROF=GA6D  D=1.35 N=0.07
01980
02000 TRACK TR14 RWY 35 STRAIGHT 6500 LEFT 90 D 1500 STRAIGHT 1300
02010  LEFT 90 D 1500 STRAIGHT 7400 LEFT 90 D 1500 STRAIGHT 1300
02020  LEFT 90 D 1500 STRAIGHT 900
02040    OPER COMSEP STAGE 1 PROF=GA6D  D=13.58 N=0.72
02060    OPER COMTEP STAGE 1 PROF=GA6D  D=1.35 N=0.07
02070
02080
02090 TRACK TR15 RWY 17 STRAIGHT 5300 LEFT 90 D 1500 STRAIGHT 1500
02100  LEFT 90 D 1500 STRAIGHT 6700 LEFT 90 D 1500 STRAIGHT 1500
02110  LEFT 90 D 1500 STRAIGHT 1400
02130    OPER COMSEP STAGE 1 PROF=GA6D D=10.39 N=0.55
02150    OPER COMTEP STAGE 1 PROF=GA6D  D=1.06 N=0.06
02160
02170
02180 TRACK TR16 RWY 17 STRAIGHT 6800 LEFT 90 D 1500 STRAIGHT 1500
02190  LEFT 90 D 1500 STRAIGHT 8200 LEFT 90 D 1500 STRAIGHT 1500
02200  LEFT 90 D 1500 STRAIGHT 1400
02220    OPER COMSEP STAGE 1 PROF=GA6D D=13.02 N=0.68
02240    OPER COMTEP STAGE 1 PROF=GA6D D=1.33 N=0.07
02250
02270 TRACK TR17 RWY 08 STRAIGHT 5800 LEFT 90 D 1500 STRAIGHT 400
02280  LEFT 90 D 1500 STRAIGHT 7700 LEFT 90 D 1500 STRAIGHT 400
02290  LEFT 90 D 1500 STRAIGHT 1900
02310    OPER COMSEP STAGE 1 PROF=GA6D D=13.89 N=0.73
02330    OPER COMTEP STAGE 1 PROF=GA6D D=1.39  N=0.07
02340
02360 TRACK TR18 RWY 08 STRAIGHT 5800 LEFT 90 D 1500 STRAIGHT 400
02370  LEFT 90 D 1500 STRAIGHT 8990 LEFT 90 D 1500 STRAIGHT 400
02380  LEFT 90 D 1500 STRAIGHT 410
02400    OPER COMSEP STAGE 1 PROF=GA6D D=6.94  N=0.36
02420    OPER COMTEP STAGE 1 PROF=GA6D D=0.70  N=0.04
02430
02450 TRACK TR19 RWY 26 STRAIGHT 5500 LEFT 180 D 1600 STRAIGHT 7800
02460  LEFT 180 D 1600 STRAIGHT 2300
02480    OPER COMSEP STAGE 1 PROF=GA6D D=23.34 N=1.22
02500    OPER COMTEP STAGE 1 PROF=GA6D D=2.39  N=0.13
02510
02530PROCESS:
02550    CONTOUR LDN AT 60 65 70 75
02552    WITH TOLERANCE=1.0
02554    REFINEMENT=10.0
02570    PLOT SIZE=30 30 SCALE=2000
02590    NOREPORT
02610    PREVIEW
02630    #TRACK
02650    #END
02670END.
```

INM INPUT DATA

1990 Conditions

```
$RUN RPZ100
$LNK ANKY
00100BEGIN.
00120SETUP:
00140TITLE <ANE LDN CONTOUR PROPOSED ACTION 1990 >
00160AIRPORT <ANOKA COUNTY-BLAINE AIRPORT,JANES FIELD>
00180ALTITUDE 909 TEMPERATURE 60 F
00200 RUNWAYS
00220    RW 17-35       0      950  TO 0 -3905  HEADING=175
00240    RW 08-26   -2600      0  TO 1400    0  HEADING=84
00260AIRCRAFT:
00280  TYPES
00300    AC COMSEP
00320    AC COMTEP
00340    AC DHC6
00360    AC GALQTF
00380    AC GALTF
00400    AC GAMTF
00420FT.
00440 PROFILES APPROACH
00460    PF GA6D SEGMENTS=4
00480            DISTANCES 50000  10000  7111   -500
00500            ALTITUDES   800    800   800      0
00520               SPEEDS FINSP  FINSP  FINSP  FINSP
00540              THRUSTS 3DLND  3DLND  3DLND
00560TAKEOFFS BY FREQUENCY:
00570FT.
00590  TRACK TR1 RWY 35 STRAIGHT 50000
00610    OPER COMSEP STAGE 1 D=5.20 N=0.25
00630    OPER COMTEP STAGE 1 D=0.58  N=0.03
00640
00650    OPER DHC6   STAGE 1 D=0.90  N=0.05
00670    OPER GALQTF STAGE 1 D=0.43  N=0.02
00690    OPER GALTF  STAGE 1 D=0.33  N=0.02
00710    OPER GAMTF  STAGE 1 D=0.33  N=0.02
00740  TRACK TR2 RWY 35 STRAIGHT 7000 RIGHT 90 D 1500 STRAIGHT 50000
00760    OPER COMSEP STAGE 1 D=5.20 N=0.25
00780    OPER COMTEP STAGE 1 D=0.57  N=0.03
00810  TRACK TR3 RWY 17 STRAIGHT 6000 RIGHT 90 D 1500 STRAIGHT 50000
00830    OPER COMSEP STAGE 1 D=4.40 N=0.25
00850    OPER COMTEP STAGE 1 D=0.50 N=0.02
00880  TRACK TR4 RWY 17 STRAIGHT 50000
00900    OPER COMSEP STAGE 1 D=4.40 N=0.25
00920    OPER COMTEP STAGE 1 D=0.50 N=0.03
00930
00940    OPER DHC6   STAGE 1 D=0.76 N=0.04
00960    OPER GALQTF STAGE 1 D=0.29 N=0.01
00980    OPER GALTF  STAGE 1 D=0.24 N=0.01
01000    OPER GAMTF  STAGE 1 D=0.24 N=0.01
01030  TRACK TR5 RWY 26 STRAIGHT 50000
01050    OPER COMSEP STAGE 1 D=4.4 N=0.25
01070    OPER COMTEP STAGE 1 D=0.5 N=0.03
01080
01090    OPER DHC6   STAGE 1 D=0.67 N=0.03
01120  TRACK TR6 RWY 26 STRAIGHT 5500 RIGHT 90 D 1500 STRAIGHT 50000
01140    OPER COMSEP STAGE 1 D=4.4 N=0.25
01160    OPER COMTEP STAGE 1 D=0.5 N=0.02
01190  TRACK TR7 RWY 08 STRAIGHT 50000
01210    OPER COMSEP STAGE 1 D=3.95 N=0.2
01230    OPER COMTEP STAGE 1 D=0.43 N=0.02
01240
01250    OPER DHC6   STAGE 1 D=0.52 N=0.03
01280 TRACK TR8 RWY 08 STRAIGHT 5500 RIGHT 90 D 1500 STRAIGHT 50000
01300    OPER COMSEP STAGE 1 D=3.95 N=0.2
01320    OPER COMTEP STAGE 1 D=0.43 N=0.02
01360LANDINGS BY FREQUENCY:
01390 TRACK TR9 RWY 17 STRAIGHT 50000
01410    OPER COMSEP PROF=GA6D  D=8.8 N=0.5
01430    OPER COMTEP PROF=GA6D  D=1.0 N=0.05
01440
01450    OPER DHC6   PROF=GA6D  D=0.76 N=0.04
01470    OPER GALQTF PROF=STD3D D=0.29 N=0.01
01490    OPER GALTF  PROF=STD3D  D=0.24 N=0.01
01510    OPER GAMTF  PROF=STD3D  D=0.24 N=0.01
01540 TRACK TR10 RWY 35 STRAIGHT 50000
01560    OPER COMSEP PROF=GA6D  D=10.4 N=0.50
01580    OPER COMTEP PROF=GA6D  D=1.15 N=0.06
01590
```

10/18/85

```
01390 TRACK TR9 RWY 17 STRAIGHT 50000
01410    OPER COMSEP PROF=6A6D  D=8.8 N=0.5
01430    OPER COMTEP PROF=6A6D  D=1.0 N=0.05
01440
01450    OPER DHC6   PROF=6A6D  D=0.76 N=0.04
01470    OPER GALGTF PROF=STD3D D=0.29 N=0.01
01490    OPER GALTF  PROF=STD3D  D=0.24 N=0.01
01510    OPER GAMTF  PROF=STD3D  D=0.24 N=0.01
01540 TRACK TR10 RWY 35 STRAIGHT 50000
01560    OPER COMSEP PROF=6A6D  D=10.4 N=0.50
01580    OPER COMTEP PROF=6A6D  D=1.15 N=0.06
01590
01600    OPER DHC6   PROF=6A6D  D=0.90 N=0.05
01620    OPER GALGTF PROF=STD3D D=0.43 N=0.02
01640    OPER GALTF  PROF=STD3D  D=0.33 N=0.02
01660    OPER GAMTF  PROF=STD3D  D=0.33 N=0.02
01690 TRACK TR11 RWY 08 STRAIGHT 50000
01710    OPER COMSEP PROF=6A6D  D=7.9 N=0.4
01730    OPER COMTEP PROF=6A6D  D=0.86 N=0.04
01740
01750    OPER DHC6   PROF=6A6D  D=0.52 N=0.03
01780  TRACK TR12 RWY 26 STRAIGHT 50000
01800    OPER COMSEP PROF=6A6D  D=8.8 N=0.50
01820    OPER COMTEP PROF=6A6D  D=1.0 N=0.05
01830
01840    OPER DHC6   PROF=6A6D  D=0.67 N=0.03
01870TOUCHGOS BY FREQUENCY:
01900  TRACK TR13 RWY 35 STRAIGHT 6500 LEFT 90 D 1500 STRAIGHT 2000
01910   LEFT 90 D 1500 STRAIGHT 8900 LEFT 90 D 1500 STRAIGHT 2000
01920   LEFT 90 D 1500 STRAIGHT 2400
01940    OPER COMSEP STAGE 1 PROF=6A6D  D=20.71 N=1.09
01960    OPER COMTEP STAGE 1 PROF=6A6D  D=2.30  N=0.12
01970
01990  TRACK TR14 RWY 35 STRAIGHT 6500 LEFT 90 D 1500 STRAIGHT 1300
02000    LEFT 90 D 1500 STRAIGHT 7400 LEFT 90 D 1500 STRAIGHT 1300
02010    LEFT 90 D 1500 STRAIGHT 900
02030    OPER COMSEP STAGE 1 PROF=6A6D  D=20.71 N=1.09
02050    OPER COMTEP STAGE 1 PROF=6A6D  D=2.30 N=0.12
02060
02070
02080 TRACK TR15 RWY 17 STRAIGHT 5300 LEFT 90 D 1500 STRAIGHT 1500
02090   LEFT 90 D 1500 STRAIGHT 6700 LEFT 90 D 1500 STRAIGHT 1500
02100   LEFT 90 D 1500 STRAIGHT 1400
02120    OPER COMSEP STAGE 1 PROF=6A6D  D=15.69 N=0.83
02140    OPER COMTEP STAGE 1 PROF=6A6D  D=1.77 N=0.09
02150
02160
02170  TRACK TR16 RWY 17 STRAIGHT 6800 LEFT 90 D 1500 STRAIGHT 1500
02180    LEFT 90 D 1500 STRAIGHT 8200 LEFT 90 D 1500 STRAIGHT 1500
02190    LEFT 90 D 1500 STRAIGHT 1400
02210    OPER COMSEP STAGE 1 PROF=6A6D  D=19.65 N=1.03
02230    OPER COMTEP STAGE 1 PROF=6A6D  D=2.22  N=0.12
02240
02260 TRACK TR17 RWY 08 STRAIGHT 5800 LEFT 90 D 1500 STRAIGHT 400
02270   LEFT 90 D 1500 STRAIGHT 7700 LEFT 90 D 1500 STRAIGHT 400
02280   LEFT 90 D 1500 STRAIGHT 1900
02300    OPER COMSEP STAGE 1 PROF=6A6D  D=21.04 N=1.11
02320    OPER COMTEP STAGE 1 PROF=6A6D  D=2.28 N=0.12
02330
02350 TRACK TR18 RWY 08 STRAIGHT 5800 LEFT 90 D 1500 STRAIGHT 400
02360   LEFT 90 D 1500 STRAIGHT 8900 LEFT 90 D 1500 STRAIGHT 400
02370   LEFT 90 D 1500 STRAIGHT 410
02390    OPER COMSEP STAGE 1 PROF=6A6D  D=10.50 N=0.55
02410    OPER COMTEP STAGE 1 PROF=6A6D  D=1.14  N=0.06
02420
02440 TRACK TR19 RWY 26 STRAIGHT 5500 LEFT 180 D 1600 STRAIGHT 7800
02450   LEFT 180 D 1600 STRAIGHT 2300
02470    OPER COMSEP STAGE 1 PROF=6A6D  D=35.34 N=1.86
02490    OPER COMTEP STAGE 1 PROF=6A6D  D=3.99  N=0.21
02500
02520PROCESS:
02540    CONTOUR LDN AT 60 65 70 75
02560    PLOT SIZE=30 30 SCALE=2000
02580    NOREPORT
02660END.
$EOF
```

INM INPUT DATA

2000 Conditions

```
CAT

CATALOG OF USER NUMBER - 10820F          07:06 NOV 04,'85

AFB1PF     11/01/85     147   NUL    AFBOUT     06:57 HRS     113D  NUL
   TK      10/18/85      10   NUL    AN20FB     11/01/85      15  PUR
   SBOS    08/29/85       3   NUL    OPSSJCL    08/29/85       3  NUL
   SJCL    11/01/85       8   SCI    NUL        11/01/85      21  PUR
   RE2     11/01/85      23   NUL    NSP86      10/17/85      56  PUR

NUMBER OF FILES = 10          ISS'S = 273       DGS'S = 113

RUN AN20FB                                                    11/4/85
00100BEGIN.
00120SETUP:
00140TITLE <ANE LDN CONTOUR-2000 FULL AIRFIELD N BLDG DEVELOPMENTS CASE >
00160AIRPORT <ANOKA COUNTY-BLAINE AIRPORT, JANES FIELD>
00180ALTITUDE 909 TEMPERATURE 60 F
00200 RUNWAYS
00220    RW 17R-35L    0      4855  TO  0     0    HEADING=175
00240    RW 17L-35R    750    3200  TO  750   0    HEADING=175
00260    RW 08R-26L   -1800  2050  TO  2200  2050 HEADING=84
00280    RW 08L-26R   -1000  2800  TO  2200  2800 HEADING=84
00300AIRCRAFT:
00320  TYPES
00340   AC CONSEP
00360   AC CONTEP
00380   AC DHC6
00400   AC GALUTF
00420   AC GALTF
    0   AC GANTF
00470FI.
00490 PROFILES APPROACH
00510   PF GA6D SEGMENTS=4
00530          DISTANCES 50000  >0000  7111   500
00550          ALTITUDES   800   800   800   0
00570          SPEEDS    FINSP  FINSP  FINSP  FINSP
00590          THRUSTS   3DLNU  3DLNU  3DLNU
00620TAKEOFFS BY FREQUENCY:
00640FI.
00660  TRACK TR1 RWY 35L STRAIGHT 50000
00680    OPER CONSEP STAGE 1 D=1.09 N=0.06
00700    OPER CONTEP STAGE 1 D=0.11 N=0.01
00720    OPER DHC6   STAGE 1 D=1.81 N=0.09
00740    OPER GALUTF STAGE 1 D=0.62 N=0.03
00760    OPER GALTF  STAGE 1 D=0.48 N=0.02
00780   OPER GANTF  STAGE 1 D=0.48 N=0.02
00785
00810  TRACK TR2 RWY 35L STRAIGHT 7000 RIGHT 90 D 1500 STRAIGHT 50000
00830    OPER CONSEP STAGE 1 D=1.09 N=0.06
00850    OPER CONTEP STAGE 1 D=0.11 N=0.01
00870
00880  TRACK TR3 RWY 17R STRAIGHT 50000
00900    OPER CONSEP STAGE 1 D=0.90 N=0.05
00920    OPER CONTEP STAGE 1 D=0.10 N=0.01
00940    OPER DHC6   STAGE 1 D=1.57 N=0.08
00960    OPER GALUTF STAGE 1 D=0.52 N=0.03
00980    OPER GALTF  STAGE 1 D=0.38 N=0.02
01000   OPER GANTF  STAGE 1 D=0.38 N=0.02
01020
01030  TRACK TR4 RWY 17R STRAIGHT 7000 LEFT 90 D 1500 STRAIGHT 50000
01050    OPER CONSEP STAGE 1 D=0.90 N=0.05
01070    OPER CONTEP STAGE 1 D=0.10 N=0.01
```

```
01070    UPER COMTEP STAGE 1 D=0.10 N=0.01
01080
01100  TRACK TR5 RWY 26L STRAIGHT 50000
01120    UPER COMSEP STAGE 1 D=3.04 N=0.16
01140    UPER COMTEP STAGE 1 D=0.35 N=0.02
01160    UPER DHC6   STAGE 1 D=1.19 N=0.06
01180  TRACK TR6 RWY 26L STRAIGHT 5500 RIGHT 90 D 1500 STRAIGHT 50000
01210    UPER COMSEP STAGE 1 D=3.04 N=0.16
01230    UPER COMTEP STAGE 1 D=0.35 N=0.02
01260  TRACK TR7 RWY 08R STRAIGHT 50000
01280    UPER COMSEP STAGE 1 D=2.71 N=0.14
01300    UPER COMTEP STAGE 1 D=0.31 N=0.02
01320    UPER DHC6   STAGE 1 D=1.05 N=0.05
01350 TRACK TR8 RWY 08R STRAIGHT 5500 LEFT 90 D 1500 STRAIGHT 50000
01370    UPER COMSEP STAGE 1 D=2.71 N=0.14
01390    UPER COMTEP STAGE 1 D=0.31 N=0.02
01420  TRACK TR9 RWY 35R STRAIGHT 50000
01440    UPER COMSEP STAGE 1 D=6.03 N=0.32
01460    UPER COMTEP STAGE 1 D=0.70 N=0.04
01490  TRACK TR10 RWY 35R STRAIGHT 7000 LEFT 90 D 1500 STRAIGHT 50000
01510    UPER COMSEP STAGE 1 D=6.03 N=0.32
01530    UPER COMTEP STAGE 1 D=0.70 N=0.04
01560 TRACK TR11 RWY 17L STRAIGH  50000
01580    UPER COMSEP STAGE 1 D=5.18 N=0.27
01600    UPER COMTEP STAGE 1 D=0.60 N=0.03
01630 TRACK TR12 RWY 17L STRAIGHT 7000 RIGHT 90 D 1500 STRAIGHT 50000
01650    UPER COMSEP STAGE 1 D=5.18 N=0.27
01670    UPER COMTEP STAGE 1 D=0.60 N=0.03
01700  TRACK TR13 RWY 26R STRAIGHT 50000
01720    UPER COMSEP STAGE 1 D=3.04 N=0.16
01740    UPER COMTEP STAGE 1 D=0.35 N=0.02
01770  TRACK TR14 RWY 26R STRAIGHT 5500 LEFT 90 D 1500 STRAIGHT 50000
01790    UPER COMSEP STAGE 1 D=3.04 N=0.16
01810    UPER COMTEP STAGE 1 D=0.35 N=0.02
01840 TRACK TR15 RWY 08L STRAIGHT 50000
01860    UPER COMSEP STAGE 1 D=2.71 N=0.14
01880    UPER COMTEP STAGE 1 D=0.31 N=0.02
01910  TRACK TR16 RWY 08L STRAIGHT 5500 RIGHT 90 D 1500 STRAIGHT 50000
01930    UPER COMSEP STAGE 1 D=2.71 N=0.14
01950    UPER COMTEP STAGE 1 D=0.31 N=0.02
01960
01980LANDINGS BY FREQUENCY:
02000  TRACK TR17 RWY 17R STRAIGHT 50000
02020    UPER COMSEP PROF=GA6D D=3.81 N=0.09
02040    UPER COMTEP PROF=GA6D D=0.70 N=0.02
02060    UPER DHC6   PROF=GA6D D=1.57 N=0.08
02080    UPER GALOTF PROF=STD3D D=0.52 N=0.03
02100    UPER GALTF  PROF=STD3D D=0.38 N=0.02
02120    UPER GAMTF  PROF=STD3D D=0.38 N=0.02
02130
02150 TRACK TR18 RWY 35L STRAIGHT 50000
02170    UPER COMSEP PROF=GA6D D=2.18 N=0.12
02190    UPER COMTEP PROF=GA6D D=0.22 N=0.02
02210    UPER DHC6   PROF=GA6D D=1.81 N=0.09
02230    UPER GALOTF PROF=STD3D D=0.62 N=0.03
02250    UPER GALTF  PROF=STD3D D=0.48 N=0.02
02270    UPER GAMTF  PROF=STD3D D=0.48 N=0.02
02290
02310 TRACK TR19 RWY 08R STRAIGHT 50000
02320    UPER COMSEP PROF=GA6D D=5.42 N=0.28
02340    UPER COMTEP PROF=GA6D D=0.62 N=0.04
02360    UPER DHC6   PROF=GA6D D=1.05 N=0.05
02370
02390 TRACK TR20 RWY 26L STRAIGHT 50000
02410    UPER COMSEP PROF=GA6D D=6.08 N=0.32
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02390 TRACK TR20 RWY 08L STRAIGHT 50000
02410    OPER COMSEP PROF=GA6D D=4.98 N=0.29
02430    OPER CONTEP PROF=GA6D D=0.70 N=0.04
02450    OPER MHC6   PROF=GA6D D=1.19 N=0.06
02460
02480 TRACK TR21 RWY 17L STRAIGHT 50000
02500    OPER COMSEP PROF=GA6D D=10.36 N=0.54
02520    OPER CONTEP PROF=GA6D D=1.20 N=0.06
02530
02550 TRACK TR22 RWY 35R STRAIGHT 50000
02570    OPER COMSEP PROF=GA6D D=12.05 N=0.65
02590    OPER CONTEP PROF=GA6D D=1.40 N=0.08
02600
02620 TRACK TR23 RWY 08L STRAIGHT 50000
02640    OPER COMSEP PROF=GA6D D=5.42 N=0.28
02660    OPER CONTEP PROF=GA6D D=0.62 N=0.04
02670
02690 TRACK TR24 RWY 26R STRAIGHT 50000
02720    OPER COMSEP PROF=GA6D D=6.08 N=0.32
02740    OPER CONTEP PROF=GA6D D=0.70 N=0.04
02750
02790TOUCHGOS RY FREQUENCY:
02830 TRACK TR25 RWY 35L STRAIGHT 6500 LEFT 90 D 1500
02850 STRAIGHT 2000 LEFT 90 D 1500 STRAIGHT 8900
02870 LEFT 90 D 1500 STRAIGHT 2000 LEFT 90 D 1500 STRAIGHT 2400
02890    OPER COMSEP STAGE 1 PROF=GA6D D=8.74 N=0.46
02910    OPER CONTEP STAGE 1 PROF=GA6D D=0.91 N=0.05
02930
02940 TRACK TR26 RWY 17R STRAIGHT 6500 RIGHT 90 D 1500
02960 STRAIGHT 2000 RIGHT 90 D 1500 STRAIGHT 8900
02980 RIGHT 90 D 1500 STRAIGHT 2000 RIGHT 90 D 1500 STRAIGHT 2400
03000    OPER COMSEP STAGE 1 PROF=GA6D D=7.22 N=0.38
03020    OPER CONTEP STAGE 1 PROF=GA6D D=0.84 N=0.04
03030
03050 TRACK TR27 RWY 26L STRAIGHT 6500 LEFT 90 D 1500
03070 STRAIGHT 2000 LEFT 90 D 1500 STRAIGHT 8900
03090 LEFT 90 D 1500 STRAIGHT 2000 LEFT 90 D 1500 STRAIGHT 2400
03110    OPER COMSEP STAGE 1 PROF=GA6D D=24.32 N=1.28
03130    OPER CONTEP STAGE 1 PROF=GA6D D=2.81 N=0.15
03140
03160 TRACK TR28 RWY 08R STRAIGHT 6500 RIGHT 90 D 1500
03180 STRAIGHT 2000 RIGHT 90 D 1500 STRAIGHT 8900
03200 RIGHT 90 D 1500 STRAIGHT 2000 RIGHT 90 D 1500 STRAIGHT 2400
03220    OPER COMSEP STAGE 1 PROF=GA6D D=21.66 N=1.14
03240    OPER CONTEP STAGE 1 PROF=GA6D D=2.51 N=0.13
03250
03270 TRACK TR29 RWY 35R STRAIGHT 5800 RIGHT 90 D 1500
03290 STRAIGHT 2000 RIGHT 90 D 1500 STRAIGHT 7700
03310 RIGHT 90 D 1500 STRAIGHT 2000 RIGHT 90 D 1500 STRAIGHT 1900
03330    OPER COMSEP STAGE 1 PROF=GA6D D=48.26 N=2.54
03350    OPER CONTEP STAGE 1 PROF=GA6D D=5.62 N=0.3
03360
03380 TRACK TR30 RWY 17L STRAIGHT 5800 LEFT 90 D 1500
03400 STRAIGHT 2000 LEFT 90 D 1500 STRAIGHT 7700
03420 LEFT 90 D 1500 STRAIGHT 2000 LEFT 90 D 1500 STRAIGHT 1900
03440    OPER COMSEP STAGE 1 PROF=GA6D D=41.42 N=2.18
03460    OPER CONTEP STAGE 1 PROF=GA6D D=4.79 N=0.25
03470
03490 TRACK TR31 RWY 26R STRAIGHT 5800 RIGHT 90 D 1500
03510 STRAIGHT 2000 RIGHT 90 D 1500 STRAIGHT 7700
03530 RIGHT 90 D 1500 STRAIGHT 2000 RIGHT 90 D 1500 STRAIGHT 1900
03550    OPER COMSEP STAGE 1 PROF=GA6D D=24.32 N=1.28
03570    OPER CONTEP STAGE 1 PROF=GA6D D=2.81 N=0.15
03580
```

```
03490 TRACK TR31 RWY 26R STRAIGHT 5800 RIGHT 90 B 1500
03510 STRAIGHT 2000 RIGHT 90 B 1500 STRAIGHT 7700
03530 RIGHT 90 B 1500 STRAIGHT 2000 RIGHT 90 B 1500 STRAIGHT 1900
03550    OPER CONSEP STAGE 1 PROF=GA6B D=24.32 W=1.28
03560    OPER CENTER STAGE 1 PROF=GA6B D=2.81 W=0.15
03580
03600 TRACK TR32 RWY 08L STRAIGHT 5800 LEFT 90 B 1500
03620 STRAIGHT 2000 LEFT 90 B 1500 STRAIGHT 7700
03640 LEFT 90 B 1500 STRAIGHT 2000 LEFT 90 B 1500 STRAIGHT 1900
03660    OPER CONSEP STAGE 1 PROF=GA6B D=21.66 W=1.14
03680    OPER CENTER STAGE 1 PROF=GA6B D=2.51 W=0.13
03690
03730PROCESS:
03740   CONTOUR LDN AT 60 65 70 75
03750   WITH TOLERANCE=1.0
03760   REFINEMENT=10.0
03770   NOREPORT
03780   PLOT SIZE=30 30 SCALE=2000
03790   PREVIEW
03800   *TRACK SIZE=30 30 SCALE=2000
03810   *END
03820END.
$
```

INM INPUT

L1065 Contours

```
        LNM L10TST
00100BEGIN.
00110
00120SETUP:
00130  TITLE <ANOKA CO L10-65 DBA TEST-60 OPS>
00140  AIRPORT <ANOKA COUNTY-BLAINE AIRPORT>
00150  ALTITUDE 313 TEMPERATURE 18.3 C
00160
00170  RUNWAYS
00180     RW 09-27  0    0  10    10000    0  HEADING=090
00190
00200AIRCRAFT:
00210
00220  TYPES
00230     AC COMSEP STAGE 2=SETG
00240     AC COMTEP STAGE 2=TETG
00250     AC GAMTF CATEGORY=JCOM
00260
00261ET.
00270PROFILES APPROACH
00280  PF TG45 SEGMENTS=4
00290       DISTANCES 50000  12206  0  -500
00300       ALTITUDES 1000 1000  39  0
00310       SPEEDS 90  90  90  90
00320       THRUSTS   60  30  30
00321
00322PROFILES TAKEOFF
00323
00324PF TETG SEGMENTS=4 WEIGHT=4000 ENGINES=2
00325       DISTANCES 0  1948  11087  50000
00326       ALTITUDES 0  0  1000  1000
00327       SPEEDS 16  90  110  110
00328       THRUSTS 100  100  51
00329
00330PF SETG SEGMENTS=4 WEIGHT=2000 ENGINES=1
00331       DISTANCES 0  866  15500  50000
00332       ALTITUDES 0  0  800  800
00333       SPEEDS  16  70  90  90
00334       THRUSTS  100 100  68
00335
00340TAKEOFFS BY PERCENTAGE:
00350
00360OFT.
00370    OPER COMSEP STAGE 1 D=15
00380    OPER COMTEP STAGE 1 D=5
00390    OPER GAMTF STAGE 1 D=1
00400TRACK TR1 RWY 09 STRAIGHT 50000
00410  PERCENT COM=100 GA=50
00420TRACK TR2 RWY 09 STRAIGHT 6500 RIGHT 90 D 1500 STRAIGHT 50000
00430  PERCENT GA=50
00440TOUCHGOS BY FREQUENCY:
00450TRACK TR3 RWY 09 STRAIGHT 6500 LEFT 90 D 1500 STRAIGHT 1500
00460    LEFT 90 D 1500 STRAIGHT 6700 LEFT 90 D 1500 STRAIGHT 1500
00470     LEFT 90 D 1500 STRAIGHT 1400
00480    OPER COMSEP PROF=TG45 STAGE 1 D=18
00490    OPER COMTEP PROF=TG45 STAGE 1 D=3
00500
00510 TRACK TR4 RWY 09 STRAIGHT 5500 LEFT 90 D 1500 STRAIGHT 1500
00520  LEFT 90 D 1500 STRAIGHT 6700 LEFT 90 D 1500 STRAIGHT 1500
00530 LEFT 90 D 1500 STRAIGHT 2400
00540
00550     OPER COMSEP PROF=TG45 STAGE 1 D=17
00560     OPER COMTEP PROF=TG45 STAGE 1 D=2
00570
00580PROCESS;
```

APPENDIX 2G

MONITORING WELLS & BORING LOGS

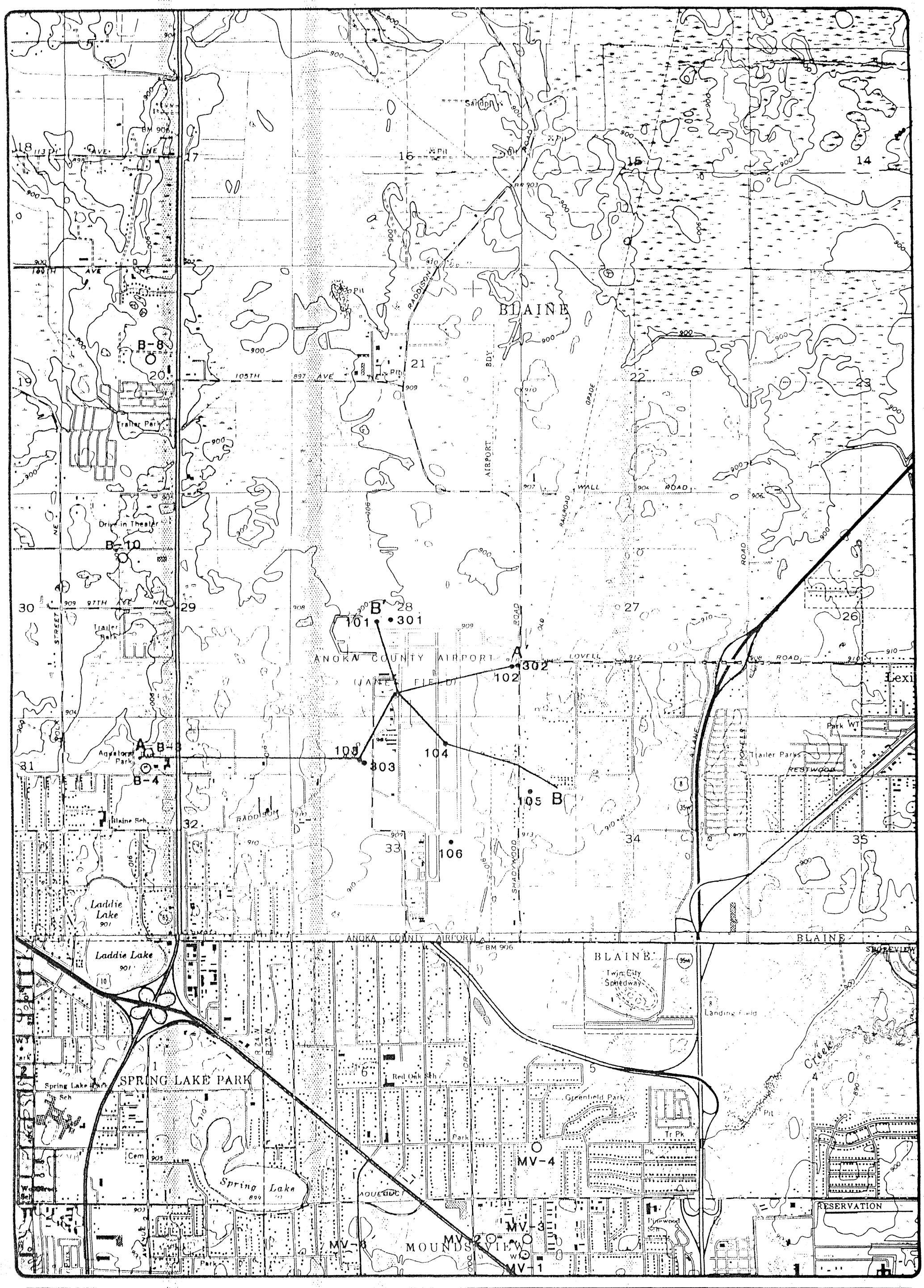
- Monitoring Well Installations

Nine monitoring wells were installed on and around the airport property to collect the hydrogeologic data necessary to determine the effect of fuel and hazardous materials spills on the groundwater resources in the vicinity. The locations of these wells is shown on Figure 2G.1. The boring and well installation logs are in Appendix 2G. The 100-series wells were installed into the uppermost geologic unit, the Fridley Formation. They are each about 10 feet deep and were used to collect data on the surficial aquifer. The 300-series wells were installed into the Hillside Sand, underlying the Twin Cities and Fridley Formations. Two of the 300-series boreholes are 75 to 80 feet deep and one is 100 feet deep. The construction information is summarized in Table 2G.1.

Five of the six wells in the 100-series were installed using similar procedures for drilling the borehole and installing the well. The borehole was advanced to the appropriate depth using a 3-1/2-inch nominal I.D. hollow stem auger. Split-barrel samples were taken every 5 feet to obtain information on soil types. After the auger was withdrawn, a 2-inch nominal I.D. screen 2 feet long was emplaced at the bottom of the borehole attached to about 10 feet of 1-1/2-inch nominal I.D. PVC riser pipe extending to 2 feet above the ground surface. Clean sand was placed in the borehole annulus to 3 feet below the ground surface. A 4-inch diameter Schedule 40 steel protective casing with locking cap was then placed around the riser pipe and the annulus filled with concrete grout.

The sixth well in the 100-series was driven to depth using a 2-inch nominal I.D. galvanized steel sand point. This well was installed using a sand point because wet and soft soil prevented the drilling rig from mobilizing at the site of Well 104. A 4-inch diameter Schedule 40 steel protective casing was set in concrete grout around the riser pipe to a depth of 3 feet below the land surface.

The three wells in the 300-series were constructed in a similar manner. For each, the borehole was advanced to 50 feet with a 3-1/2-inch nominal I.D. hollow stem auger, which was then retrieved and replaced with a 6-1/4-inch nominal I.D. hollow stem auger. Drilling was continued from 50 feet using rotary drilling methods. A 5-7/8-inch diameter rotary bit was used with a drilling fluid composed of Revert and potable water. Split barrel samples were taken every five feet to collect information on the geologic materials at depth. Thinwall tube samples were collected where possible within the fine silts and clays of the lower Fridley and the Twin Cities Formation till so that laboratory tests could be performed to determine the in situ permeability of the fine-grained sediments. Once the borehole



ANOKA COUNTY - BLAINE AIRPORT (JANES FIELD) EIS/EA

- • EIS MONITORING WELL
- ○ MUNICIPAL WELL

LOCATION OF WELLS IN AIRPORT VICINITY

HTA companies

1" = 2000'

N

FIGURE 2G.1

was completed, the well was assembled and installed with a 5-foot section of 2-inch nominal I.D. PVC screen placed 8 to 10 feet into the Hillside Sand and a 2-inch nominal I.D. PVC riser pipe extending from the top of the screen to 2 feet above the ground surface. A sand pack was emplaced around the screen and the remaining borehole annulus was filled with neat cement grout. Well 301 was advanced to a depth of 100 feet to identify with certainty the sand underlying the Twin Cities Formation till as the Hillside Sand.

Groundwater elevations were measured in the monitoring wells on October 16, 1985. These data were used to construct the water table configuration map which accompanies this report. The water levels of a few selected wetlands or drainage ditches were also measured with standard surveying techniques. These water level data were used to calibrate the computer model described below.

- Laboratory Analysis of Soil Samples

Split-barrel samples were taken at 5-foot intervals during the drilling. The sampling procedure was carried out in accordance with the guidelines set forth in ASTM: D1586-67. Six samples representing the Fridley and Hillside alluvial sands were chosen for laboratory analysis. Grain size distribution analyses were performed on all six of the samples using procedures in accordance with ASTM Designation D422-63. The results of these tests are in Appendix 2G. The grain size distribution analyses were used to calculate the hydraulic conductivity of the sediments using Hazen's approximation:

$$K = D_{10}^2$$

where K = hydraulic conductivity (cm/sec)
D_{10} = sieve mesh diameter allowing 10 percent of the sample to pass through (mm)

Four of the six samples used in the sieve tests were sufficiently fine that more than 10 percent of the samples passed through the finest sieve used in the grain size analysis (a #200, 0.075 mm sieve). For this reason, the curves were extrapolated a few percent so that the size of the ten percent fraction could be determined. The results of these calculations are shown in Table 2G.2.

Thinwall samples were collected wherever possible in the fine sediments. The sampling was done according to the procedure set forth in ASTM Designation D1587-74. Four thinwall tube samples were chosen for triaxial permeameter tests to determine the in situ permeability of the fine sediments. One of the samples

TABLE 2G.1
ANOKA COUNTY-BLAINE AIRPORT (JANES FIELD) EIS/EA
SUMMARY OF MONITORING WELL CONSTRUCTION INFORMATION AND
MONITORING WELL GROUNDWATER ELEVATIONS

Well No.	Aquifer of Completion	Ground Surface Elevation	Measuring Point Elevation	Total Borehole Depth (Ft.)	Riser Pipe	Screen	Depth to Top of Screen (Ft.)	Screen Length (Ft.)	Depth to Groundwater (Ft.)	Groundwater Elevation (Ft.)
101	Fridley Fm.	904.40	906.32	10.0	1½"PVC	2"PVC	8.0	2	5.59	900.73
102	Fridley Fm.	912.90	914.90	10.4	1½"PVC	2"PVC	8.0	2	5.86	909.04
103	Fridley Fm.	907.20	909.10	10.0	1½"PVC	2"PVC	7.7	2	4.62	904.48
104	Fridley Fm.	905.60	907.63	N/A	2" Glv.	2"Glv.	5.8	4	1.63	906.00
105	Fridley Fm.	913.10	915.08	10.0	1½"PVC	2"PVC	8.0	2	5.31	909.77
106	Fridley Fm.	907.20	909.23	10.0	1½"PVC	2"PVC	8.0	2	2.98	906.25
301	Hillside Sand	904.70	906.66	100.0	2"PVC	2"PVC	78.0	5	32.81	873.85
302	Hillside Sand	912.60	914.37	76.0	2"PVC	2"PVC	71.0	5	34.80	879.57
303	Hillside Sand	907.70	909.10	79.0	2"PVC	2"PVC	73.0	5	47.49	866.62

Source: Barr Engineering Co.

was taken in the fine-grained lower Fridley and the other three were taken from the upper, middle and lower intervals of the Twin Cities Formation till. The results of the permeability tests are shown in Table 2G.2.

TABLE 2G.2
HYDRAULIC CHARACTERISTICS FROM LABORATORY ANALYSES

A. Fine-Grained Sediments 1/

Sample No.	Formation	Hydraulic Conductivity (cm/sec)
303-10	Lower Fridley Fm.	2.0 x 10-6
	Twin Cities Fm.	
302-13	upper	2.8 x 10-7
303-15	middle	2.1 x 10-7
302-15	lower	1.1 x 10-6

B. Coarse-Grained Sediments 2/

Sample No.	Formation	Hydraulic Conductivity (cm/sec)
101-4	Upper Fridley Fm.	2.5 x 10-3 3/
103-4	Upper Fridley Fm.	1.8 x 10-3 3/
106-3	Upper Fridley Fm.	1.1 x 10-2
302-4	Upper Fridley Fm.	4.9 x 10-3
302-17	Hillside Side	2.9 x 10-3 3/
303-16	Hillside Side	8.1 x 10-3 3/

C. Average Hydraulic Conductivity Values

Formation	Average Hydraulic Conductivity (cm/sec)	No. of Analyses
Upper Fridley Fm.	5.05 x 10-3	4
Lower Fridley Fm.	2.0 x 10-6	1
Twin Cities Fm.	5.3 x 10-7	3
Hillside Sand	5.5 x 10-3	2

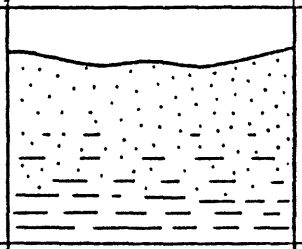
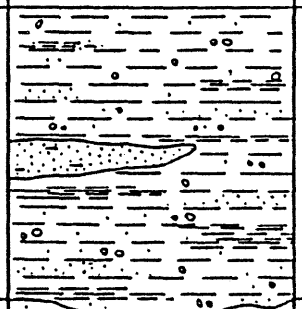
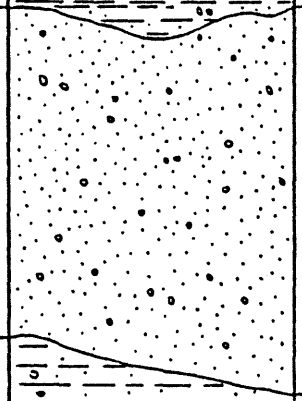
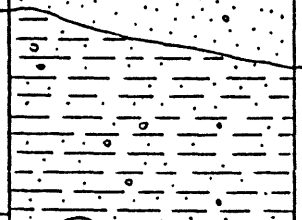
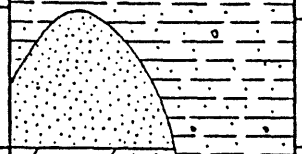
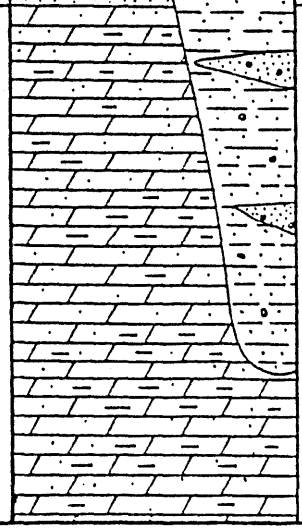
1/ Hydraulic conductivity measurements in the fine-grained samples were made at in __ situ____ pressures using a triaxial permeameter.

2/ Hydraulic conductivity of the coarse-grained samples was estimated using Hazen's Approximation from grain-size distribution measurements.

3/ Estimate based on grain-size distribution curve extrapolation.

Source: Barr Engineering Co.

GENERALIZED STRATIGRAPHIC COLUMN
ANOKA COUNTY - BLAINE AIRPORT VICINITY

Unit Name	Thickness(ft)	Schematic Column	Lithologic and Hydraulic Characteristics
Fridley Formation	50		fine sand, grading downward to clay and silt at base, brown; aquitard
Twin Cities Till	25-60		sandy clay with gravel, contains lenses of sand and gravel; aquitard
Hillside Sand	20-180		sand and gravel, brown; aquifer
Unnamed Till	120-180		sandy clay with gravel, grey and brown, contains lenses of silt and sand; aquitard
Jordan Sandstone	0-90		sandstone, light grey; aquifer
St. Lawrence Formation	20-65		dolostone, grey to tan, silty and sandy; aquitard

PRELIMINARY

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO 101

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LAB TESTS W	D	L.L./P.L.	Qu
	FILL, MIXTURE OF SILTY SAND AND SAND, brown and black	FILL	3		1	SB				
4				▼						
5	CLAYEY SAND, black, soft (SC)	TOPSOIL			2	SB				
	SILTY SAND, fine grained, brown to gray, waterbearing, medium dense (SM)	COARSE ALLUVIUM	10		3	SB				
11½			11		4	SB				
	End of Boring									
	NOTE: Monitoring Well installed in boring. See attached "Installation of Monitoring Well" data sheet.									

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
10-1	9:05	6'	4½'		to	5'
10-1	9:15	6'	4½'		to	4½'
10-1	9:30	11½'	10'		to	NMR
10-1	10:15	(SEE NOTE)			to	

START 10-1-85 COMPLETE 10-1-85

METHOD HSA 0-10' @ 9:30

CREW CHIEF Scherle

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO 103

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	L.L./P.L.	Qu
½	SILTY SAND, fine (See#1) (SM)	TOPSOIL			1	SB				
	SILTY SAND, fine grained, brown, moist to 2½' then waterbearing, very loose (SM)	COARSE ALLUVIUM	2	▼	2	SB				
5	SILTY SAND, fine grained, light brown, waterbearing, medium dense (SM/SP-SM)		11		3	SB				
7	SILTY SAND, fine grained, gray, waterbearing, loose (SM/SP-SM)									
11½			8		4	SB				
	End of Boring									
	#1 - grained, black, moist, very loose (SM)									
	NOTE: Monitoring Well installed in boring. See attached "Installation of Monitoring Well" data sheet.									

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
9-24	3:40	6½'	4½'		to	3½'
9-25	8:30	6½'	4½'		to	2½'
9-25	8:50	11½'	10'		to	NMR
9-25	9:15		(SEE NOTE)		to	

START 9-24-85 COMPLETE 9-24-85

METHOD HSA 0-10' @ 8:50

CREW CHIEF Scherle

SE-2 (77-B) -4

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 105

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS W	D	L.L. / P.L.	Qu
½	SILTY SAND, fine grained(See#1)(SM)	TOPSOIL			1	HSA				
	SILTY SAND, fine grained, brown mottled, moist to 4½' then water-bearing, medium dense (SM/SP-SM)	COARSE ALLUVIUM	9	▼	2	SB				
9	SILTY SAND, fine grained, brown, wet, loose (SM/ML)		8		3	SB				
11½	End of Boring									
	#1 - dark brown, moist (SM)									
	NOTE: Monitoring Well installed in boring. See attached "Installation of Monitoring Well" data sheet.									

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
10-10	2:40	6'	4½'		to	4½'
10-10	3:00	11½'	10'		to	NMR
10-10	3:55		(SEE NOTE)		to	
					to	

START 10-10-85 COMPLETE 10-10-85

METHOD HSA 0-10' @ 3:00

CREW CHIEF Scherle

SE-2 (77-B) -4

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 106

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS W	D	LL/PL	Qu
	FILL, MOSTLY SILTY SAND, black and brown, water in fill below about 3½'	FILL	8	▼	1	SB				
			16		2	SB				
6	SAND W/SILT, fine grained, grayish brown, waterbearing, medium dense (SP-SM)	COARSE ALLUVIUM								
			13		3	SB				
11½	End of Boring									
	NOTE: Monitoring Well installed in boring. Then removed on 10-7-85, as directed by client, and a new installation performed at an alternate location in unsamples borehole (NO.106-A) See attached "Installation of Monitoring Well" data sheet.									

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
9-24	1:25	6½'	4½'		to	4½'
9-24	1:35	6½'	4½'		to	3½'
9-24	1:50	11½'	10'		to	NMR
9-24	3:00	(SEE NOTE)			to	

START 9-24-85 COMPLETE 9-24-85

METHOD HSA 0-10' @ 1:50

CREW CHIEF Scherle

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 301

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	LL/PL	Qu
	NO SAMPLES TAKEN									
14½	SAND W/SILT, fine grained, gray, waterbearing, loose to very loose to medium dense to very loose to very dense (SP-SM)	COARSE ALLUVIUM	6		1	SB				
			6		2	SB				
			2		3	SB				
			11		4	SB				
			3		5	SB				
40	Continued on Next Page									

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 301 (Cont.)

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	LL/PL	Qu
40	SAND (CONT.) (SP-SM)	COARSE ALLUVIUM (CONT.)	38		6	SB				
45½	SILT, gray, wet, a few lenses of lean clay (ML)	FINE ALLUVIUM	14		7	SB				
48	FAT CLAY, gray, medium, a few lenses of silt and lean clay (CH)		6		8	SB				
52	LEAN CLAY, gray, rather stiff (CL)				9	3T				
					10	SB				
56	FAT CLAY, gray, rather stiff to medium, a few lenses of silt (CH)		14		11	SB				
					12	SB				
59½	SANDY LEAN CLAY W/A LITTLE GRAVEL, gray, medium (CL)	WEATHERED TILL	7		13	SB				
					14	3T				
63	CLAYEY SAND W/A LITTLE GRAVEL, gray, medium, a few lenses of silty sand and waterbearing sand (SC-SM)	TILL								
			6		15	SB				
68	CLAYEY SAND W/A LITTLE GRAVEL, gray, rather stiff (SC)									
70										

Continued on Next Page

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 301 (Cont.)

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	LL/PL	Qu
70	CLAYEY SAND (CONT.) (SC)	TILL (CONT.)	11		16	SB				
73	SAND W/SILT, fine grained, reddish brown, waterbearing, very dense (SP-SM)	COARSE ALLUVIUM	51		17	SB				
			77		18	SB				
95	Continued on Next Page									

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO 301 (Cont.)

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	LL/PL	Qu
95	SAND (CONT.) (SP-SM)	COARSE ALLUVIUM (CONT).								
99	LEAN CLAY, reddish brown, stiff (CL/CH)	FINE ALLUVIUM	21		19	SB				
101½	End of Boring									

NOTE: Monitoring Well installed in boring. See attached "Installation of Monitoring Well" data sheet.

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
					to	
10-9	2:25	101½'	49'		to	NMR
10-10	1:15		(SEE NOTE)		to	
					to	

START 10-7-85 COMPLETE 10-9-85

METHOD 3¼ HSA 0-45' @ 2:25

6¼ HSA 0-49', DM (Revert)46½'-100'

CREW CHIEF Scherle & Brabender

SE-2 (77-B) 4

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 302

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LAB TESTS W	D	LL/PL	Qu
	FILL, MIXTURE OF SILTY SAND AND SAND, black and brown	FILL	5		1	SB				
2	SILTY SAND, fine grained, brown, moist to 4' then waterbearing, loose (SM)	COARSE ALLUVIUM	8	▼	2	SB				
7	SAND W/SILT, fine grained, brown, waterbearing, very loose to very dense (SP-SM)		3		3	SB				
			39		4	SB				
19	SAND, fine grained, gray, water-bearing, very dense (SP)		34		5	SB				
23	SILTY SAND, fine grained, gray, waterbearing, dense to very dense (SM)		21		6	SB				
30	— — — — —	— —								

Continued on Next Page

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 302 (Cont.)

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	LL/PL	Qu
30	SILTY SAND (CONT.) (SM)	COARSE ALLUVIUM (CONT.)	31		7	SB				
			53		8	SB				
			59		9	SB				
42	SAND W/SILT, fine grained, gray, waterbearing, medium dense (SP-SM)		13		10	SB				
48	LEAN CLAY, gray, rather stiff, some lenses of silt (CL)	FINE ALLUVIUM	13		11	SB				
54	FAT CLAY, gray, rather stiff, a few lenses of lean clay (CH)		9		12	SB				
58	CLAYEY SAND W/A LITTLE GRAVEL, gray, medium (SC)	TILL			13	3T				
60	Continued on Next Page									

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 302 (Cont.)

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO.	SAMPLE TYPE	LABORATORY TESTS W	D	L.L./P.L.	Qu
60	CLAYEY SAND (CONT.) (SC)	TILL (CONT.)	7		14	SB				
					15	3T				
66	SILTY SAND, fine grained, reddish brown, waterbearing, medium dense to very dense (SM)	COARSE ALLUVIUM	14		16	SB				
			44		17	SB				
77½	End of Boring									
	NOTE: Monitoring well installed in boring. See attached "Installation of Monitoring Well" data sheet."									

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
10-1	12:00	6'	4½'		to	5'
10-1	12:45	6'	4½'		to	4'
10-2	3:35	77½'	50'		to	NMR
10-3	12:10		(SEE NOTE)		to	

START 10-1-85 COMPLETE 10-2-85

METHOD 3¼ HSA 0-49½' @ 3:35

6¼ HSA 0-50' DM (Revert) 51-76'

CREW CHIEF Scherle

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 303

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	LL/PL	Qu
	NO SAMPLES TAKEN									
15	SAND, fine grained, gray, water-bearing, very loose to medium dense (SP)	COARSE ALLUVIUM	4		1	SB				
			14		2	SB				
23	SILTY SAND, fine grained, gray, waterbearing, medium dense (SM)		9		3	SB				
29	SAND W/SILT, fine grained, gray, waterbearing, medium dense (SP-SM)		10		4	SB				
33	SILT, gray, wet, very loose, a few lenses of waterbearing sand (ML)	FINE ALLUVIUM	3		5	SB				
38	SILTY SAND, fine grained, gray, waterbearing, medium dense (SM)	COARSE ALLUVIUM								
40	Continued on Next Page									

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 303 (Cont.)

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	$\frac{-L}{P_L}$	Qu
40	SILTY SAND (CONT.) (SM)	COARSE ALLUVIUM (CONT.)	11		6	SB				
			9		7	SB				
46	SILT, gray, wet, medium dense (ML)	FINE ALLUVIUM			8	SB				
50	LEAN CLAY, gray, medium to rather stiff, a few lenses of silt and fat clay (CL)		6		9	SB				
					10	3T				
			10		11	SB				
58	CLAYEY SAND W/A LITTLE GRAVEL, gray, medium to rather stiff to medium (SC)	TILL	8		12	SB				
					13	3T				
65	Continued on Next Page									

twin city testing and engineering laboratory, inc.

LOG OF TEST BORING

JOB NO. 120 86-1054 VERTICAL SCALE 1" = 4' BORING NO. 303 (Cont.)

PROJECT ANOKA COUNTY - BLAINE AIRPORT - BLAINE, MINNESOTA

DEPTH IN FEET	DESCRIPTION OF MATERIAL	GEOLOGIC ORIGIN	N	WL	SAMPLE NO	SAMPLE TYPE	LABORATORY TESTS W	D	LL/PL	Qu
65	CLAYEY SAND (CONT.) (SC)	TILL (CONT.)	9		14	SB				
					15	SB				
70½	SAND W/SILT, fine grained, reddish brown, waterbearing, loose to very dense (SP-SM)	COARSE ALLUVIUM	7							
			62		16	SB				
79	End of Boring									
	NOTE: Monitoring Well installed in boring. See attached "Installation of Monitoring Well" data sheet.									

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	BAILED DEPTHS	WATER LEVEL
					to	
9-26	2:45	79'	50'		to	NMR
9-27	11:30		(SEE NOTE)		to	
					to	

START 9-25-85 COMPLETE 9-26-85

METHOD 3¼ HSA 0-44½' @ 2:45

6¼ HSA 0-50' DM (Revert) 49½-79'

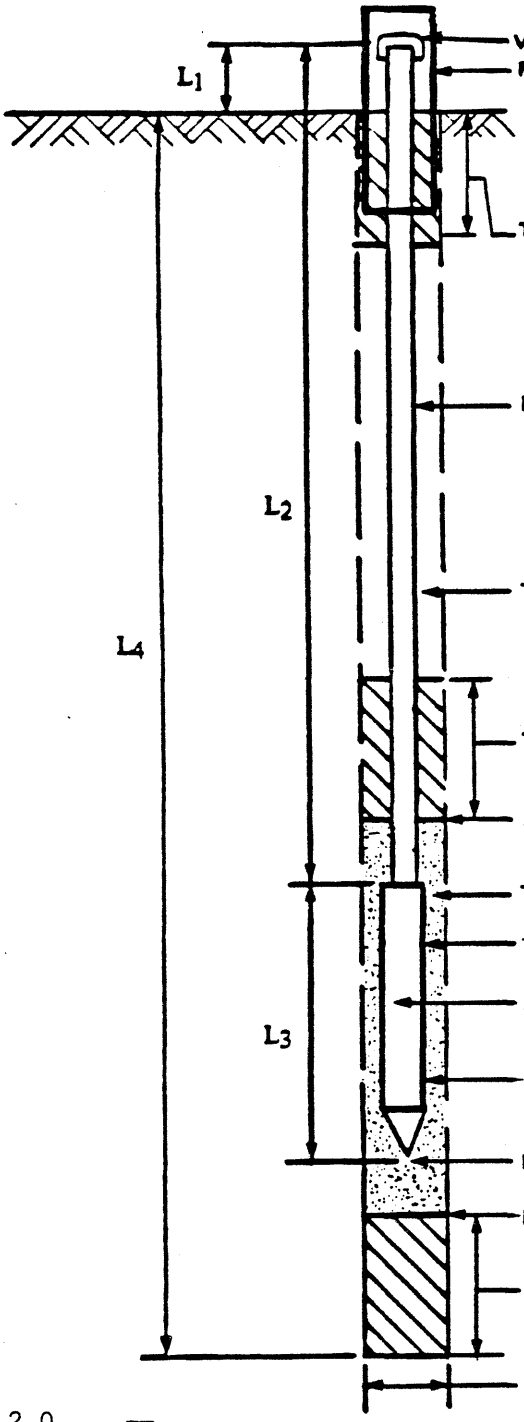
CREW CHIEF Scherle

twin city testing and engineering laboratory, inc.

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 MONITORING WELL NO. 101

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION (with cap removed) _____



VENTED CAP	
PROTECTIVE CASING	
Diameter and Type	4" Steel
Total Length	5.0'
Length Above Ground	2.2'
THICKNESS AND TYPE OF SEAL	2½' Grout (Cement/Bentonite)
DIAMETER AND TYPE OF RISER PIPE	1½" PVC
TYPE OF BACKFILL AROUND RISER	Native Soil
THICKNESS AND TYPE OF SEAL	None
DEPTH TO TOP OF FILTER SAND	6.0'
TYPE OF FILTER AROUND SCREEN	Medium Sand
TYPE OF MONITORING WELL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 2'
DEPTH TO BOTTOM OF MONITORING WELL	10.0'
DEPTH TO BOTTOM OF FILTER SAND	10.0'
THICKNESS AND TYPE OF SEAL	None (10.0' to 11.5' Collapsed Soil)
DIAMETER OF BOREHOLE	7"

L_1= 2.0 FT

L_2= 10.0 FT

L_3= 2.0 FT

L_4= 11.5 FT

INSTALLATION COMPLETED:
Date 10-1-85 Time 10:15

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)

(1) DEPTH BELOW TOP OF RISER PIPE

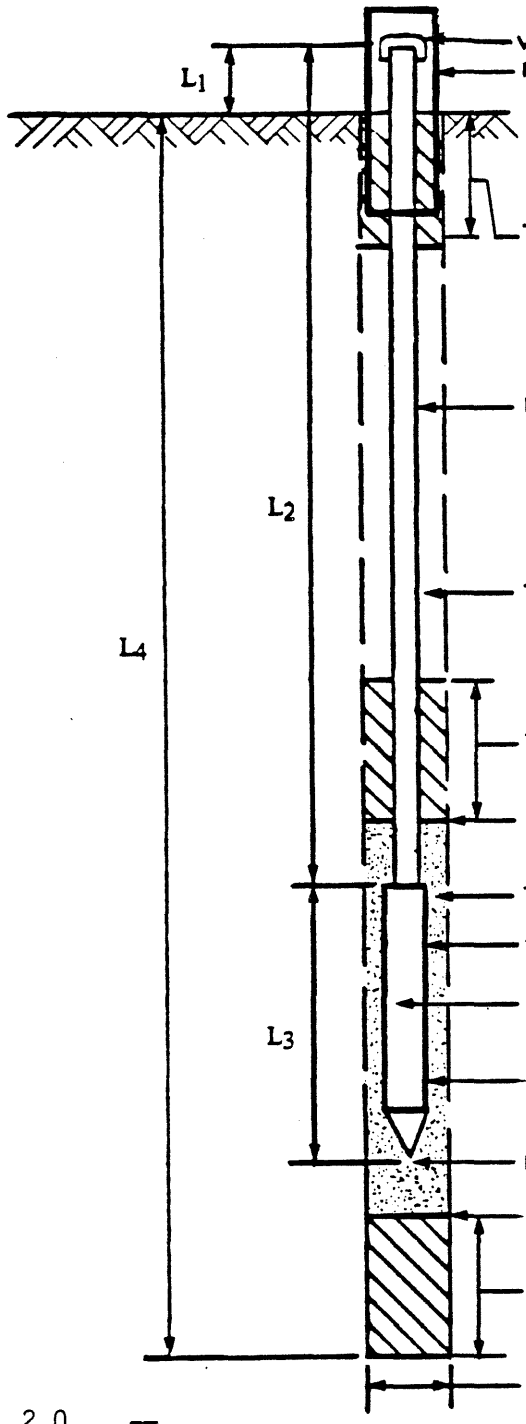
SOIL EXPLORATION COMPANY

SE-29 (83-B)

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 **MONITORING WELL NO.** 103

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION (with cap removed) _____



VENTED CAP	
PROTECTIVE CASING Diameter and Type	4" Steel
Total Length	5.0'
Length Above Ground	2.2'
THICKNESS AND TYPE OF SEAL	0' to 2½' Concrete
DIAMETER AND TYPE OF RISER PIPE	1½" PVC
TYPE OF BACKFILL AROUND RISER	Native Soil
THICKNESS AND TYPE OF SEAL	None
DEPTH TO TOP OF FILTER SAND	7½'
TYPE OF FILTER AROUND SCREEN	Medium Sand
TYPE OF MONITORING WELL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 2'
DEPTH TO BOTTOM OF MONITORING WELL	9.7'
DEPTH TO BOTTOM OF FILTER SAND	9.7'
THICKNESS AND TYPE OF SEAL	None (9.7' to 11.5' collapsed soil)
DIAMETER OF BOREHOLE	7"

L_1= 2.0 FT

L_2= 9.7 FT

L_3= 2.0 FT

L_4= 11.5 FT

INSTALLATION COMPLETED:
Date 9-25-85 Time 9:15

MONITORING WELL WATER LEVEL MEASUREMENTS			
DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)

(1) DEPTH BELOW TOP OF RISER PIPE

SOIL EXPLORATION COMPANY

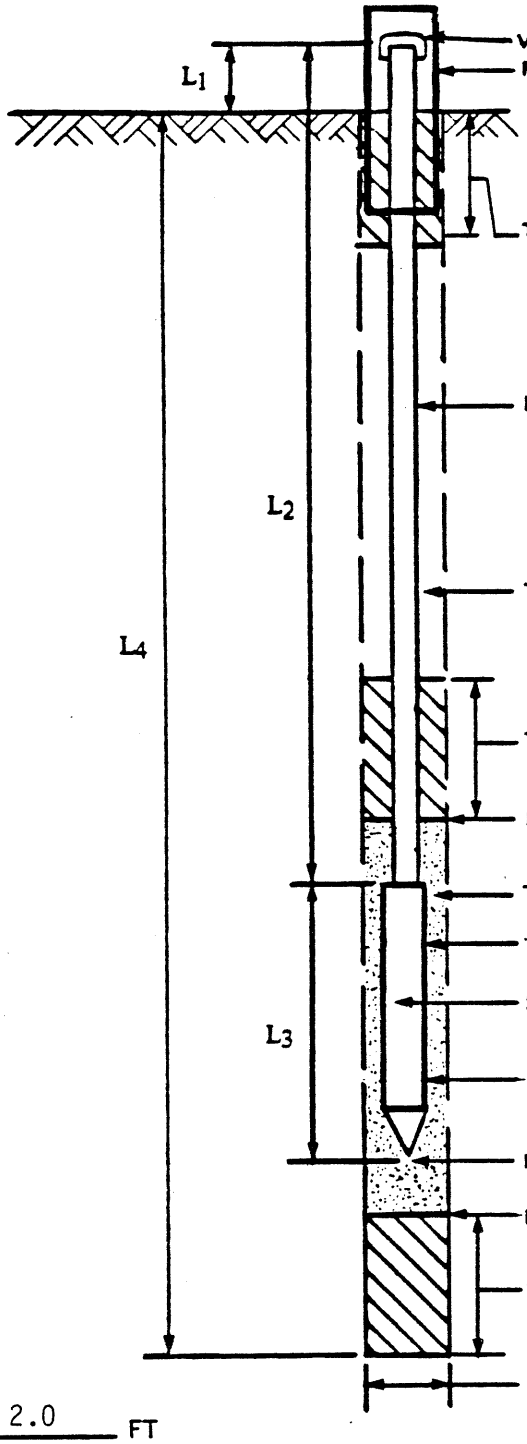
SE-29 (83-B)

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 **MONITORING WELL NO.** 102 (See Note)

Note: Installed in unsampled borehole.

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION _____ (with cap removed)



VENTED CAP	
PROTECTIVE CASING	
Diameter and Type	4" Steel
Total Length	5'
Length Above Ground	2.1'
THICKNESS AND TYPE OF SEAL	0' to 4.1' Grout (Cement/Bentonite)
DIAMETER AND TYPE OF RISER PIPE	1½" PVC
TYPE OF BACKFILL AROUND RISER	Native Soil
THICKNESS AND TYPE OF SEAL	None
DEPTH TO TOP OF FILTER SAND	4.1'
TYPE OF FILTER AROUND SCREEN	Native Soil
TYPE OF MONITORING WELL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 2'
DEPTH TO BOTTOM OF MONITORING WELL	10.0'
DEPTH TO BOTTOM OF FILTER SAND	10.0'
THICKNESS AND TYPE OF SEAL	None
DIAMETER OF BOREHOLE	7"

L_1= 2.0 FT

L_2= 10.0 FT

L_3= 2.0 FT

L_4= 10.0 FT

INSTALLATION COMPLETED:
Date 10-3-85 Time 2:00

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)
10-3	1:40		8.8'
10-3	2:00		5.9'

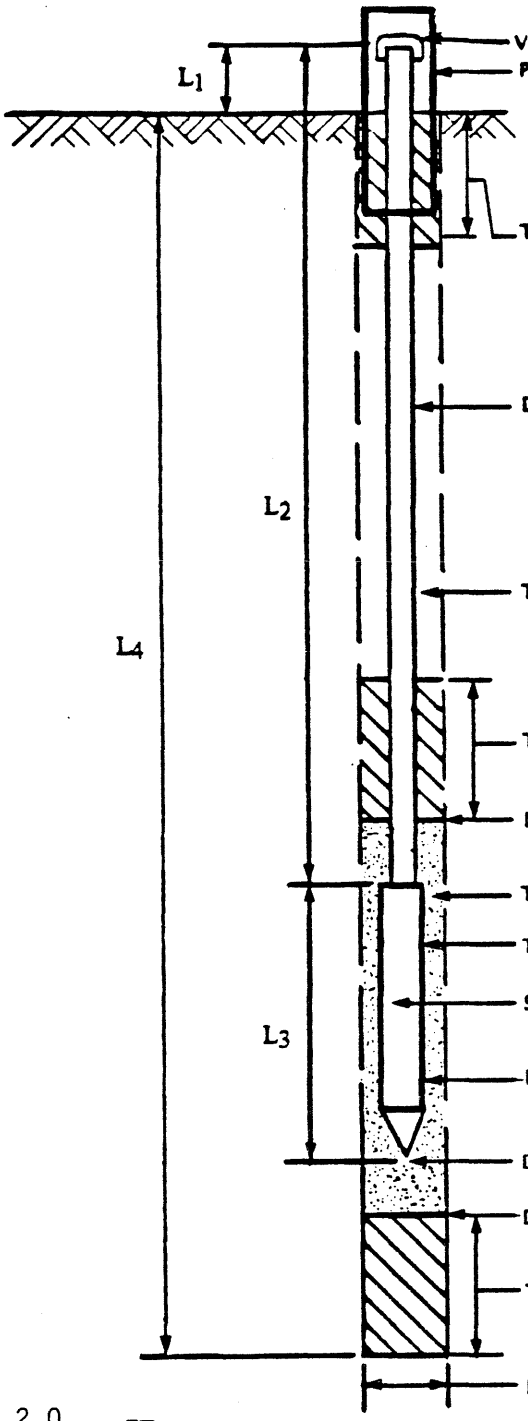
(1) DEPTH BELOW TOP OF RISER PIPE

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 **MONITORING WELL NO.** 104 (See Note)

Note: No borehole. Installed by driving into ground with drop-hammer.

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION (with cap removed) _____



Diameter and Type	4" Steel
Total Length	5.2'
Length Above Ground	2.2'
THICKNESS AND TYPE OF SEAL	0' to 2½' Grout (Cement/Bentonite)
DIAMETER AND TYPE OF RISER PIPE	2" Galvanized Steel
TYPE OF BACKFILL AROUND RISER	N/A
THICKNESS AND TYPE OF SEAL	N/A
DEPTH TO TOP OF FILTER SAND	N/A
TYPE OF FILTER AROUND SCREEN	N/A
TYPE OF MONITORING WELL	Galvanized Steel
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 4'
DEPTH TO BOTTOM OF MONITORING WELL	9.8'
DEPTH TO BOTTOM OF FILTER SAND	N/A
THICKNESS AND TYPE OF SEAL	N/A
DIAMETER OF BOREHOLE	N/A

L_1= 2.0 FT

L_2= 7.8 FT

L_3= 4.0 FT

L_4= 9.8 FT

INSTALLATION COMPLETED:
Date 10-11-85 Time 1:30

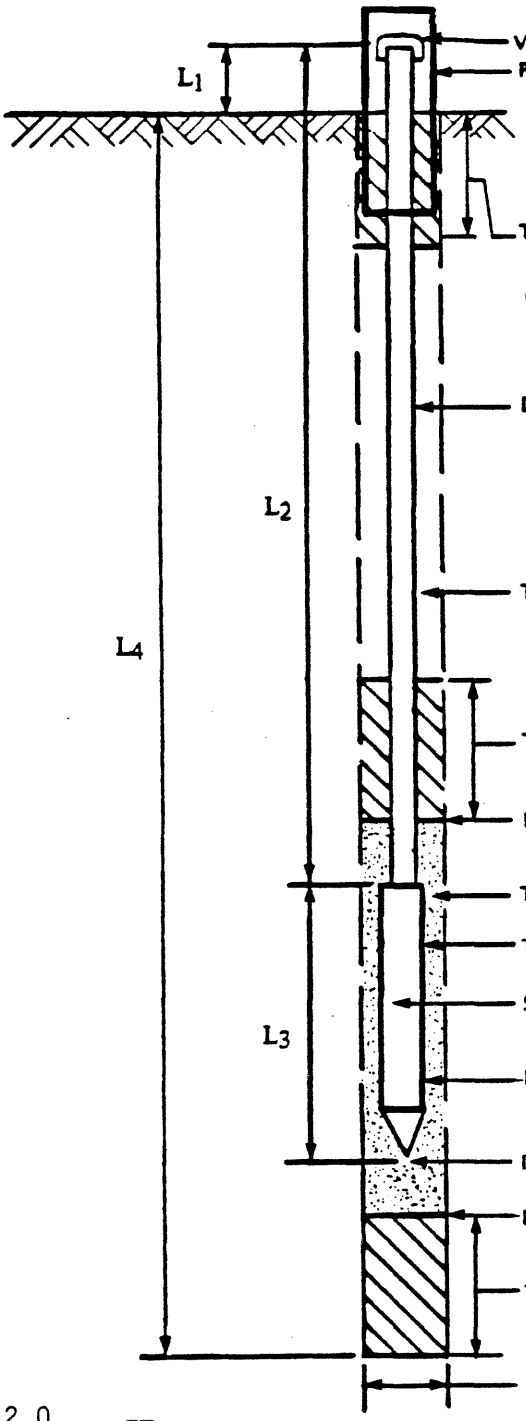
MONITORING WELL WATER LEVEL MEASUREMENTS			
DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)

(1) DEPTH BELOW TOP OF RISER PIPE

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 **MONITORING WELL NO.** 105

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION _____
(with cap removed)



VENTED CAP	
PROTECTIVE CASING	
Diameter and Type	4" Steel
Total Length	5.0'
Length Above Ground	2.2'
THICKNESS AND TYPE OF SEAL	0' to 3.0' Concrete
DIAMETER AND TYPE OF RISER PIPE	1½" PVC
TYPE OF BACKFILL AROUND RISER	Medium Sand
THICKNESS AND TYPE OF SEAL	None
DEPTH TO TOP OF FILTER SAND	3.0'
TYPE OF FILTER AROUND SCREEN	Medium Sand
TYPE OF MONITORING WELL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 2'
DEPTH TO BOTTOM OF MONITORING WELL	10.0'
DEPTH TO BOTTOM OF FILTER SAND	10.0'
THICKNESS AND TYPE OF SEAL	None (10.0'-11.5' Collapsed Soil)
DIAMETER OF BOREHOLE	7"

L_1= 2.0 FT

L_2= 10.0 FT

L_3= 2.0 FT

L_4= 11.5 FT

INSTALLATION COMPLETED:
Date 10-10-85 Time 3:55

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)

(1) DEPTH BELOW TOP OF RISER PIPE

SOIL EXPLORATION COMPANY

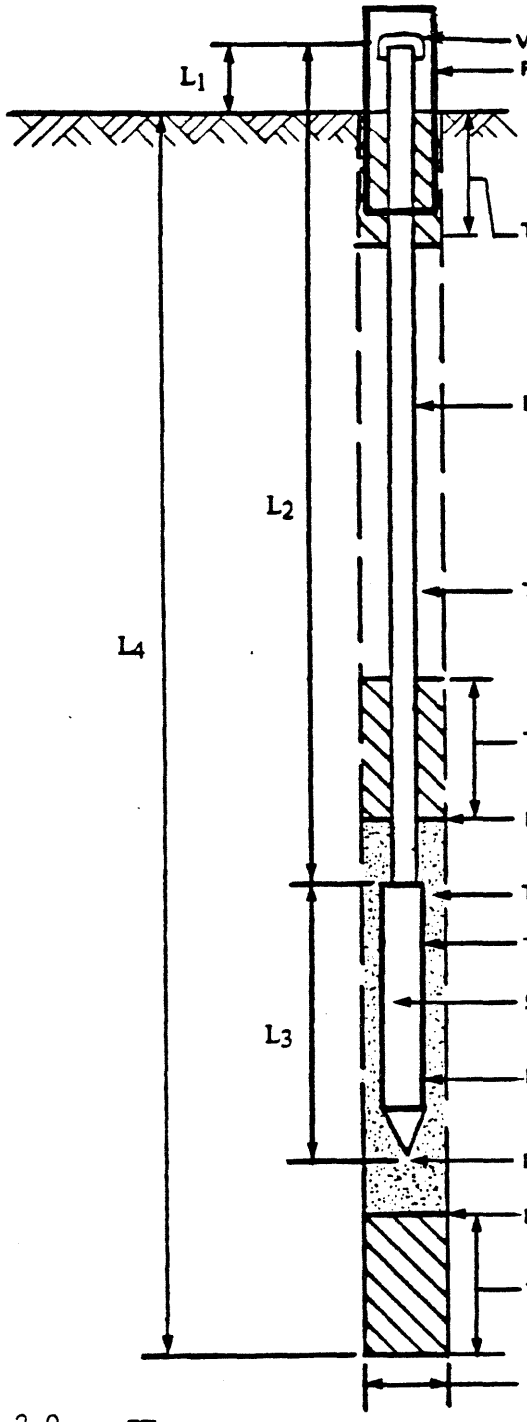
SE-29 (83-B)

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 **MONITORING WELL NO.** 106-A (See Note)

Note: Installed in unsampled borehole.

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION _____
(with cap removed)



VENTED CAP	
PROTECTIVE CASING	
Diameter and Type	4" Steel
Total Length	5.0'
Length Above Ground	2.2'
THICKNESS AND TYPE OF SEAL	0' to 2.5' Concrete
DIAMETER AND TYPE OF RISER PIPE	1½" PVC
TYPE OF BACKFILL AROUND RISER	Native Soil
THICKNESS AND TYPE OF SEAL	None
DEPTH TO TOP OF FILTER SAND	7.0'
TYPE OF FILTER AROUND SCREEN	Medium Sand
TYPE OF MONITORING WELL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 2'
DEPTH TO BOTTOM OF MONITORING WELL	10.0'
DEPTH TO BOTTOM OF FILTER SAND	10.0'
THICKNESS AND TYPE OF SEAL	None
DIAMETER OF BOREHOLE	7"

L_1= 2.0 FT

L_2= 10.0 FT

L_3= 2.0 FT

L_4= 10.0 FT

INSTALLATION COMPLETED:
Date 10-7-85 Time 10:25

MONITORING WELL WATER LEVEL MEASUREMENTS			
DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)

(1) DEPTH BELOW TOP OF RISER PIPE

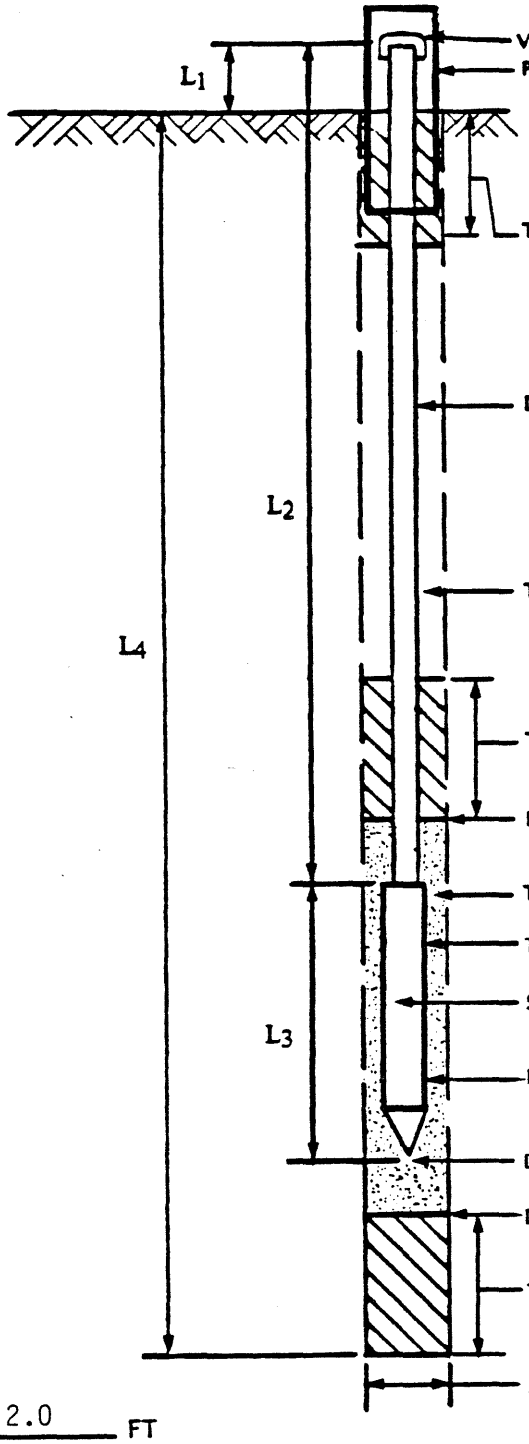
SOIL EXPLORATION COMPANY

SE-29 (83-B)

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 **MONITORING WELL NO.** 301

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION _____
(with cap removed)



VENTED CAP	
PROTECTIVE CASING Diameter and Type	4" Steel
Total Length	5.0'
Length Above Ground	2.2'
THICKNESS AND TYPE OF SEAL	0' to 3' Concrete 3' to 69½' Grout (Cement/Bentonite)
DIAMETER AND TYPE OF RISER PIPE	2" PVC
TYPE OF BACKFILL AROUND RISER	Grout
THICKNESS AND TYPE OF SEAL	Grout
DEPTH TO TOP OF FILTER SAND	69½'
TYPE OF FILTER AROUND SCREEN	Coarse Sand
TYPE OF MONITORING WELL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 5'
DEPTH TO BOTTOM OF MONITORING WELL	83.0'
DEPTH TO BOTTOM OF FILTER SAND	101.5'
THICKNESS AND TYPE OF SEAL	None
DIAMETER OF BOREHOLE	10" (0'-49') 6" (49'-101.5')

L_1= 2.0 FT

L_2= 80.0 FT

L_3= 5.0 FT

L_4= 101.5 FT

INSTALLATION COMPLETED:
Date 10-10-85 Time 1:15

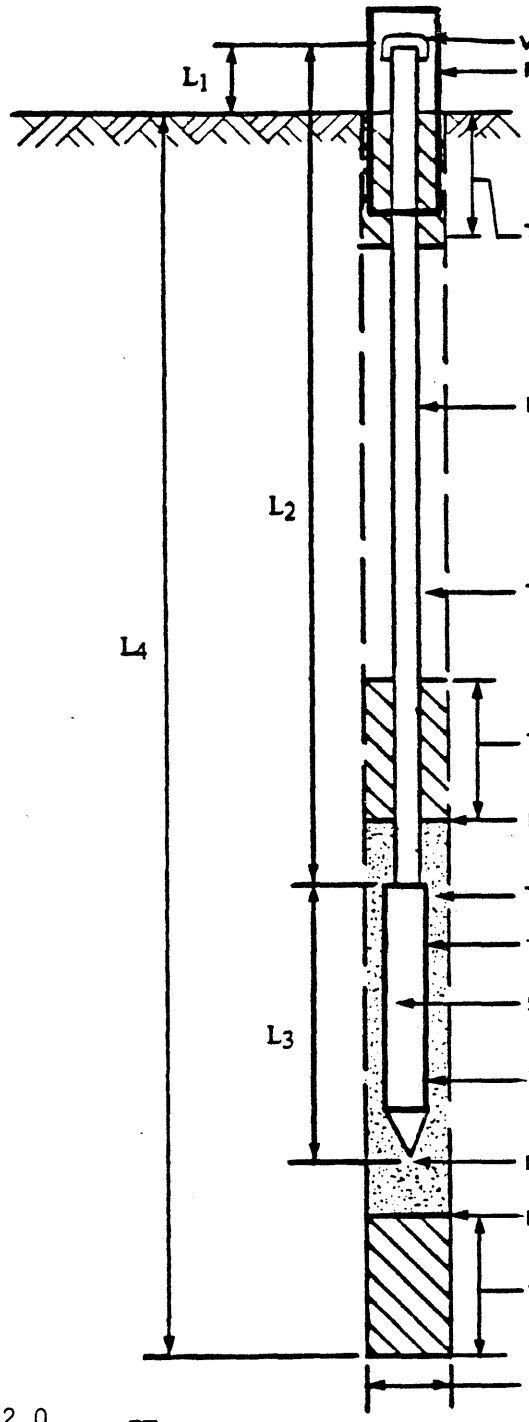
MONITORING WELL WATER LEVEL MEASUREMENTS			
DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)

(1) DEPTH BELOW TOP OF RISER PIPE

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 **MONITORING WELL NO.** 302

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION (with cap removed) _____



VENTED CAP	
PROTECTIVE CASING	
Diameter and Type	4" Steel
Total Length	5.0'
Length Above Ground	2.2'
THICKNESS AND TYPE OF SEAL	0' to 67.0' Grout (Cement/Bentonite)
DIAMETER AND TYPE OF RISER PIPE	2" PVC
TYPE OF BACKFILL AROUND RISER	Grout
THICKNESS AND TYPE OF SEAL	Grout
DEPTH TO TOP OF FILTER SAND	67.0'
TYPE OF FILTER AROUND SCREEN	Coarse Sand
TYPE OF MONITORING WELL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 5'
DEPTH TO BOTTOM OF MONITORING WELL	75.4'
DEPTH TO BOTTOM OF FILTER SAND	75.4'
THICKNESS AND TYPE OF SEAL	None (75.4' to 77.5' Collapsed Soil)
DIAMETER OF BOREHOLE	10" (0'-50') 6" (50'-77.5')

L_1= 2.0 FT

L_2= 72.4 FT

L_3= 5.0 FT

L_4= 77.5 FT

INSTALLATION COMPLETED:
Date 10-3-85 Time 12:10

MONITORING WELL WATER LEVEL MEASUREMENTS

DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)

(1) DEPTH BELOW TOP OF RISER PIPE

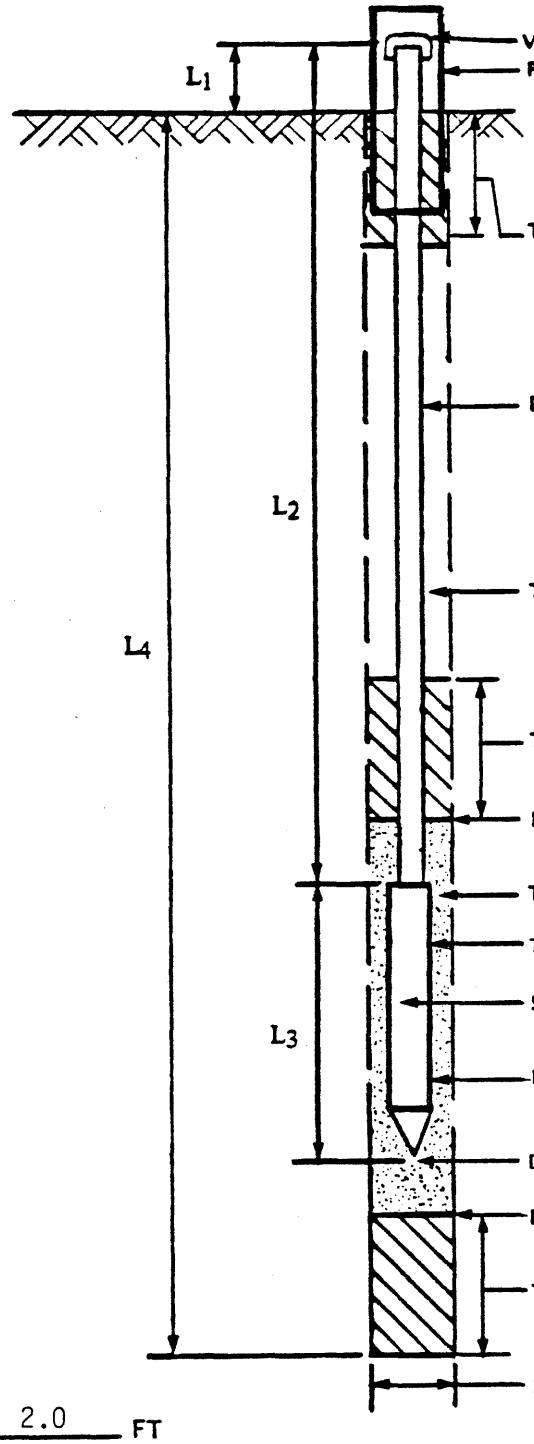
SOIL EXPLORATION COMPANY

SE-29 (83-B)

INSTALLATION OF MONITORING WELL

JOB NO. 120 86-1054 **MONITORING WELL NO.** 303

GROUND SURFACE ELEVATION _____ TOP OF RISER PIPE ELEVATION _____
(with cap removed)



Diameter and Type	4" Steel
Total Length	5.0'
Length Above Ground	2.2'
THICKNESS AND TYPE OF SEAL	0' to 3' Concrete 3' to 71.5' Grout (Cement/Bentonite)
DIAMETER AND TYPE OF RISER PIPE	2" PVC
TYPE OF BACKFILL AROUND RISER	Grout
THICKNESS AND TYPE OF SEAL	Grout
DEPTH TO TOP OF FILTER SAND	71.5'
TYPE OF FILTER AROUND SCREEN	Coarse Sand
TYPE OF MONITORING WELL	PVC
SCREEN GAUGE OR SIZE OF OPENINGS (SLOT NO.)	#10 Slot
DIAMETER AND LENGTH OF SCREEN	2" x 5'
DEPTH TO BOTTOM OF MONITORING WELL	78.0'
DEPTH TO BOTTOM OF FILTER SAND	78.0'
THICKNESS AND TYPE OF SEAL	None (78.0' to 79.0' Collapsed Soil)
DIAMETER OF BOREHOLE	10" (0'-50') 6" (50'-79')

L_1= 2.0 FT

L_2= 75.0 FT

L_3= 5.0 FT

L_4= 79.0 FT

INSTALLATION COMPLETED:
Date 9-27-85 Time 11:30

MONITORING WELL WATER LEVEL MEASUREMENTS			
DATE	TIME	BAILED DEPTHS	WATER LEVEL (1)

(1) DEPTH BELOW TOP OF RISER PIPE

SIEVE ANALYSIS TESTS

PROJECT: Anoka County-Blaine Airport, Blaine, Minnesota

DATE 10-10-85

REPORTED TO: Barr Engineering Company

JOB NO. 120 86-1054

BORING NO.	101	103	106	302	302	303			
SAMPLE NO.	4	4	3	4	17	16			
DEPTH (in ft.)	10-11	10-11	10-11	15-16	76-77½	75-76			
SOIL TYPE	Silty Sand, fine grained(SM)	Silty Sand, fine grained(SM)	Sand w/Silt, fine grained(SP-SM)	Sand w/Silt, fine grained(SP-SM)	Silty Sand, fine grained(SM)	Sand w/Silt, fine grained(SP-SM)			
WEIGHT OF TOTAL SAMPLE (grams)	207	189	229	246	202	220			
BASED ON TOTAL SAMPLE, % FINER THAN 3"									
2"									
1½"									
1"									
3/4"									
3/8"									
4									
10	100.0	100.0	100.0	100.0	100.0	100.0			
40	99.9	Trace	98.3	Trace	Trace	99.9			
100	57.8	80.8	34.5	46.7	94.6	35.0			
200	16.4	17.7	4.9	10.7	13.8	6.4			

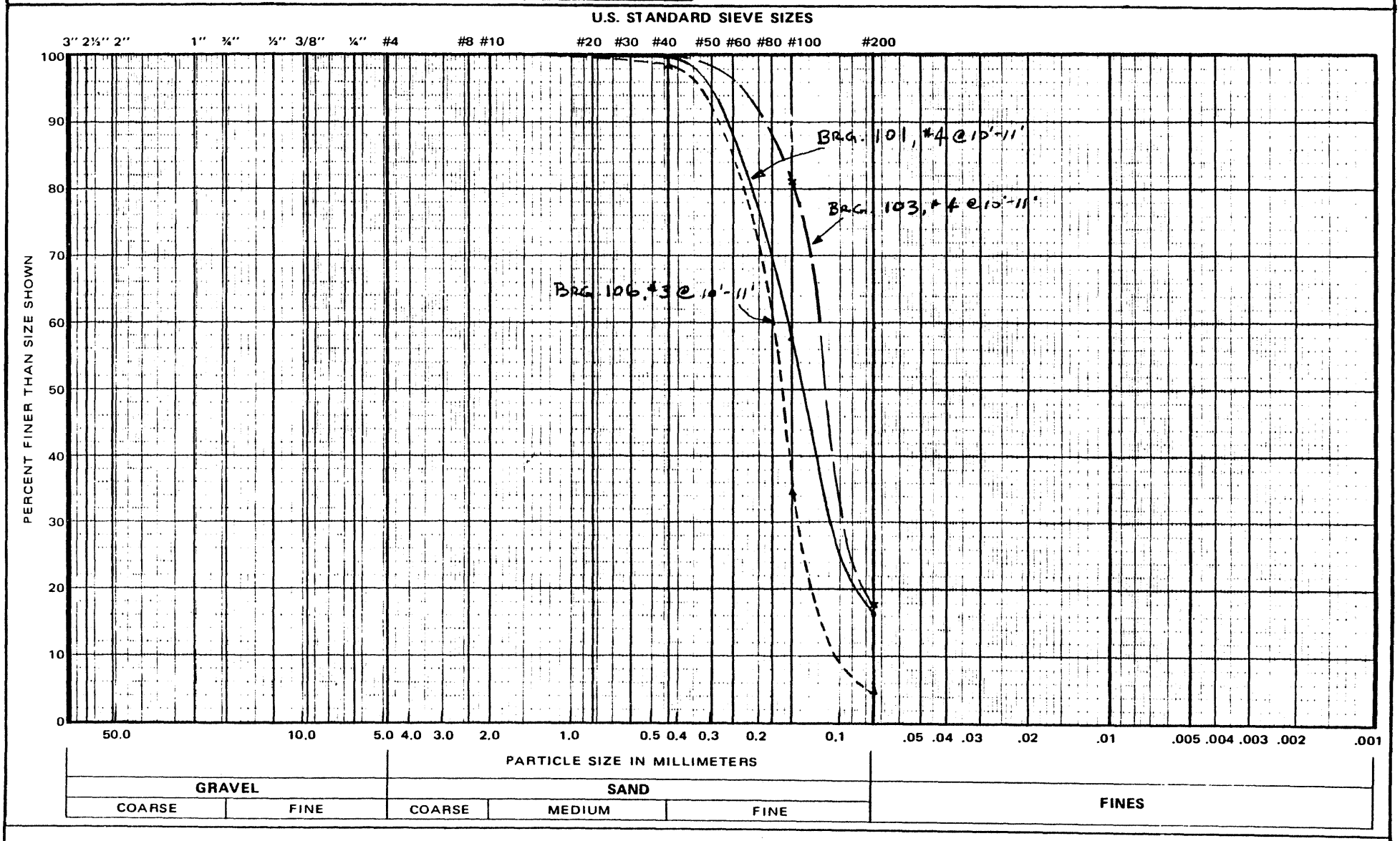
GRAIN SIZE DISTRIBUTION CURVE

Boring Number	Sample Number	Depth (ft)	Soil Classification
101	4	10-11	Silty Sand, fine grained (SM)
103	4	10-11	Silty Sand, fine grained (SM)
106	3	10-11	

Job No. 120 86-1054 Date 10-11-85

Project Anoka County-Blaine Airport
Blaine, Minnesota

Reported To Barr Engineering Co



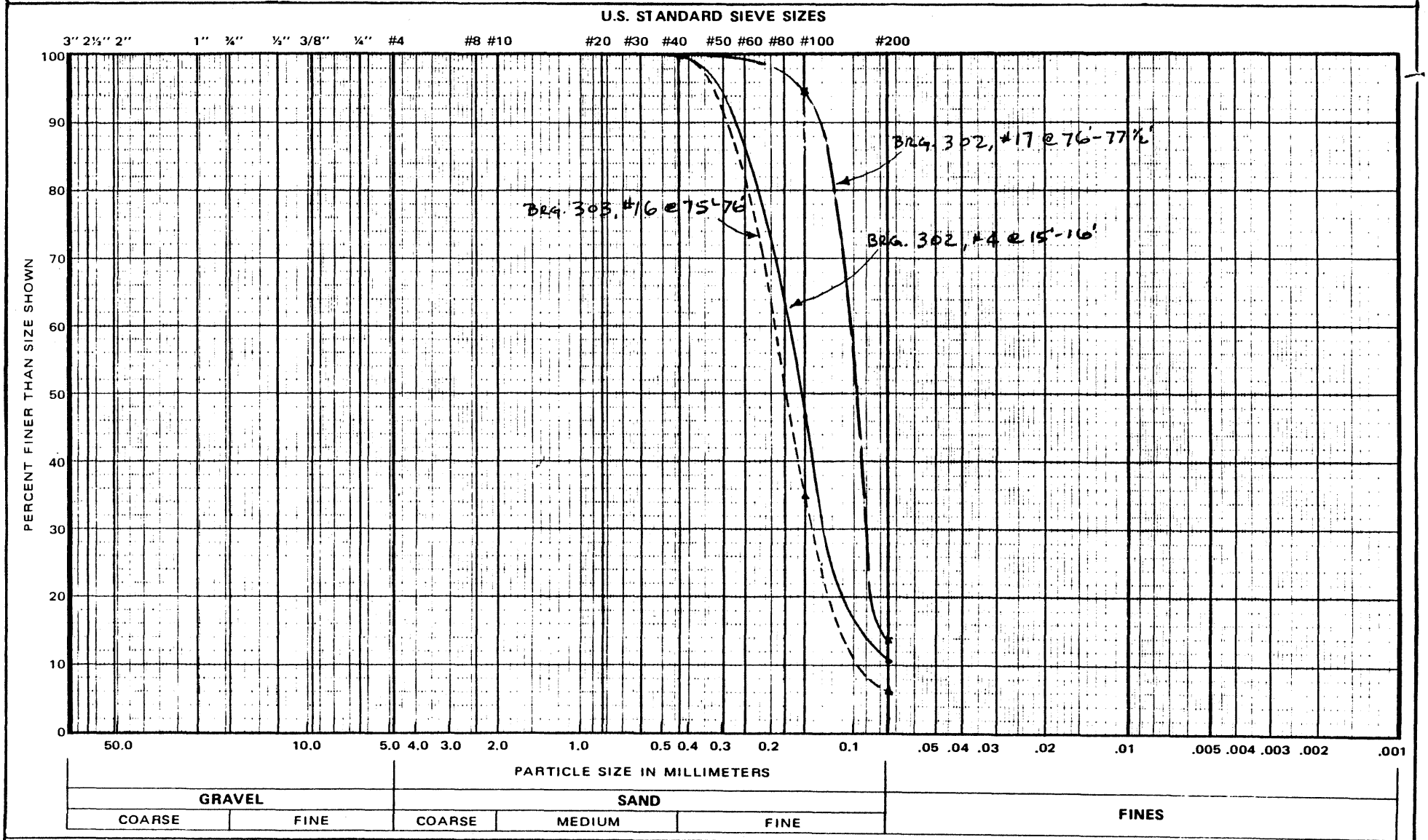
GRAIN SIZE DISTRIBUTION CURVE

Boring Number	Sample Number	Depth (ft)	Soil Classification
302	4	15-16	Sand w/Silt, fine grained (SP-SM)
302	17	76-77½	Silty Sand, fine grained (SM)
303	16	75-76	Sand w/Silt, fine grained (SP-SM)

Job No. 120 86-1054 Date 10-11-85

Project Anoka County-Blaine Airport
Blaine, Minnesota

Reported To Barr Engineering Company



GENERAL NOTES

DRILLING AND SAMPLING SYMBOLS

SYMBOL	DEFINITION
HSA	3 1/4" I.D. Hollow Stem Auger
_FA	4", 6" or 10" Diameter Flight Auger
_HA	2", 4" or 6" Hand Auger
_DC	2 1/2", 4", 5" or 6" Steel Drive Casing
_RC	Size A, B, or N Rotary Casing
PD	Pipe Drill or Cleanout Tube
CS	Continuous Split Barrel Sampling
DM	Drilling Mud
JW	Jetting Water
SB	2" O.D. Split Barrel Sample
_L	2 1/2" or 3 1/2" O.D. SB Liner Sample
_T	2" or 3" Thin Walled Tube Sample
3TP	3" Thin Walled Tube (Pitcher Sampler)
_TO	2" or 3" Thin Walled Tube (Osterberg Sampler)
W	Wash Sample
B	Bag Sample
P	Test Pit Sample
_Q	BQ, NQ, or PQ Wireline System
_X	AX, BX, or NX Double Tube Barrel
CR	Core Recovery - Percent
NSR	No Sample Recovered, classification based on action of drilling equipment and/or material noted in drilling fluid or on sampling bit.
NMR	No Measurement Recorded, primarily due to presence of drilling or coring fluid.
▼	Water Level Symbol

TEST SYMBOLS

SYMBOL	DEFINITION
W	Water Content - % of Dry Wt. - ASTM D 2216
D	Dry Density - Pounds Per Cubic Foot
LL, PL	Liquid and Plastic Limit - ASTM D 4318
	Additional Insertions in Last Column
Qu	Unconfined Comp. Strength-psf - ASTM D 2166
Pq	Penetrometer Reading - Tons/Square Foot
Ts	Torvane Reading - Tons/Square Foot
G	Specific Gravity - ASTM D 854
SL	Shrinkage Limits - ASTM D 427
OC	Organic Content - Combustion Method
SP	Swell Pressure - Tons/Square Foot
PS	Percent Swell
FS	Free Swell - Percent
pH	Hydrogen Ion Content, Meter Method
SC	Sulfate Content - Parts/Million, same as mg/L
CC	Chloride Content - Parts/Million, same as mg/L
C*	One Dimensional Consolidation - ASTM D 2435
Qc*	Triaxial Compression
D.S.*	Direct Shear - ASTM D 3080
K*	Coefficient of Permeability - cm/sec
D*	Dispersion Test
DH*	Double Hydrometer - ASTM D 4221
MA*	Particle Size Analysis - ASTM D 422
R	Laboratory Resistivity, in ohm - cm - ASTM G 57
E*	Pressuremeter Deformation Modulus - TSF
PM*	Pressuremeter Test
VS*	Field Vane Shear - ASTM D 2573
IR*	Infiltrometer Test - ASTM D 3385
RQD	Rock Quality Designation - Percent

* See attached data sheet or graph

WATER LEVEL

Water levels shown on the boring logs are the levels measured in the borings at the time and under the conditions indicated. In sand, the indicated levels may be considered reliable ground water levels. In clay soil, it may not be possible to determine the ground water level within the normal time required for test borings, except where lenses or layers of more pervious waterbearing soil are present. Even then, an extended period of time may be necessary to reach equilibrium. Therefore, the position of the water level symbol for cohesive or mixed texture soils may not indicate the true level of the ground water table. Perched water refers to water above an impervious layer, thus impeded in reaching the water table. The available water level information is given at the bottom of the log sheet.

DESCRIPTIVE TERMINOLOGY

DENSITY TERM	"N" VALUE	CONSISTENCY TERM
Very Loose	0-4	Soft
Loose	5-8	Medium
Medium Dense	9-15	Rather Stiff
Dense	16-30	Stiff
Very Dense	Over 30	Very Stiff

Standard "N" Penetration: Blows Per Foot of a 140 Pound Hammer Falling 30 inches on a 2 inch OD Split Barrel Sampler

Lamination	Up to 1/2" thick stratum
Layer	1/2" to 6" thick stratum
Lens	1/2" to 6" discontinous stratum, pocket
Varved	Alternating laminations of clay, silt and /or fine grained sand, or colors thereof
Dry	Powdery, no noticeable water
Moist	Below saturation
Wet	Saturated, above liquid limit
Waterbearing	Pervious soil below water

RELATIVE GRAVEL PROPORTIONS

CONDITION	TERM	RANGE
Coarse Grained Soils	A little gravel	2 - 14%
	With gravel	15 - 49%
Fine Grained Soils		
15-29% + No. 200	A little gravel	2 - 7%
15-29% + No. 200	With gravel	8 - 29%
30% + No. 200	A little gravel	2 - 14%
30% + No. 200	With gravel	15 - 24%
30% + No. 200	Gravelly	16 - 49%

RELATIVE SIZES

Boulder	Over 12"
Cobble	3" - 12"
Gravel	
Coarse	3/4" - 3"
Fine	#4 - 3/4"
Sand	
Coarse	#4 - #10
Medium	#10 - #40
Fine	#40 - #200
Silt & Clay	- #200, Based on Plasticity

CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D 2487 - 83
(Based on Unified Soil Classification System)

SOIL ENGINEERING

			Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]	Soil Classification: Group Symbol	Soil Classification: Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	$Cu \geq 4$ and $1 \leq Cc \leq 3^E$	GW	Well graded gravel[F]
			$Cu < 4$ and/or $1 > Cc > 3^E$	GP	Poorly graded gravel[F]
		Gravels with Fines More than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	$Cu \geq 6$ and $1 \leq Cc \leq 3^E$	SW	Well-graded sand[I]
			$Cu < 6$ and/or $1 > Cc > 3^E$	SP	Poorly graded sand[I]
		Sands with Fines More than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve	Silts and Clays Liquid limit less than 50	inorganic	PI > 7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI < 4 or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OL	Organic clay[K,L,M,N] Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		organic	Liquid limit - oven dried / Liquid limit - not dried < 0.75	OH	Organic clay[K,L,M,P] Organic silt[K,L,M,Q]
Highly organic soils			Primarily organic matter, dark in color, and organic odor	PT	Peat
Fibric Peat > 67% Fibers			Hemic Peat 33%-67% Fibers	Sapric Peat < 33% Fibers	

[A] Based on the material passing the 3-in. (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded gravel with silt
- GW-GC well-graded gravel with clay
- GP-GM poorly graded gravel with silt
- GP-GC poorly graded gravel with clay

[D] Sands with 5 to 12% fines require dual symbols:
- SW-SM well-graded sand with silt
- SW-SC well-graded sand with clay
- SP-SM poorly graded sand with silt
- SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥30% plus no. 200, predominantly sand, add "sandy" to to group name.

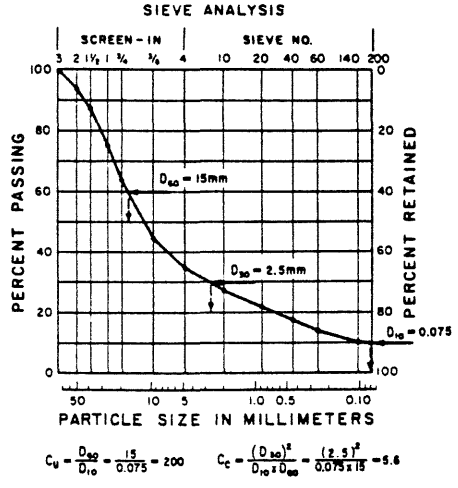
[M] If soil contains ≥30% plus No. 200, predominantly gravel, add "gravelly" to group name.

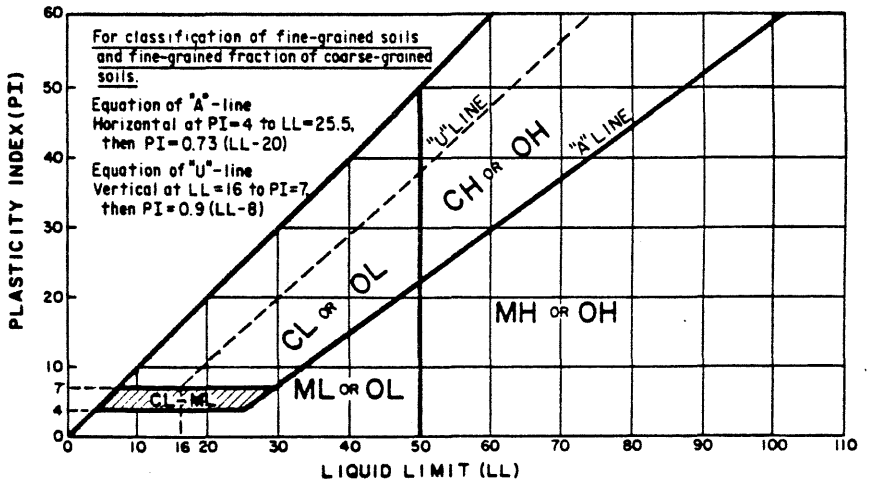
[N] PI ≥ 4 and plots on or above "A" line.

[O] PI ≤ 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.





APPENDIX 2H

MPCA NOISE RULES

CHAPTER 7010
MINNESOTA POLLUTION CONTROL AGENCY
AIR QUALITY DIVISION
NOISE POLLUTION CONTROL RULES

7010.0100 DEFINITIONS.
7010.0200 SEVERABILITY.
7010.0300 VARIANCE.
7010.0400 NOISE STANDARDS.
7010.0500 NOISE AREA CLASSIFICATION SYSTEM ACCORDING TO LAND ACTIVITY AT RECEIVER.
7010.0600 MEASUREMENT PROCEDURE.
7010.0700 EXCEPTIONS.

MOTOR VEHICLE NOISE LIMITS
7010.1000 DEFINITION.
7010.1100 PROHIBITIONS.
7010.1200 SCOPE.
7010.1300 EXCEPTIONS.
7010.1400 NOISE LIMIT FOR VEHICLES OVER 10,000 POUNDS.
7010.1500 MOTOR VEHICLE NOISE LIMITS FOR MOTORCYCLES
7010.1600 NOISE LIMITS FOR OTHER VEHICLES.

7010.0100 DEFINITIONS.

For the purpose of all noise pollution control rules:

A. "ANSI" means the American National Standards Institute or its successor bodies.

B. "Agency" means the Minnesota Pollution Control Agency, its agent, or representative.

C. "dBA" is a unit of sound level. "dBA" is the weighted sound pressure level by the use of the A metering characteristic and weighting as specified in ANSI Specification for Sound Level Meters, S1.4 - 1971, which is hereby incorporated by reference. For the purpose of these parts, dBA is used as a measure of human response to sound.

D. "Daytime hours" are those from 7:00 a.m. to 10:00 p.m. (0700-2200).

E. "Decibel" is a unit of sound pressure level, abbreviated dB.

F. "Director" means the executive director of the Minnesota Pollution Control Agency.

G. "Impulsive noise" means either a single sound pressure peak (with either a rise time less than 200 milliseconds or total duration less than 200 milliseconds) or multiple sound pressure peaks (with either rise times less than 200 milliseconds or total duration less than 200 milliseconds) spaced at least by 200 millisecond pauses.

H. "L_{10}" is the sound level, expressed in dBA, which is exceeded ten percent of the time for a one hour survey, as measured by test procedures approved by the director.

I. "L_{50}" is the sound level, expressed in dBA, which is exceeded 50 percent of the time for a one hour survey, as measured by test procedures approved by the director.

J. "Nighttime hours" are those from 10:00 p.m. to 7:00 a.m. (2200-0700).

K. "Noise" means any sound not occurring in the natural environment, including, but not limited to, sounds emanating from aircraft and highways, and industrial, commercial, and residential sources.

L. "Nonimpulsive noise" means all noise not included in the definition of impulsive noise.

M. "Person" means any human being, any municipality, or other governmental or political subdivision, or any other public agency, any public or private corporation, any partnership, firm, association, or other organization, any receiver trustee, assignee, agent, or other legal representative of any of the

foregoing, or any other legal entity, but does not include the Minnesota Pollution Control Agency.

N. "SLUCM" means the Standard Land Use Coding Manual (1969, United States Government Printing Office) which designates land activities by means of numerical codes.

O. "Sound" is an oscillation in pressure, stress, particle displacement, particle velocity, etc., in an elastic or partially elastic medium, or the superposition of such propagated alterations.

P. "Sound pressure level" is 20 times the logarithm to the base ten of the ratio of the pressure of a sound, p, to the reference pressure, p_r. For the purposes of these parts, the reference pressure shall be 20 micronewtons per square meter (20 $\mu N/m^2$). In equation form, sound pressure level in units of decibels is expressed as:

$$SPL\ (dB) = 20 \log_{10} p/p_r$$

Statutory Authority: *MS s 116.07 subds 2,4*

7010.0200 SEVERABILITY.

If any provision of any rule or the application thereof to any person or circumstances is held to be invalid, such invalidity shall not affect other provision or application, and to this end the provisions of all rules and the various applications thereof are declared to be severable.

Statutory Authority: *MS s 116.07 subds 2,4*

7010.0300 VARIANCE.

Whereupon written application of the responsible person or persons, the agency finds that by reason of exceptional circumstances strict conformity with any provisions of any noise rule would cause undue hardship, would be unreasonable, impractical, or not feasible under the circumstances, the agency may permit a variance upon such conditions and within such time limitations as it may prescribe for the prevention, control, or abatement of noise pollution in harmony with the intent of the state and any applicable federal laws.

Statutory Authority: *MS s 116.07 subds 2,4*

7010.0400 NOISE STANDARDS.

These standards describe the limiting levels of sound established on the basis of present knowledge for the preservation of public health and welfare. These standards are consistent with speech, sleep, annoyance, and hearing conservation requirements for receivers within areas grouped according to land activities by the noise area classification (NAC) system herein described. However, these standards do not, by themselves, identify the limiting levels of impulsive noise needed for the preservation of public health and welfare.

	Day (0700-2200)		Night (2200-0700)	
NAC	L_{50}	L_{10}	L_{50}	L_{10}
1	60	65	50	55
2	65	70	65	70
3	75	80	75	80

Statutory Authority: *MS s 166.07 subds 2,4*

7010.0500 NOISE AREA CLASSIFICATION SYSTEM ACCORDING TO LAND ACTIVITY AT RECEIVER.

Subpart 1. **In general.** Acceptable sound levels for the receiver are a function of the intended activity in that land area. The following noise area classifications are grouped and defined by the SLUCM numerical codes and descriptions.

Subp. 2. NAC-1. Noise area classification-1 (NAC-1) includes the following land activities:

NAC-1

11	Household units (includes farm houses)
12	Group quarters
13	Residential hotels
14	Mobile home parks or courts
15	Transient lodgings
19	Other residential, NEC*
397	Motion picture production
651	Medical and other health services
674	Correctional institutions
68	Educational services
691	Religious activities
71	Cultural activities and nature exhibitions
721	Entertainment assembly
7491	Camping and picnicking areas (designated)
75	Resorts and group camps
79	Other cultural, entertainment, and recreational activities, NEC

Subp. 3. NAC-2. Noise area classification-2 (NAC-2) includes the following land activities:

NAC-2

4113	Railroad terminals (passenger)
4115	Railroad terminals (passenger and freight)
4122	Rapid rail transit and street railway passenger terminals
4211	Bus passenger terminals (intercity)
4212	Bus passenger terminals (local)
4213	Bus passenger terminals (intercity and local)
429	Other motor vehicle transportation, NEC
4312	Airport and flying field terminals (passenger)
4314	Airport and flying field terminals (passenger and freight)
4411	Marine terminals (passenger)
4413	Marine terminals (passenger and freight)
46	Automobile parking
4721	Telegraph message centers
492	Transportation services and arrangements
51	Wholesale trade
52	Retail trade – building materials, hardware, and farm equipment
53	Retail trade – general merchandise
54	Retail trade – food
55	Retail trade – automotive, marine craft, aircraft, and accessories
56	Retail trade – apparel and accessories
57	Retail trade – furniture, home furnishings, and equipment
58	Retail trade – eating and drinking
59	Other retail trade, NEC
61	Finance, insurance, and real estate services
62	Personal services
63	Business services
64	Repair services

652 Legal services
659 Other professional services, NEC
66 Contract construction services
67 Governmental services (except 674)
69 Miscellaneous services (except 691)
72 Public assembly (except 721, 7223)
73 Amusements (except 731)
74 Recreational activities (except 7491)
76 Parks

Subp. 4. NAC-3. Noise area classification-3 (NAC-3) includes the following land activities:

NAC-3
21 Food and kindred products – manufacturing
22 Textile mill products – manufacturing
23 Apparel and other finished products made from fabrics, leather, and similar materials – manufacturing
24 Lumber and wood products (except furniture) – manufacturing
25 Furniture and fixtures – manufacturing
26 Paper and allied products – manufacturing
27 Printing, publishing, and allied industries
28 Chemicals and allied products – manufacturing
29 Petroleum refining and related industries
31 Rubber and miscellaneous plastic products – manufacturing
32 Stone, clay, and glass products – manufacturing
33 Primary metal industries
34 Fabricated metal products – manufacturing
35 Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks – manufacturing
39 Miscellaneous manufacturing, NEC (except 397)
41 Railroad, rapid rail transit, and street railway transportation (except 4113, 4115, 4122)
42 Motor vehicle transportation (except 4211, 4212, 4213, 429)
43 Aircraft transportation (except 4312, 4314)
44 Marine craft transportation (except 4411, 4413)
45 Highway and street right-of-way
47 Communication (except 4721)
48 Utilities
49 Other transportation, communication, and utilities, NEC (except 492)
7223 Race tracks
731 Fairgrounds and amusement parks
81 Agriculture
82 Agricultural and related activities
83 Forestry activities and related services (including commercial forest land, timber production, and other related activities)
84 Fishing activities and related services
85 Mining activities and related services
89 Other resource production and extraction, NEC

Subp. 5. **NAC-4.** Noise area classification-4 (NAC-4) includes the following land activities:

NAC-4

91 Undeveloped and unused land area (excluding noncommercial forest development)
92 Noncommercial forest development
93 Water areas
94 Vacant floor area
95 Under construction
99 Other undeveloped land and water areas, NEC

*NEC = Not elsewhere coded

Statutory Authority: *MS s 116.07 subds 2,4*

7010.0600 MEASUREMENT PROCEDURE.

A measurement procedure approved by the director shall be used to determine the acceptability of sound levels in a given area. Such measurements shall be made at the point of human activity in the receiving area which is nearest the noise source and which is typical for the noise area classification category of the receiving area, except where existing barriers, obstructions, or reflecting surfaces prevent an accurate measurement. All measurements shall be made outdoors.

Statutory Authority: *MS s 116.07 subds 2,4*

7010.0700 EXCEPTIONS.

A. The standards of NAC-2 may apply to buildings within the following NAC-1 categories: 11, 12, 13, 14, 15, 19, 397, 651, 68, 691, 71, 721, if all of the following conditions are met:

(1) the building is constructed and insulated in such a way as to assure that the exterior-interior sound level attentuation, measured under a measurement procedure approved by the director, is at least 30 dBA;

(2) the building possesses year-around indoor climate control; and

(3) the building has no facilities intended for outdoor activities, including but not limited to yards, swimming pools, patios, balconies, tennis courts, golf course, gardens, and picnic areas.

B. The NAC-1 day standards may apply to land uses in NAC-1 categories during nighttime hours in lieu of NAC-1 night standards if such land uses are not intended for overnight sleeping.

Statutory Authority: *MS s 116.07 subds 2,4*

MOTOR VEHICLE NOISE LIMITS

7010.1000 DEFINITION.

"Motor vehicle" means any self-propelled vehicle not operated exclusively upon railroad tracks and any vehicle propelled or drawn by a self-propelled vehicle and includes vehicles known as trackless trolleys which are propelled by electric power obtained from overhead trolley wires but not operated upon rails, except snowmobiles.

Statutory Authority: *MS s 116.07 subd 4*

7010.1100 PROHIBITIONS.

Subpart 1. **Operation of vehicle.** No person shall operate either a motor vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 at any time or under any condition of grade, load, acceleration, or deceleration in such a manner as to exceed the noise limits contained herein for the category of motor vehicle and speed limits specified,

Subp. 2. **Sale of vehicle.** No person shall sell or offer for sale a new motor vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 which when maintained according to the manufacturer's specifications would exceed the noise limits contained herein for the category of motor vehicle and speed limits specified, when tested with a measurement procedure approved by the director.

Subp. 3. **Modification of vehicle.** No person shall modify a motor vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 in a manner which will amplify or increase the noise emitted by the vehicle, above the noise limits contained herein for the category of motor vehicle and speed limits specified, when tested with a measurement procedure approved by the director. No person shall operate a motor vehicle so modified.

Subp. 4. **Sale of parts.** No person shall sell or offer for sale replacement or additional parts for a motor vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 which when installed in the vehicle will amplify or increase the noise emitted by the vehicle, above the noise limits contained herein for the category of motor vehicle and speed limits specified, when tested with a measurement procedure approved by the director. No person shall operate a motor vehicle incorporating such parts.

Statutory Authority: *MS s 116.07 subd 4*

7010.1200 SCOPE.

This chapter applies to the total noise from a vehicle or combination of vehicles of a type subject to registration pursuant to Minnesota Statutes, chapter 168 and shall not be construed as limiting or precluding the enforcement of any other provision of law relating to motor vehicle exhaust noise.

Statutory Authority: *MS s 116.07 subd 4*

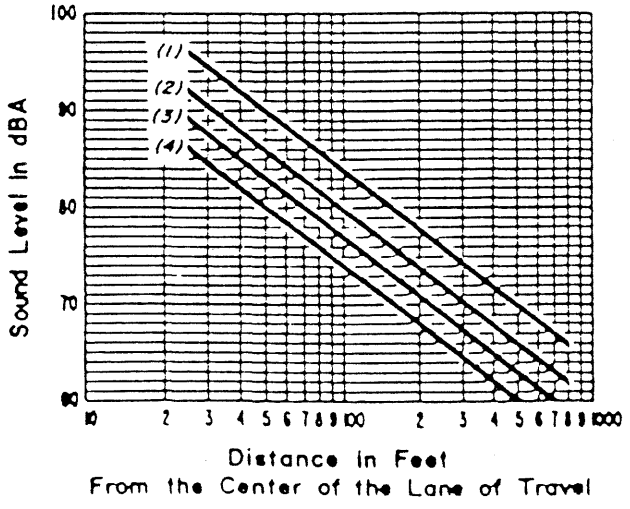
7010.1300 EXCEPTIONS.

Vehicles under parts 7010.1500 and 7010.1600 are allowed to exceed the noise limits contained herein when performing acceleration maneuvers for safety purposes.

Statutory Authority: *MS s 116.07 subd 4*

7010.1400 NOISE LIMIT FOR VEHICLES OVER 10,000 POUNDS.

Motor vehicle noise limits for vehicles with a manufacturer's gross vehicle weight rating of more than 10,000 pounds and any combination of vehicles towed by such motor vehicle.



A. Speed limits greater than 35 mph.

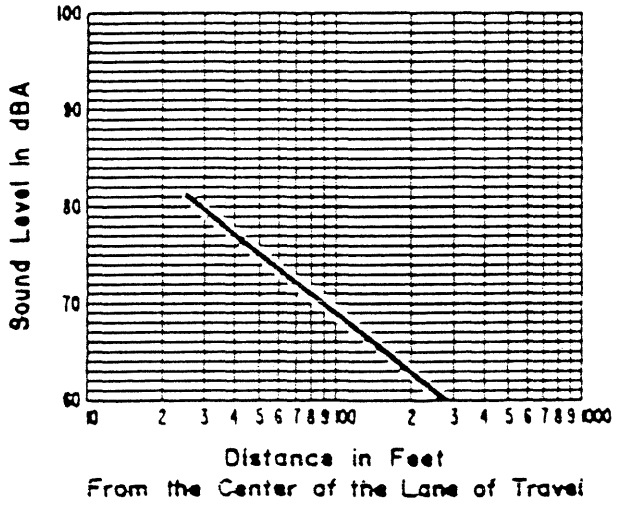
B. Speed limits equal to or less than 35 mph and stationary run-up tests (for vehicles with governed engines). For stationary run-up tests on all-paved surfaces, add 2 dBA.

C. Speed limits equal to or less than 35 mph and stationary run-up tests (for vehicles with governed engines), for vehicles manufactured on or after January 1, 1978. For stationary run-up tests on all-paved surfaces, add 2 dBA.

D. Speed limits equal to or less than 35 mph and stationary run-up tests (for vehicles with governed engines), for vehicles manfuactured on or after January 1, 1982. For stationary run-up tests on all-paved surfaces, add 2 dBA.

Statutory Authority: *MS s 116.07 subd 4*

7010.1500 MOTOR VEHICLE NOISE LIMITS FOR MOTORCYCLES.



A. For vehicles manufactured before January 1, 1975.

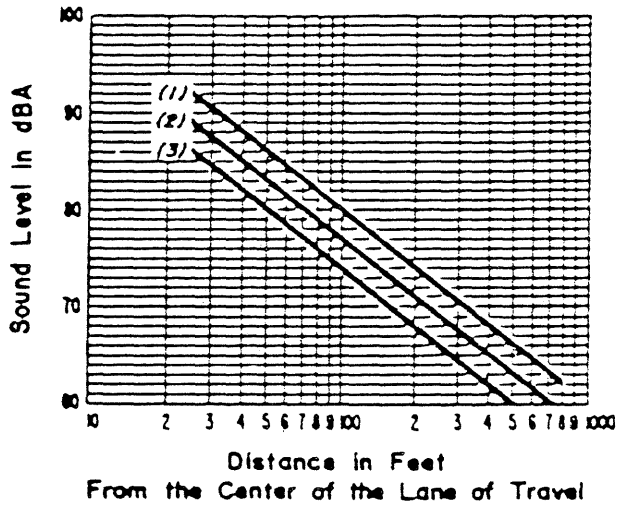
B. Speed limits greater than 35 mph for vehicles manufactured on or after January 1, 1975.

C. Speed limits equal to or less than 35 mph for vehicles manufactured on or after January 1, 1975.

Statutory Authority: *MS s 116.07 subd 4*

7010.1600 NOISE LIMITS FOR OTHER VEHICLES.

Motor vehicle noise limits for any other motor vehicle not included under parts 7010.1400 and 7010.1500 and any combination of vehicles towed by such motor vehicle.



Statutory Authority: *MS s 116.07 subd 4*

APPENDIX 2I

HIGHWAY CAPACITY CALCULATIONS

APPENDIX
SUMMARY OF LEVEL OF SERVICE
ANALYSIS

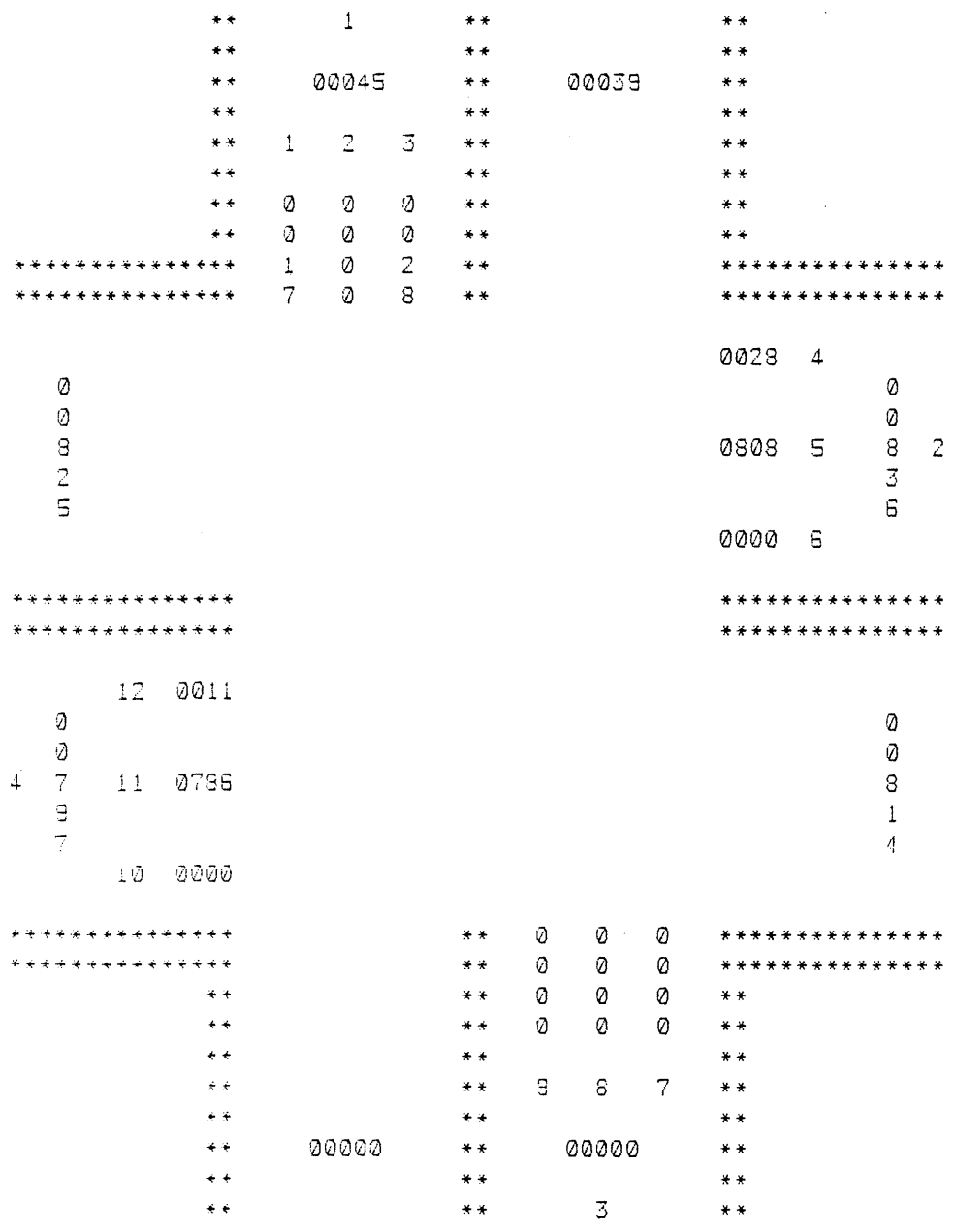
AA TRAF 1			Seq.	Cycle	Degree of Sat.	Level of Service
1-54	TH 65 and 89th Street	1985	31	60	.61	C
55-108	TH 65 and 89th Street	1990	11	60	.59	A
109-162	TH 65 and 89th Street	2000	37*	90	.82	E
163-216	Radisson Road and Airport Access	1985	11	60	.20	A
217-270	Radisson Road and Airport Access	1990	11	60	.14	A
271-324	Radisson Road and Airport Access	2000	11	60	.15	A
325-378	Airport Access North and North County Line	1985	11	60	.41	A
379-432	Airport Access North and North County Line	1990	11	60	.45	A
433-486	Airport Access North and North County Line	2000	11	60	.22	A

*Revised from Standard Phase #37

Level of service ranges from "A" which is excellent to "F" which is complete breakdown

ANOKA AIRPORT -- NOVEMBER 8, 1985
NORTH COUNTY LINE AND AIRPORT ACCESS ROAD
1990 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - MAP OF DESIGN HOUR VOLUMES



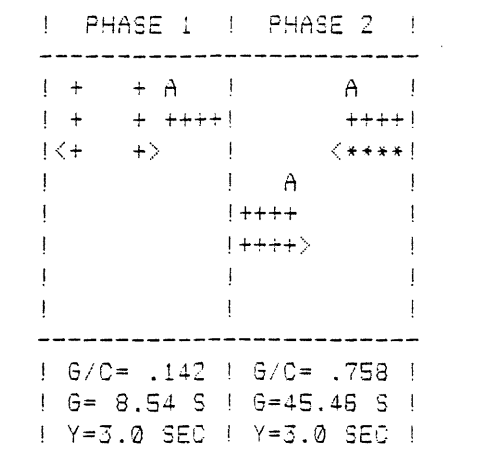
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ANOKA AIRPORT -- NOVEMBER 8, 1985
NORTH COUNTY LINE AND AIRPORT ACCESS ROAD
1990 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - CAPACITY ANALYSIS WORKSHEET

BASIC CONDITIONS:
  METRO POPLTN 2000000
  METRO LOCATN OUTLNG   DEGREE OF SATURATION .45

SEQUENCE 11

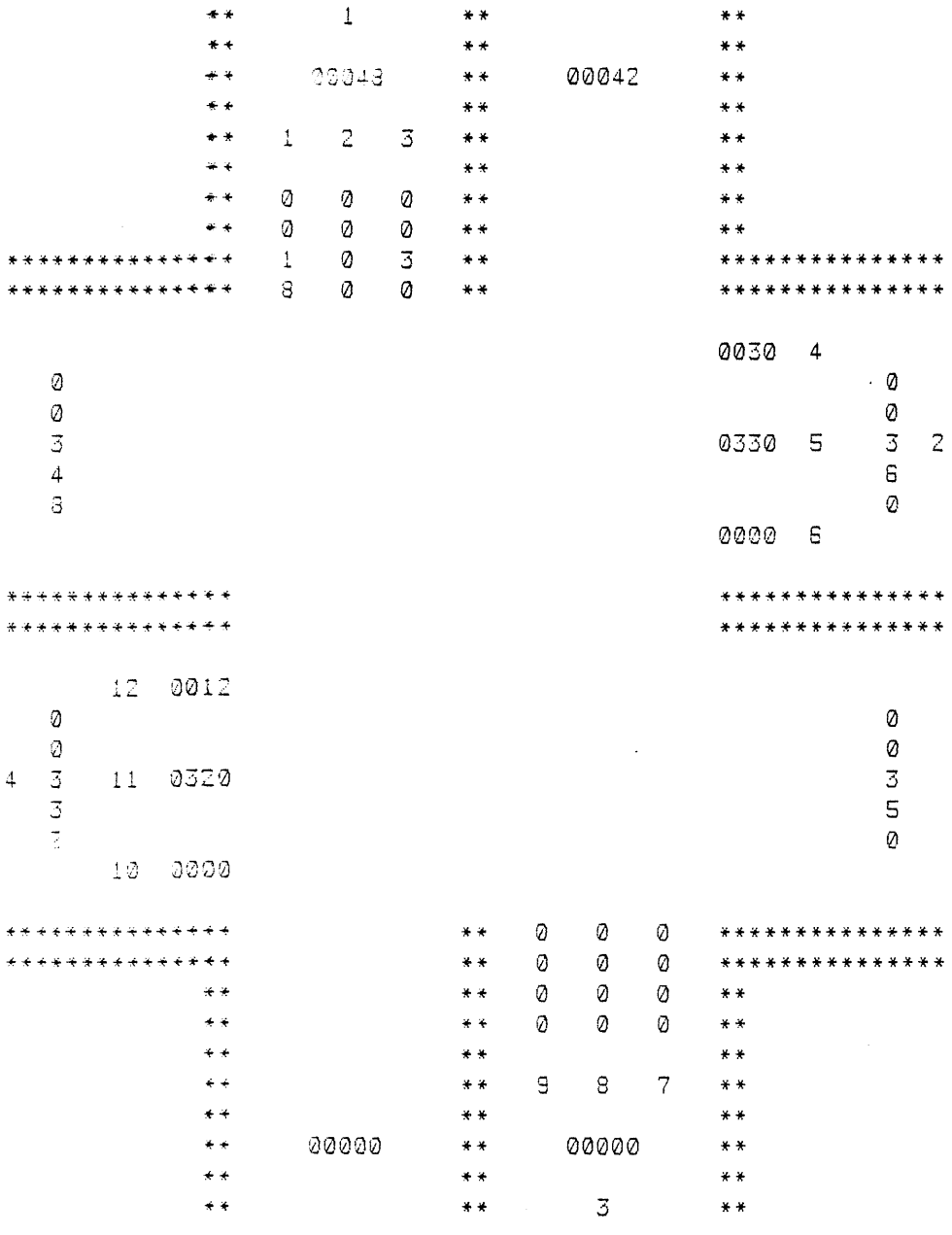


C= 60 SEC G= 54.0 SEC = 90.0% Y= 6.0 SEC = 10.0% PED= 0.0 SEC = 0.0%

MOVMNT	WDTH /LNS	CHT REF	G/C REQD	G/C USED	SRVC VOLUME C (VPH)	SRVC VOLUME E	DHV	L S	MAXIMUM QUEUE
APPROACH N PHF= .90 TK= 3% RT= 37.8% LT= 62.2% NO BUS STOP									
LT+TH+RT	12/1	4	.06	.14	113	140	45	*A	32 FEET
APPROACH E PHF= .90 TK= 3% RT= 3.3% LT= 0.0% NO BUS STOP									
RT	12/1	18A	.03	1.00	980	1274	29	A	25 FEET
TH	12/1	4	.44	.76	1379	1708	309	*A	166 FEET
APPROACH W PHF= .90 TK= 3% RT= 0.0% LT= 1.4% NO BUS STOP									
TH	12/1	4	.43	.76	1379	1708	786	A	161 FEET
LT	12/1	17B	0.00	.76	96	125	11	A	25 FEET

ANOKA AIRPORT -- NOVEMBER 8, 1985
NORTH COUNTY LINE AND AIRPORT ACCESS ROAD
2000 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - MAP OF DESIGN HOUR VOLUMES



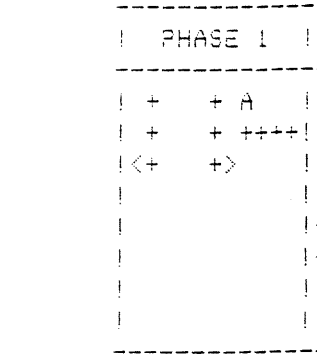
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ANOKA AIRPORT -- NOVEMBER 9, 1985
NORTH COUNTY LINE AND AIRPORT ACCESS ROAD
2000 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - CAPACITY ANALYSIS WORKSHEET

BASIC CONDITIONS:
  METRO POPLTN 2000000
  METRO LOCATN OUTLNG   DEGREE OF SATURATION .22

SEQUENCE 11

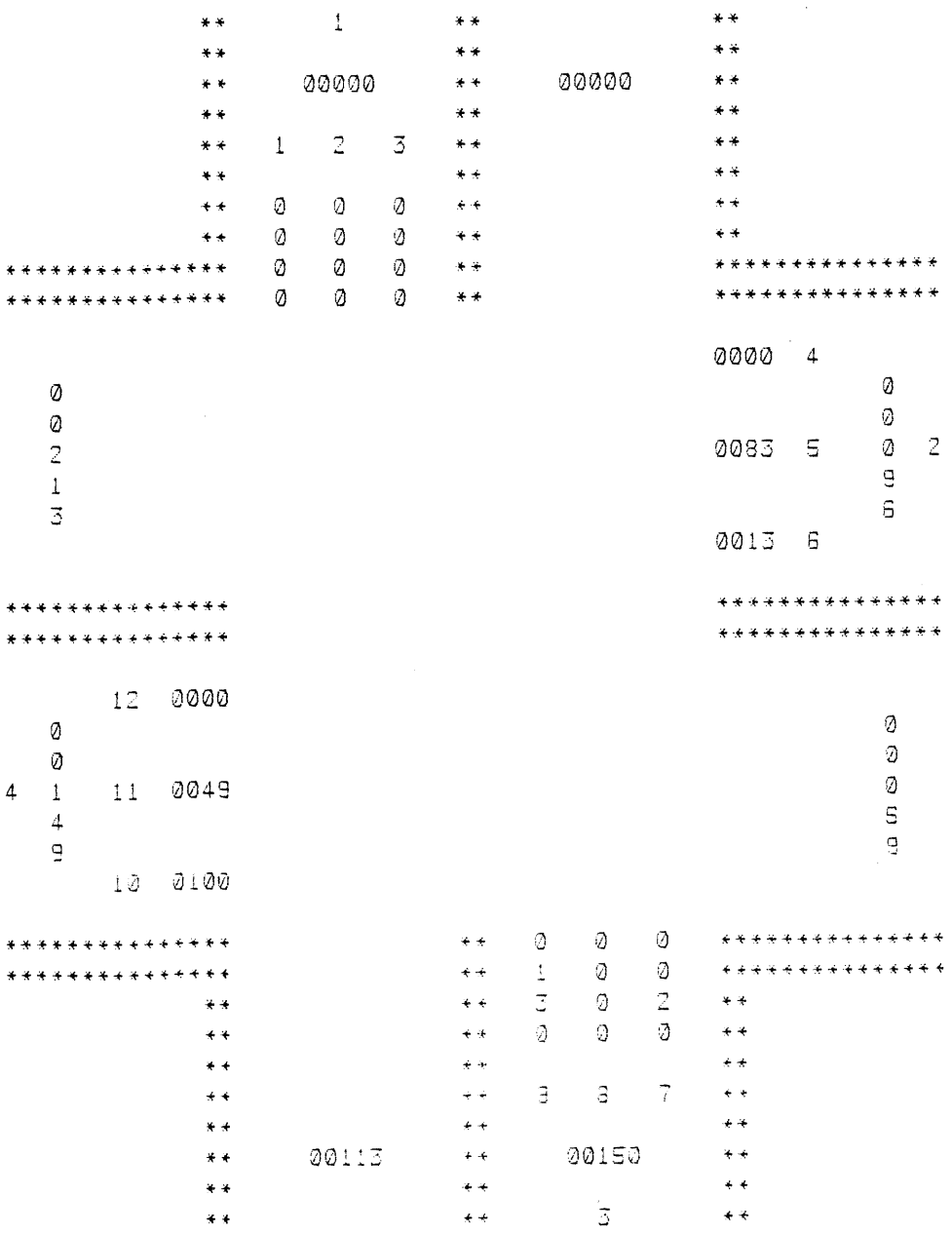


C= 60 SEC G= 54.0 SEC = 90.0% Y= 6.0 SEC = 10.0% PED= 0.0 SEC = 0.0%

MOVMNT	WDTH /LNS	CHT REF	G/C REQD	G/C USED	SRVC VOLUME C (VPH)	SRVC VOLUME E	DHV	L S	MAXIMUM QUEUE
APPROACH N PHF= .90 TK= 3% RT= 37.5% LT= 62.5% NO BUS STOP									
LT+TH+RT	12/1	4	.06	.28	225	279	48	*A	29 FEET
APPROACH E PHF= .90 TK= 3% RT= 8.3% LT= 0.0% NO BUS STOP									
RT	12/1	18A	.03	1.00	980	1274	30	A	25 FEET
TH	12/1	4	.18	.62	1122	1390	330	*A	107 FEET
APPROACH W PHF= .90 TK= 3% RT= 0.0% LT= 3.6% NO BUS STOP									
TH	12/1	4	.18	.62	1122	1390	320	A	104 FEET
LT	12/1	17A	0.00	.62	390	507	12	A	25 FEET

ANOKA AIRPORT -- NOVEMBER 8, 1985
RADISSON ROAD AND ACCESS TO AIRPORT
1990 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - MAP OF DESIGN HOUR VOLUMES



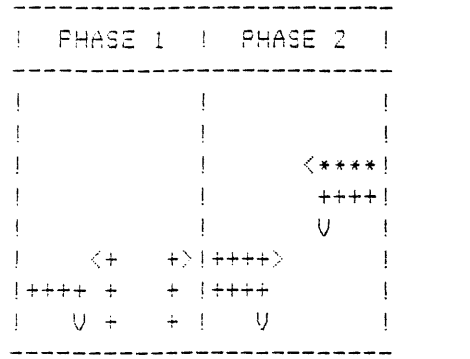
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ANCKA AIRPORT -- NOVEMBER 8, 1985
RADISSON ROAD AND ACCESS TO AIRPORT
1990 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - CAPACITY ANALYSIS WORKSHEET

BASIC CONDITIONS:
  METRO POPLTN 2000000
  METRO LOCATN OUTLNG   DEGREE OF SATURATION .14

SEQUENCE 11

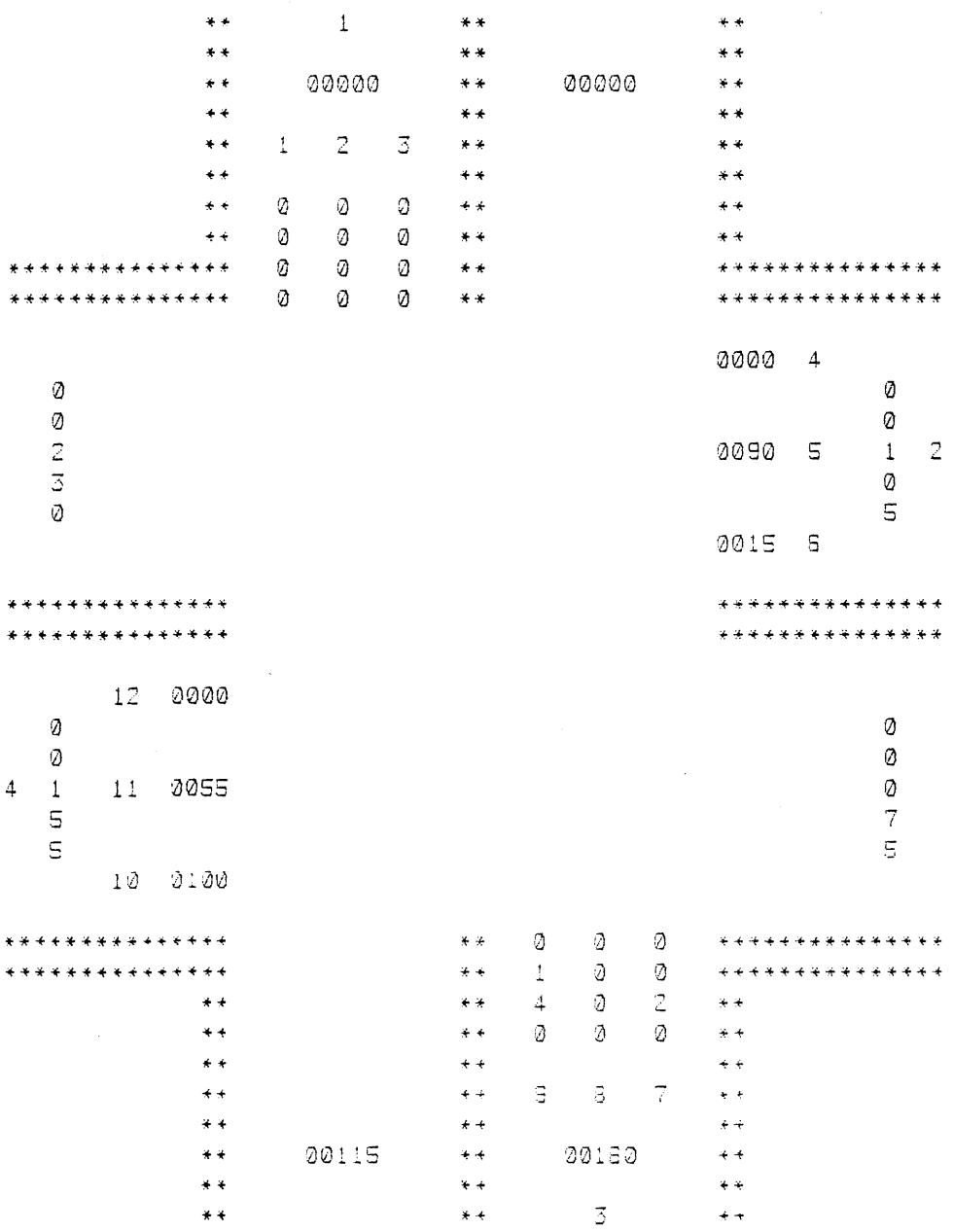


C= 60 SEC G= 54.0 SEC = 90.0% Y= 6.0 SEC = 10.0% PED= 0.0 SEC = 0.0%

MOVMNT	WDTH /LNS	CHT REF	G/C REQD	G/C USED	SRVC VOLUME C (VPH) E	DHV	L S	MAXIMUM QUEUE
APPROACH E PHF= .90 TK= 5% RT= 0.0% LT= 13.5% NO BUS STOP								
TH	12/1	4	.05	.30	528	654	83 *A	50 FEET
LT	12/1	17A	0.00	.30	289	376	13 A	25 FEET
APPROACH S PHF= .90 TK= 5% RT= 13.3% LT= 86.7% NO BUS STOP								
LT+TH+RT	12/1	4	.17	.60	533	660	150 *A	50 FEET
APPROACH W PHF= .90 TK= 5% RT= 67.1% LT= 0.0% NO BUS STOP								
RT	12/1	18A	.10	1.00	960	1248	100 A	25 FEET
TH	12/1	4	.03	.30	528	654	49 A	29 FEET

ANOKA AIRPORT -- NOVEMBER 8, 1985
RADISSON ROAD AND ACCESS TO AIRPORT
2000 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - MAP OF DESIGN HOUR VOLUMES



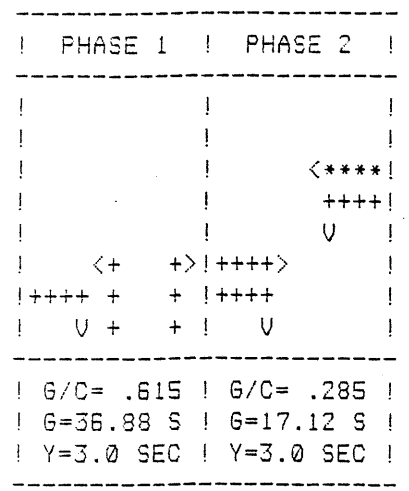
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ANOKA AIRPORT -- NOVEMBER 8, 1985
RADISSON ROAD AND ACCESS TO AIRPORT
2000 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - CAPACITY ANALYSIS WORKSHEET

BASIC CONDITIONS:
  METRO POPLTN 2000000
  METRO LOCATN OUTLNG   DEGREE OF SATURATION .15

SEQUENCE 11

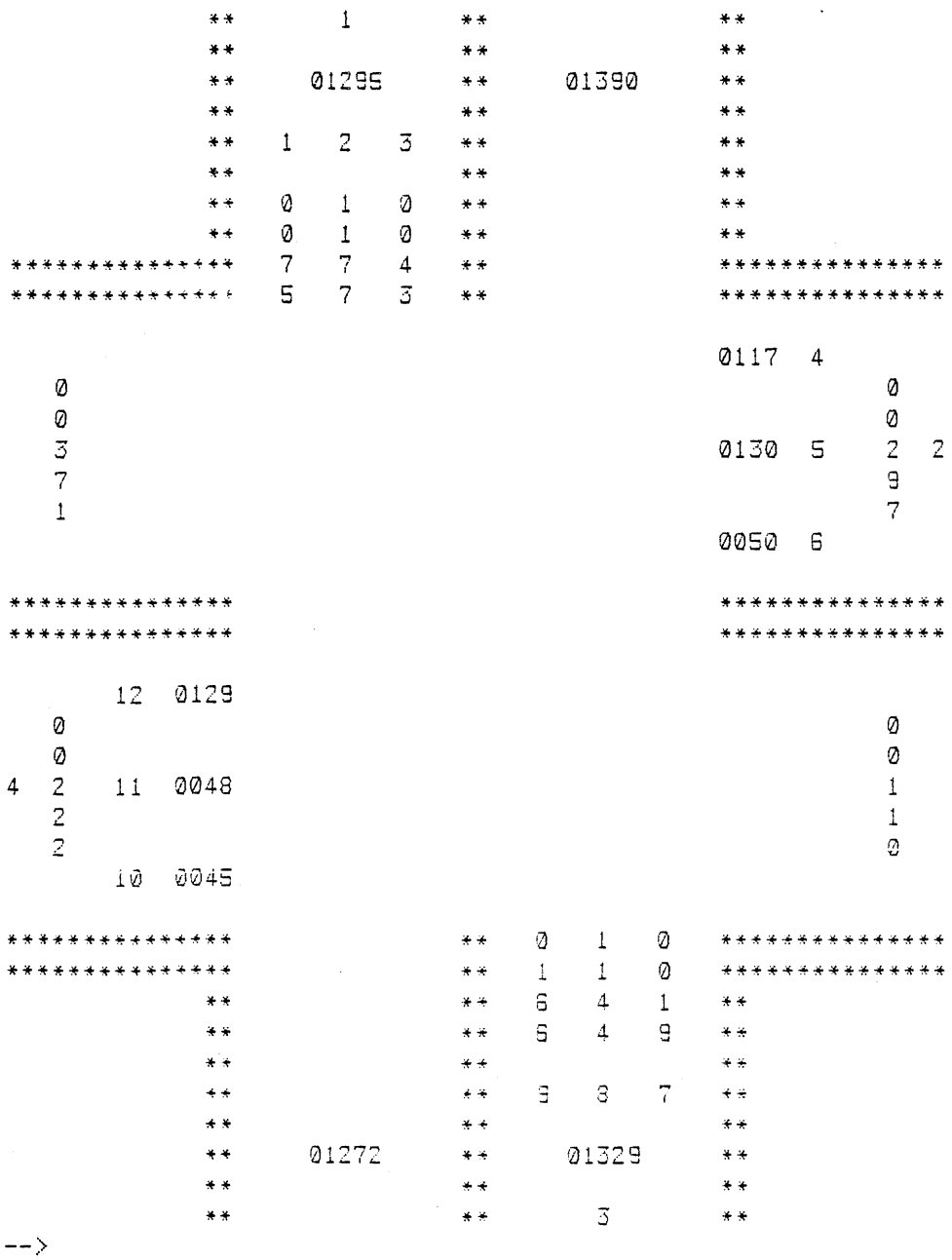


C= 60 SEC G= 54.0 SEC = 90.0% Y= 6.0 SEC = 10.0% PED= 0.0 SEC = 0.0%

MOVMNT	WDTH /LNS	CHT REF	G/C REQD	G/C USED	SRVC VOLUME C (VPH)	SRVC VOLUME E	DHV	L S	MAXIMUM QUEUE
APPROACH E PHF= .90 TK= 5% RT= 0.0% LT= 14.3% NO BUS STOP									
TH	12/1	4	.05	.29	509	631	90	*A	55 FEET
LT	12/1	17A	0.00	.29	271	352	15	A	25 FEET
APPROACH S PHF= .90 TK= 5% RT= 12.5% LT= 87.5% NO BUS STOP									
LT+TH+RT	12/1	4	.18	.61	548	678	160	*A	52 FEET
APPROACH W PHF= .90 TK= 5% RT= 64.5% LT= 0.0% NO BUS STOP									
RT	12/1	18A	.10	1.00	960	1248	100	A	25 FEET
TH	12/1	4	.03	.29	509	631	55	A	33 FEET

ANOKA AIRPORT -- NOVEMBER 8, 1985
TH 65 (CENTRAL AVENUE) AND 89TH STREET
1985 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - MAP OF DESIGN HOUR VOLUMES



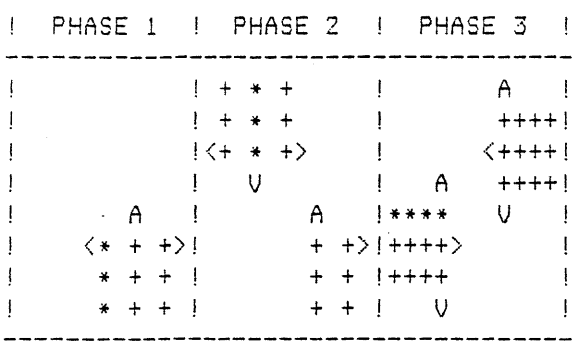
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ANOKA AIRPORT -- NOVEMBER 8, 1985
TH 65 (CENTRAL AVENUE) AND 89TH STREET
1985 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - CAPACITY ANALYSIS WORKSHEET

BASIC CONDITIONS:
METRO POPLTN 2000000
METRO LOCATN OUTLNG DEGREE OF SATURATION .61

SEQUENCE 31



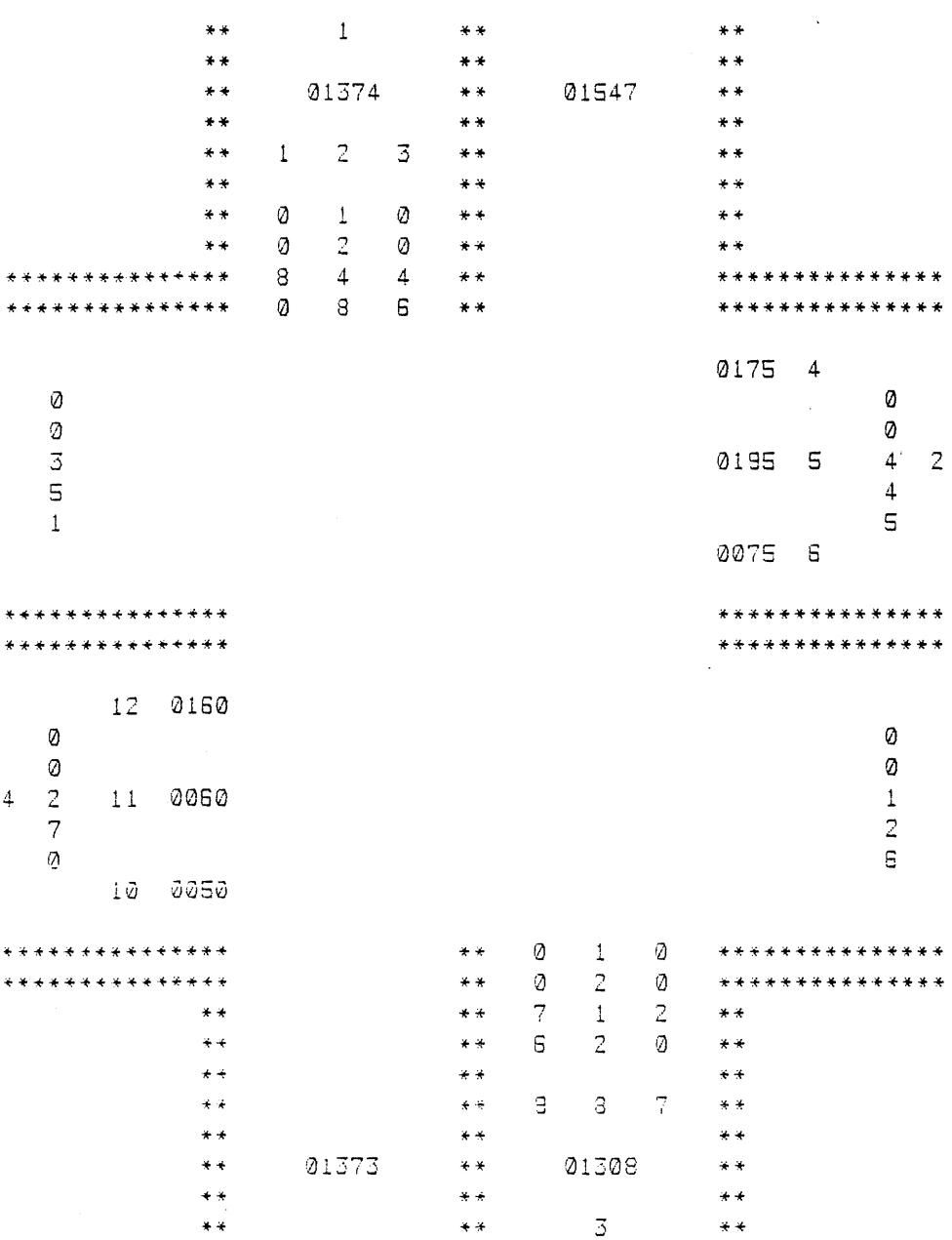
PHASE 1	PHASE 2	PHASE 3
G/C= .164	G/C= .444	G/C= .242
G= 9.86 S	G=26.63 S	G=14.51 S
Y=3.0 SEC	Y=3.0 SEC	Y=3.0 SEC

C= 60 SEC G= 51.0 SEC = 85.0% Y= 9.0 SEC = 15.0% PED= 0.0 SEC = 0.0%

MOVMNT	WDTH /LNS	CHT REF	G/C REQD	G/C USED	SRVC VOLUME C (VPH)	E	VOLUME DHV	L S	MAXIMUM QUEUE
APPROACH N PHF= .90 TK= 4% RT= 5.8% LT= 3.3% NO BUS STOP									
RT	12/1+	17D	.07	.44	484	630	75	A	35 FEET
TH	24/2	4	.41	.44	1271	1523	1177	*C+	279 FEET
LT	12/1+	17B	0.00	.44	96	125	43	A	25 FEET
APPROACH E PHF= .90 TK= 4% RT= 39.4% LT= 16.8% NO BUS STOP									
LT+TH+RT	24/2	4	.14	.24	502	601	297	A	96 FEET
APPROACH S PHF= .90 TK= 4% RT= 1.4% LT= 12.5% NO BUS STOP									
RT	12/1+	17D	.02	.66	718	934	19	A	25 FEET
TH	24/2	4	.40	.66	1885	2257	1144	A	166 FEET
LT	12/1+	18B	.15	.16	179	233	166	*C+	118 FEET
APPROACH W PHF= .90 TK= 4% RT= 20.3% LT= 58.1% NO BUS STOP									
LT+TH+RT	24/2	17A	.22	.24	150	195	222	*B+	71 FEET

ANOKA AIRPORT -- NOVEMBER 8, 1985
TH 65 (CENTRAL AVENUE) AND 89TH STREET
1990 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - MAP OF DESIGN HOUR VOLUMES



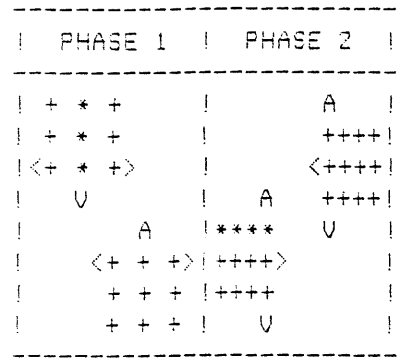
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ANOKA AIRPORT -- NOVEMBER 8, 1988
TH 88 (CENTRAL AVENUE) AND 89TH STREET
1990 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - CAPACITY ANALYSIS WORKSHEET

BASIC CONDITIONS:
  METRO POPLTN 2000000
  METRO LOCATN OUTLNG   DEGREE OF SATURATION .59

SEQUENCE 11



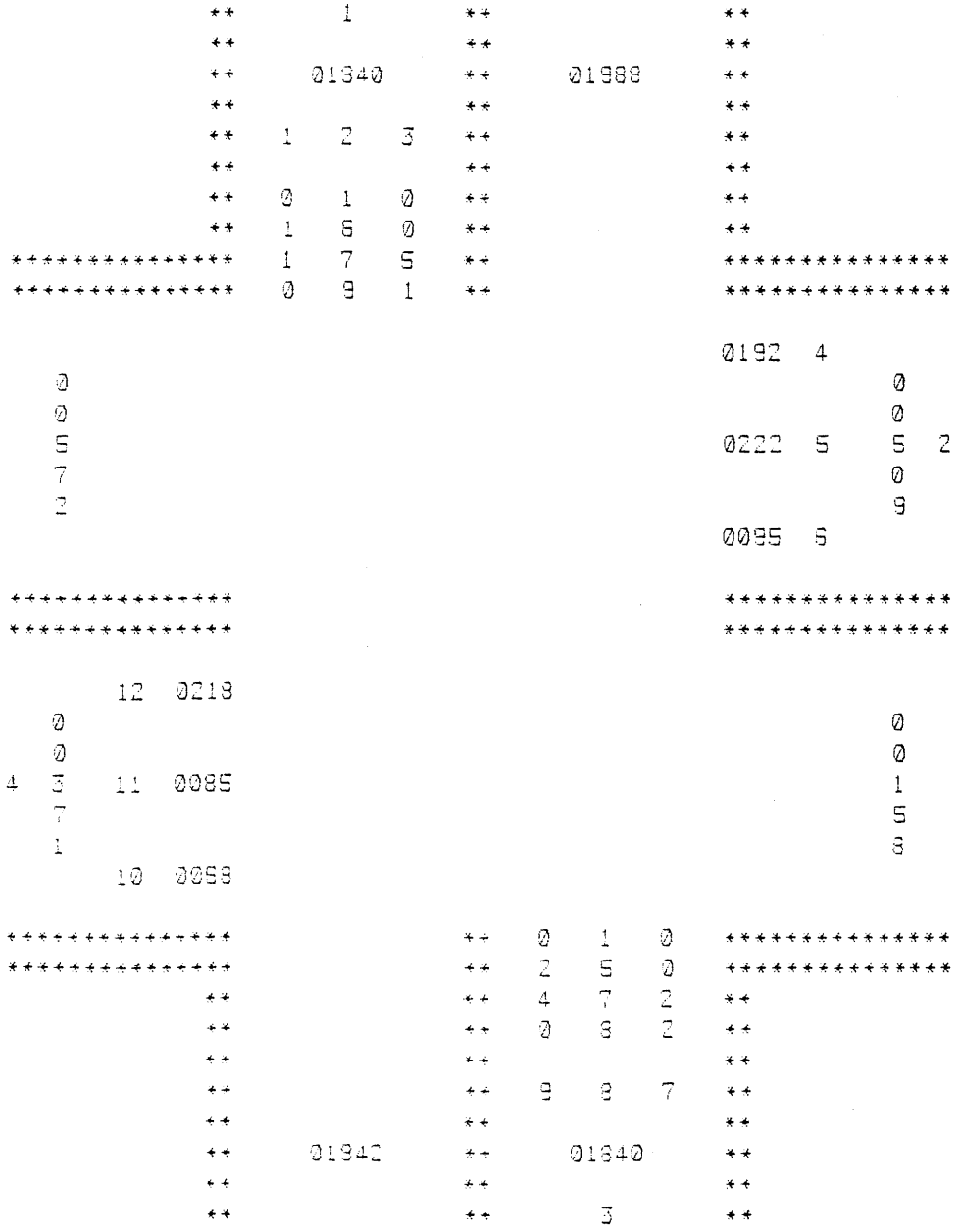
C= 60 SEC G= 54.0 SEC = 90.0% Y= 6.0 SEC = 10.0% PED= 0.0 SEC = 0.0%

MOVMNT	WDTH /LNS	CHT REF	G/C REQD	G/C USED	SRVC VOLUME C (VPH)	SRVC VOLUME E	VOLUME DHV	L S	MAXIMUM QUEUE
APPROACH N PHF= .90 TK= 4% RT= 5.8% LT= 3.3% NO BUS STOP									
RT	12/1+	17D	.07	.53	576	749	80	A	32 FEET
TH	24/2	4	.44	.53	1513	1812	1248	*A	251 FEET
LT	12/1+	17B	0.00	.53	96	125	46	A	25 FEET
APPROACH E PHF= .90 TK= 4% RT= 39.3% LT= 16.9% NO BUS STOP									
RT	12/1	18A	.18	.37	361	469	175	A	93 FEET
LT+TH	24/2	4	.12	.37	833	998	270	A	72 FEET
APPROACH S PHF= .90 TK= 4% RT= 1.5% LT= 5.8% NO BUS STOP									
RT	12/1+	17D	.02	.53	576	749	20	A	25 FEET
TH	24/2	4	.42	.53	1513	1812	1212	A	243 FEET
LT	12/1+	17B	0.00	.53	96	125	76	A	30 FEET
APPROACH W PHF= .90 TK= 4% RT= 18.5% LT= 59.3% NO BUS STOP									
RT	12/1	18A	.05	.37	361	469	50	A	26 FEET
LT+TH	24/2	17A	.31	.37	235	305	220	*A	58 FEET

-->

ANOKA AIRPORT -- NOVEMBER 8, 1985
TH 65 (CENTRAL AVENUE) AND 89TH STREET
2000 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - MAP OF DESIGN HOUR VOLUMES

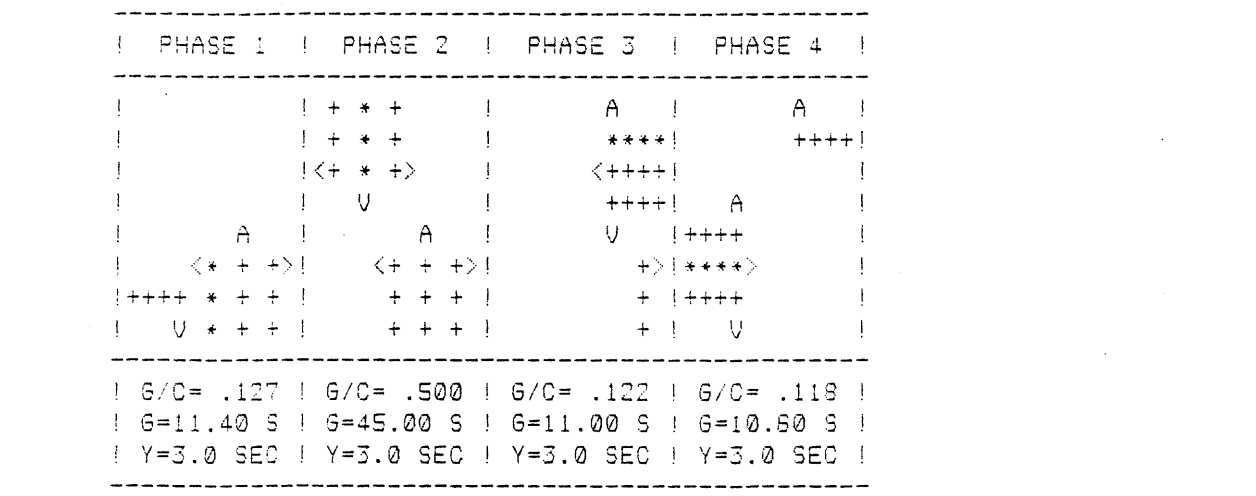


ANOKA AIRPORT -- NOVEMBER 8, 1985
TH 65 (CENTRAL AVENUE) AND 69TH STREET
2000 PM PEAK HOUR VOLUMES

SIGNAL/TEAPAC - CAPACITY ANALYSIS WORKSHEET

BASIC CONDITIONS:
  METRO POPLTN 2000000
  METRO LOCATN OUTLNG   DEGREE OF SATURATION .82

SEQUENCE 0



C= 90 SEC G= 78.0 SEC = 86.7% Y=12.0 SEC = 13.3% PED= 0.0 SEC = 0.0%

MOVMNT	WDTH /LNS	CHT REF	G/C REQD	G/C USED	SRVC VOLUME C (VPH)	SRVC VOLUME E	DHV	L S	MAXIMUM QUEUE
APPROACH N PHF= .90 TK= 4% RT= 6.0% LT= 2.8% NO BUS STOP									
RT	12/1+	17D	.10	.50	546	709	110	A	70 FEET
TH	24/2	4	.59	.50	1432	1715	1673	*E	537 FEET
LT	12/1+	17B	0.00	.50	64	83	51	A	32 FEET
APPROACH E PHF= .90 TK= 4% RT= 37.7% LT= 18.7% NO BUS STOP									
RT	12/1	18A	.20	.27	265	345	192	*A	178 FEET
LT+TH	24/2	4	.14	.12	270	324	317	E+	178 FEET
APPROACH S PHF= .90 TK= 4% RT= 1.2% LT= 13.0% NO BUS STOP									
RT	12/1+	17D	.02	.82	890	1157	22	A	25 FEET
TH	24/2	4	.55	.66	1890	2264	1578	A	343 FEET
LT	12/1+	18B	.16	.13	202	263	240	*D	268 FEET
APPROACH W PHF= .90 TK= 4% RT= 18.3% LT= 58.8% NO BUS STOP									
RT	12/1	18A	.07	.28	269	350	68	A	62 FEET
LT+TH	24/2	4	.14	.12	260	312	303	*E+	171 FEET

APPENDIX 2J

CORRESPONDENCE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

RECEIVED
OCT 21 1985
INC.

PS-FAA-F51013-MN

OCT 15 1985

Nancy J. Reiss
Airport Planner
Hoyle, Tanner, and Associates
One Technology Park
Londonderry, New Hampshire 03053

Dear Ms. Reiss:

This letter is in response to your October 15, 1985, request that we inform you, in writing, of any sole-source aquifers in the vicinity of the Anoka County-Blaine Airport, near Blaine, Minnesota. You indicated that this information was necessary for the the Environmental Impact Statement which you are preparing for proposed airport improvements. No sole-source aquifers have been identified in Region V of our Agency. This region includes Minnesota.

Sincerely yours,

William D. Franz

William D. Franz, Chief
Environmental Review Branch
Planning and Management Division

3/3069.46

MINNESOTA HISTORICAL SOCIETY
FOUNDED IN 1849
690 Cedar Street, St. Paul, Minnesota 55101 • (612) 296-6126

25 February 1985

ORIGINAL			
	HL		NLT
✓	JWT		BLD
✓	JDB		
	ADH		
	OJA		
	RKM		
	CAT		
	BWL		
✓	JRL		

Mr. J. Richard Ludders
Director, Aviation Planning
Hoyle, Tanner & Associates, Inc.
One Technology Park
Londonderry, New Hamphire 03053

FEB 28 1985

Dear Mr. Ludders:

RE: Anoka County-Blaine Airport
(Janes Field)
Phase 1A and Phase 1B Development
Blaine, MN

MHS Referral File Number: W-578
(PLEASE REFER TO THIS NUMBER IN
ALL FUTURE CORRESPONDENCE)

Thank you for the opportunity to review and comment on the above project. It has been reviewed pursuant to responsibilities given the State Historic Preservation Officer by the National Historic Preservation Act of 1966 and the Procedures of the National Advisory Council of Historic Preservation (36CFR800).

This review reveals the location of no known sites of historic, architectural, cultural, archaeological, or engineering significance within the area of the proposed project. There are no sites in the project area which are on the National Register or eligible for inclusion on the National Register, and, therefore, none which may be affected by your proposal.

Again, thank you for your participation in this important effort to preserve Minnesota's heritage.

Sincerely,

Russell W. Fridley
State Historic Preservation Officer

cc: Nigel Finney
Metropolitan Airports Commission
P.O. Box 11700
Minneapolis, MN 55111

United States Department of the Interior

IN REPLY REFER TO:

FISH AND WILDLIFE SERVICE
St. Paul Field Office, Habitat Resources
50 Park Square Court
400 Sibley Street
St. Paul, Minnesota 55101

November 14, 1985

Ms. Nancy Reiss
Hoyle, Tanner & Associates, Incorporated
One Technology Park
Londonderry, New Hampshire 03053

Dear Ms. Reiss:

This responds to your telephonic request of November 11, 1985 for our comments on endangered species in the area of the Anoka County-Blaine Airport, Minnesota.

Available records do not show federally listed threatened or endangered species in Anoka County. Therefore, the proposed construction at the Anoka County-Blaine Airport will not affect federally listed threatened or endangered species. This precludes the need for further action on this project as required under Section 7 of the Endangered Species Act of 1973 as amended. However, should this project be modified or new information becomes available which indicates listed species may be affected, consultation with this office should be reinitiated.

Thank you for soliciting our comments.

Sincerely,

James L. Smith
Acting Field Office Supervisor

cc: Barton-Aschmann Assoc., Mpls. (Ron Peterson)

United States Department of Agriculture

Soil Conservation Service

6120 Earle Brown Drive
Brooklyn Center, Minnesota 55430

ORIGINAL			
	HDH		NLT
	JWT		BLD
	JDB		
	ADH		
	OJA	✓	NJR
	RKM		
	CAT		
	BWL		
✓	JRL		

front file

31309

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SEP 20 1985
HTA, INC.

September 16, 1985

Nancy Reiss,Airport Planner
Hoyle, Tanner and Associates, Inc.
One Technology Park
Londonderry, New Hampshire 03053

Dear Nancy:

I have reviewed the proposed site for the Anoka-Blaine Airport project. According to the soil maps and prime farmland maps there is no prime or unique farmland in the area that you outlined in the project proposal.

There is a small area of farmland of local importance in the northwest quarter of Section 28 (see attached map). At the present time this land does not qualify for unique farmland. It does however, have the potential to be unique farmland if adequately drained and farmed.

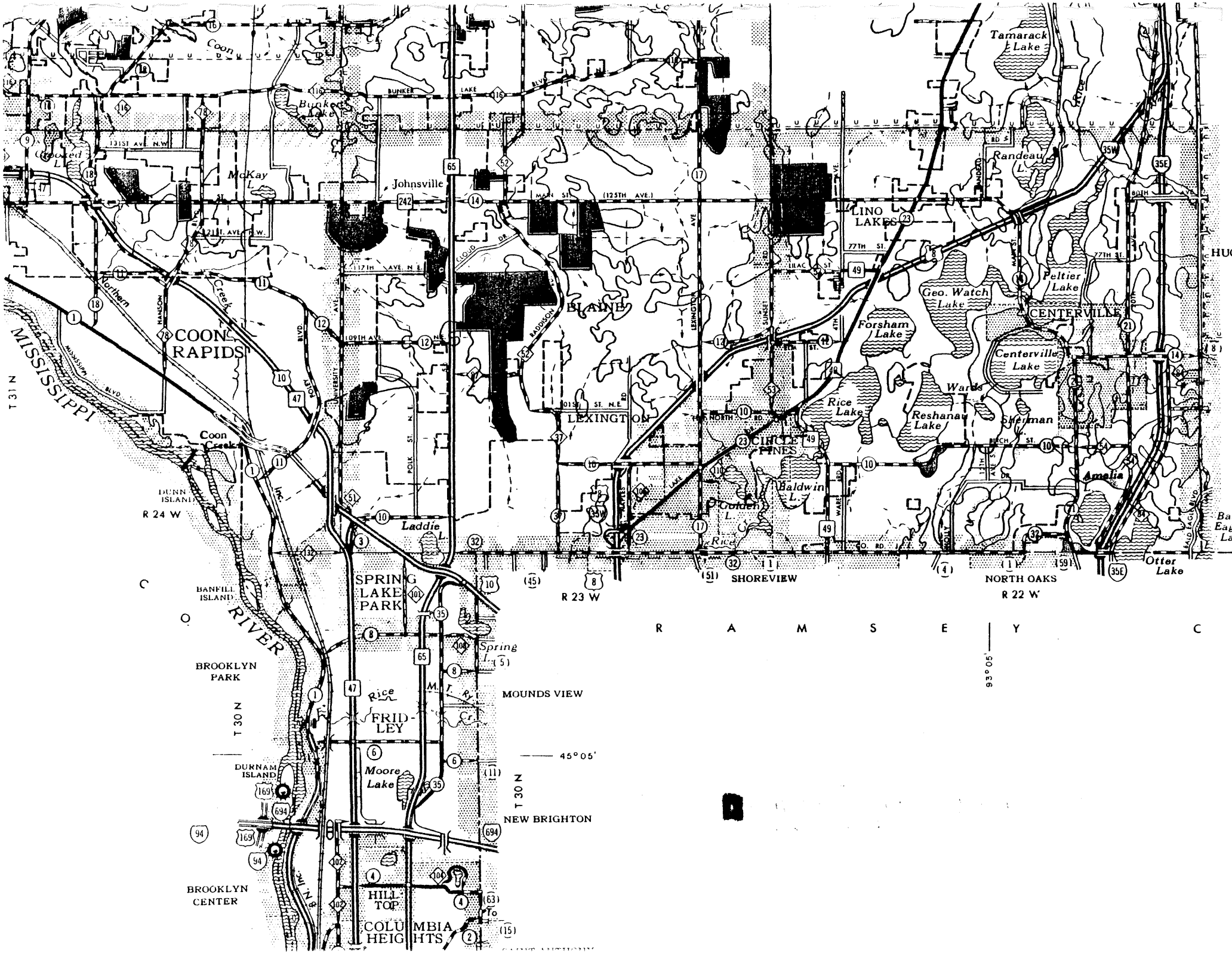
If you have any additional questions please feel free to contact me.

Very truly yours,

Allan G. Giencke
Area Soil Scientist

Enclosure/

cc: Harvey Sundmaker, Area Conservationist, Brooklyn Center, MN
Timothy Fredbo, District Conservationist, Maplewood, MN


Tamarack Lake
Coon Creek
Bunker Lake
BUNKER LAKE BLVD.
131ST AVE. N.W.
Hooded L.
McKay L.
Johnsville
MAIN ST. (125TH AVE.)
121ST AVE. N.W.
117TH AVE. N.E.
CLOUD DR.
Randeau L.
35W
35E
LINO LAKES
77TH ST.
LILAC ST.
Peltier Lake
Geo. Watch Lake
CENTERVILLE
Forsham Lake
Centerville Lake
Northern Creek
MISSISSIPPI BLVD.
COON RAPIDS
HANSON BLVD.
109TH AVE. N.E.
RADDISON RD.
LEXINGTON AVE.
SUNSET RD.
BLAINE
101ST ST. N.E.
POLK ST. N.E.
UNIVERSITY AVE.
Rice Lake
Wards Lake
Reshanau Lake
Sherman
Coon Creek
DUNN ISLAND
LEXINGTON
CIRCLE PINES
Baldwin L.
Golden L.
Amelia
Laddie L.
Rice L.
R 24 W
SPRING LAKE PARK
BANFILL ISLAND
SHOREVIEW
R 23 W
NORTH OAKS
R 22 W
Otter Lake
RAMSEY
93°05'
BROOKLYN PARK
Spring L.
MOUNDS VIEW
Rice Cr.
FRIDLEY
Moore Lake
45°05'
T 30 N
DURNAM ISLAND
NEW BRIGHTON
BROOKLYN CENTER
HILLTOP
COLUMBIA HEIGHTS
T 31 N

LAND OF QUALITY FOODS

90 W. PLATO BOULEVARD
SAINT PAUL, MN 55107

STATE OF MINNESOTA
DEPARTMENT OF AGRICULTURE

(612) 296-1488

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SEP 16 1985
HTA, INC.

September 11, 1985

ORIGIN ... FILE ... NJR ... JRL

31309.17

Ms. Nancy Reiss
Hoyle, Tanner and Associates, Inc.
1 Technology Park
Londonderry, NH 03053

Dear Ms. Reiss:

I am responding to your inquiry regarding the environmental review for the Anoka County-Blaine Airport phase 1A and phase 1B development. According to the information contained in the scoping environmental assessment worksheet for the project, apparently prepared by your firm, no agricultural land appears to be affected by the proposed project. Furthermore, none of the land in the vicinity appears to be planned or zoned for agricultural use. Therefore, the Minnesota Department of Agriculture does not feel that further study of impact upon agricultural land needs to be included in the scope of the final environmental impact statement for the project.

Thank you for the opportunity to comment.

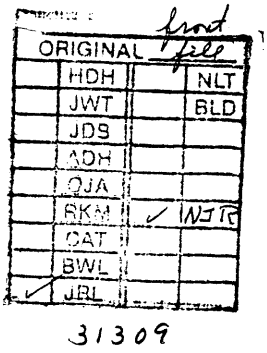
Sincerely,

MINNESOTA DEPARTMENT OF AGRICULTURE

Paul D. Burns
Environmental Review Coordinator
Planning Division

PDB:cb

City of Blaine
9150 CENTRAL AVENUE N.E., BLAINE, MINNESOTA 55434, (612) 784-6700



31309

September 16, 1985

RECEIVED
SEP 20 1985
HTA, INC.

Nancy Reiss
Hoyle, Tanner and Associates
1 Technology Park
Londonderry, NH 03053

Dear Ms. Reiss:

The City of Blaine does not possess any prime farmland as designed by the Minnesota Department of Agriculture. The City does contain unique farmland in the form of sod farms. There is neither unique nor prime farmland with the Blaine-Anoka County Airport property.

Additionally, the City of Blaine does not currently participate in the State's Agriculture Preserve Act. The City Council and some property owners have discussed the possibility of setting aside some areas under the Agriculture Preserve Regulation, but no official action has been taken at this time. Again, there is no agriculture preserve land within the Blaine-Anoka County Airport.

If you should require additional comments regarding this topic, please do not hesitate to contact the City.

Sincerely yours,

CITY OF BLAINE

Joe Grillo

Joe Grillo, AICP
Director of Community Development

JG:jmn

United States Department of the Interior

FISH AND WILDLIFE SERVICE
St. Paul Field Office, Habitat Resources
50 Park Square Court
400 Sibley Street
St. Paul, Minnesota 55101

September 11, 1985

front file

ORIGINAL	TO	
	HDH	NLT
✓	JWT	BLD
✓	JDB	
	ADH	
	OJA	
	RKM	
	CAT	
	BWL	
✓	JRL	

31309.17

RECEIVED
SEP 16 1985
HTA, INC.

Mr. Nigel D. Finney
Director of Planning and Engineering
Metropolitan Airports Commission
6040 28th Avenue South
Minneapolis, Minnesota 55450

Dear Mr. Finney:

This responds to the request by Hoyle, Tanner and Associates for our verification of their findings that the proposed construction at the Anoka-Blaine Airport will not affect lands protected under Section 4(f) of the Department of Transportation Act of 1966.

Our review indicates the proposed project as described in the Scoping Environmental Assessment Worksheets of February 1985 and April 1985 does not involve land acquired or managed with federal grant-in-aid assistance under the Wildlife Restoration Act (Pittman-Robertson Act, Public Law 75-415) or the Fish Restoration Act (Dingell-Johnson Act, Public Law 81-681).

For comments on 4(f) lands not under the jurisdiction of the U.S. Fish and Wildlife Service, we recommend you contact the National Park Service, the State of Minnesota, and local municipalities.

Thank you for soliciting our comments.

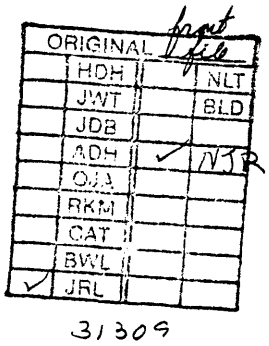
Sincerely,

Robert F. Welford
Field Office Supervisor

cc: Hoyle, Tanner and Associates, Inc., Londonderry, NH

U.S. Department of Housing and Urban Development
Minneapolis-St. Paul Office, Region V
220 Second Street, South
Minneapolis, Minnesota 55401-2195

RECEIVED
SEP 20 1985
HTA, INC.



September 17, 1985

Nancy Reiss, Airport Planner
Hoyle, Tanner & Associates, Inc.
One Technology Park
Londonderry, NH 030503

Dear Ms. Reiss:

SUBJECT: HUD 4F Land/Jane's Field

This letter will serve to confirm the September 16, 1985 conversation between you and Minneapolis-St. Paul HUD Environmental Officer Dan Waloga regarding the effect of the proposed airport improvements at Jane's Field (Blaine-Anoka County Airport) upon HUD properties in the area.

As explained previously, HUD does not currently own or have title to properties within the area under review. However, to the west of the existing airport boundaries there currently are several subdivisions consisting of single-family detached and townhouse units. For many of these residences HUD has provided FHA mortgage insurance under provisions of Section 203(b) of the National Housing Act. In some instances, where a resident has defaulted on a mortgage, HUD reimburses the lender and takes possession of the property. The house is then resold by HUD - a process which normally takes approximately four months. It is during this process that HUD has title to the residence.

Although HUD does not presently own properties in the vicinity of Jane's Field, there are agency requirements for the issuance of mortgage insurance which may be relevant to any review of the development proposals for the airport. HUD will not approve mortgage insurance for new construction or substantial rehabilitation within the boundaries of airport runway clear zones. Also, mortgage insurance will not be issued for an existing structure located within a clear zone unless the purchaser is apprised to the danger potential and signs an affidavit of notification. Therefore, any airport development plans which would involve extension of clear zones beyond existing airport boundaries could adversely affect the eligibility of a property for HUD/FHA mortgage insurance.

Similarly, HUD regulations also condition the degree of noise pollution to which a residence (proposed for construction or substantial rehabilitation) may be exposed. Noise exposures (from all sources) exceeding 75dB on the Ldn scale are unacceptable; residences exposed to 65-75dB require additional noise attenuation before they are eligible for FHA mortgage insurance. The City of Blaine has zoned much of the undeveloped land immediately adjacent to the airport boundaries for industrial use, however a substantial increase in airport capacity would affect existing area residents and (depending on the projected noise contours) may require that new residential development be constructed with noise attenuation measures.

At the present time it is impossible for this agency to quantitate the effect that increased airport noise levels would have on the value of residential property. Such an effect (if one exists) would be more apparent under current area market conditions of stable assessed valuation, rather in previous years where inflationary pressures induced annual price increases.

If you require additional clarification of the issues discussed in this letter, or have further questions regarding HUD environmental requirements, please contact Environmental Officer Dan Waloga at (612) 349-3037.

Sincerely,

for Robert B. Becker

Thomas T. Feeney
Manager, S

Minnesota
STATE PLANNING AGENCY

Room 100 Capitol Square Building
550 Cedar Street St. Paul, MN 55101

September 9, 1985

ORIGINAL			
	HDH		NLT
	JWT		BLD
✓	JDB		
	ADR	✓	NJR
	OJA		
	RKM		
	CAT		
	BWL		
✓	JRL		

31309.17

Ms. Nancy Reiss
Aoyle Tanner Associates
One Technology Park
Londonerry, N.H. 03053

Dear Ms. Reiss:

This is in regard to your question concerning the potential impact of the Anoka County Airport on the Minnesota Coastal Zone Program. Minnesota though participating in the Coastal Zone Program, neither completed nor adopted this program for the state's coastal waters (North Shore of Lake Superior).

Sincerely,

Steven C. Reckers

SCR:fa

AN EQUAL OPPORTUNITY EMPLOYER

APPENDIX 2K

ENGINEERING COST ESTIMATES

ALTERNATE

TKDA

TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES, INCORPORATED

ENGINEERS ARCHITECTS PLANNERS

2500 AMERICAN NATIONAL BANK BUILDING
SAINT PAUL, MINNESOTA 55101
612/292-4400

Project ANOKA Co. - BLAINE Airport Comm No _____ Sheet _____ of _____

Computations for ALTERNATE # 3 By GKS Date 3/28/86

Quantity and Cost Estimate Chkd _____ Date _____

ALTERNATE #3

Location	Construction Costs	20% Eng. & Cont.	Total
EAST BUILDING AREA	$ 421,000.00	$ 84,000.00	$ 505,000.00
EAST SIDE TAXIWAY	357,800.00	71,500.00	429,300.00
WEST BUILDING AREA	876,100.00	175,200.00	1,051,300.00
WEST SIDE TAXIWAY	238,800.00	47,700.00	286,500.00
TOTALS	$ 1,893,700.00	$ 378,400.00	$ 2,272,100.00

TKDA

TOLTZ KING, DUVALL, ANDERSON AND ASSOCIATES INCORPORATED

ENGINEERS ARCHITECTS PLANNERS

2500 AMERICAN NATIONAL BANK BUILDING
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612/292-4400

Project ANOKA Co - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST BUILDING AREA By GKS Date 3/86

Quantity and Cost Estimate ALT # 3 Chkd _____ Date _____

Common - subgrade EXCAVATIONS - using compilations from JGP & RAB dated 3/84.

common EXCAVATION	60,000 cy
subgrade EXCAVATION	20,000 cy
topsoil striping under embankments	20,000 cy
	100,000 cy

100,000 cy @ $2.50/cy = $250,000.00

GRANULAR MATERIAL - using compilations from JGP & RAB dated 3/84.

GRANULAR REQUIRED:

27,000	EMBANKMENTS
20,000	SUBGRADE EX.
20000	topsoil striping
2,000	ALLEYWAYS
69,000 cy	≈ 70,000 cy

70,000 cy REQUIRED
- 50,000 cy AVAILABLE from EXCAV.
20,000 cy GRAN. borrow

20,000 cy @ $3.00/cy = $60,000.00

Aggregate BASE - use under service road and alley-ways. Use 6" thickness w/ 3' shoulders on twy 1' shoulders on alleys

AREA: 585' x 17' x 13 ea alleys
1480' x 17' alley
170' x 30' connection to service rd
17,727 sy

18,000 cy @ $2.50/cy = $45,000.00

bituminous PAVEMENT - service road and alley-ways. Use 3" thickness service rd. 3" in two lifts. Radii considered 2" thickness alleys for estimate

AREA: 585' x 15' x 13 ea alley (2")
1480' x 15' alley (3")
170' x 24' conn. to s.r. (3")

26280 SF x 3/12 x 0.075 TN/CF = 493 TN
114075 SF x 3/12 x 0.075 TN/CF = 1426 TN
1919 TN

2000 TON @ $23.00/TN = $45,000.00

Turf ESTABLISHMENT - seed & mulch building area. For this estimate assume no sodding. No reduction for paved area.

AREA: 2000' x 750' = 34.5 ac

35 acres @ $500.00/ac = $17,500.00

DRAINAGE FACILITIES - culvert needed @ connection to service road. assume 36" RCP w/ Aprons will handle flow.

LENGTH: 30' + 10'+10' = 50 LF + 2 aprons

50 LF @ $60.00/LF = $3,000 + Aprons = $3,500.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	100,000	2.50	$250,000.00
GRANULAR MATERIAL	CY	20,000	3.00	60,000.00
AGGREGATE BASE	SY	18,000	2.50	45,000.00
BITUMINOUS PVMT	TON	2,000	23.00	45,000.00
TURF ESTABLISHMENT	L.S.	1	17,500.00	17,500.00
DRAINAGE FACILITIES	LS.	1	3,500.00	3,500.00
			SUB-TOTAL	$421,000.00
			+ 20% ENG. & CONTINGENCY	84,000.00
			TOTAL	$505,000.00

TKDA

ENGINEERS ARCHITECTS PLANNERS

TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES, INCORPORATED

2500 AMERICAN NATIONAL BANK BUILDING
SAINT PAUL, MINNESOTA 55101
612/292-4400

Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST SIDE TAXIWAY By GKS Date 3/86

QUANTITY AND COST ESTIMATE ALT #3 Chkd _____ Date _____

Common - subgrade EXCAVATIONS . modify JGP comps 11/83. Assume 2' subcut full width of safety area on taxiway and connectors.

EXCAVATIONS:
430' x 80' x 2' (connector)
500' x 80' x 2' x 2 (connector)
250' x 40' x 2' (turnaround)
1800' x 80' x 2' (taxiway)
} 19,880 CY

20,000 cy @ $2.50/cy = $50,000.00

GRANULAR MATERIAL. from X-sections assume 5' gran. backfill required to bring section to grade. No salvage material from excavations

GRAN.
430' x 80' x 5'
500' x 80' x 5' x 2
250' x 40' x 5'
1800' x 80' x 5'
} 49,704 cy.

50,000 cy @ $3.00/cy = $150,000.00

AGGREGATE BASE - use under taxiways 6" thickness (3' shoulders)

AREA:
430' x 46' connector
500' x 46' connector
500' x 46' connector
250' x 40' turn-around
1800' x 46' taxiway

17,629 SY 18,000 SY @ 2.50 = $45,000.00

bituminous PAVEMENT - taxiways. 3" thickness (2 lifts). at this time radius incidental.

AREA:
430' x 40' connector
500' x 40' x 2 EA. connectors
250' x 40' turn-around
1800' x 40' taxiway

139,280 SF x 3/12 x 0.075 TON/CF = 2,610 TON

2600 TON @ $23.00/TON = $59,800.00

turf establishment - sod 10' shoulder along connectors and taxiway. Seed & mulch other areas within construction limits.

AREA: sod [(500' x 4') + (1000 x 2)] x 10' = 6,222 SY
6250 SY @ $2.00/SY = $12,500.00

SEED (2100 x 100) + (2100 x 100) + (250 x 300 x 2) = 13.1 acre

13 ac @ $500.00 = $6500.00

$19,000.00

Drainage Facilities – culvert needed @ each connector to taxiway. assume for this estimate 36" RCP w/ Apron

LENGTH : (40 + 55 + 55) x 3 ea = 450 LF + 6 aprons

450 LF @ $60.00/LF = $ 27,000.00

Taxiway Lighting – assume lighting at turn-offs only. Use 3 lights per / radius. Estimate includes any duct work & wiring.

LIGHTS : 4 radii @ 3 ea = 12 taxiway lights

12 lights @ $500.00/EA = $ 6,000.00

Pavement Marking – assume 6" ℄ striping on connectors and taxiway (REFLECTORIZED)

LENGTH : 600 + 600 + 500 + 1800 = 3,500 LF

3500 LI = x 6" = 1750 SF @ $0.55/SF = $962.50

use $1,000.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	20,000	2.50	50,000.00
Granular Material	CY	50,000	3.00	150,000.00
Aggregate Base	SY	18000	2.50	45,000.00
Bituminous Pavement	TON	2,600	23.00	59,800.00
Turf Establishment	L.S	1	19,000.00	19,000.00
Drainage Facilities	L.S.	1	27,000.00	22,000.00
Taxiway Lighting	L.S.	1	6,000.00	6,000.00
Pavement Marking	L.S.	1	1,000.00	1,000.00

Sub-total	$ 357,800.
+ 20% Eng. & Contingency	71,500.
TOTAL	$ 429,300.

TKDA

TOLTZ, KING, DUVALL, ANDERSON AND ASSOCIATES, INCORPORATED

ENGINEERS ARCHITECTS PLANNERS

2500 AMERICAN NATIONAL BANK BUILDING
SAINT PAUL, MINNESOTA 55101
612/292-4400

Project ANOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for WEST BUILDING AREA By GKS Date 3/86

Quantity and Cost Estimate ALT #3 Chkd _____ Date _____

common- subgrade excavations - modifying computations from JOP 11/83

common (topsoil stripping)	66,000 cy
subgrade (alley subcut)	13,000 cy
muck elevation (below 902 elev)	40,000 cy
	119,000 cy

120,000 cy @ $2.50 /cy = $300,000.00

granular material - from computations JOP 11/83

gran. borrow (build to grade)	110,000 cy
gran. borrow (muck excavation)	40,000 cy UP TO GRADE
	150,000 cy

150,000 cy @ $3.00/cy = $450,000.00

Aggregate base - use under service rd. & alleyways (3' should on S.R. 6" thickness 1' should on alley)

AREA:

720' x 17' x 8 EA	Alleyway
720' x 22' x 3 EA	Alleyway
1420' x 22' x 1 EA	Service Rd
19,631 SY	

20,000 SY @ $2.50 = $50,000.00

bituminous - service road and alleyways - 2" thickness alleys, 3" service rd radius incidental.

AREA:

720' x 15' x 8 ea	alleys (2")
720' x 20' x 3 ea	alleys (2")
1420' x 20' x 1 ea	S.R. (3")

28400 SF x 2/12 x 0.075 TON/CF = 533 TON
129600 SF x 3/12 x 0.075 TON/CF = 1620 TON
2153 TON

2200 TON @ $23.00 = $50,600.00

turf establishment - seed & mulch building area. assume no sodding for this estimate. No reduction for paved areas in this estimate.

AREA : $(600' \times 900') + (600' \times 400') = 38.5$ ac.

39 AC @ $500/ac = $19,500.00

DRAINAGE FACILITIES - culvert needed @ service rd. connection from TGP estimate use 36" RCP w/ Aprons

LENGTH : (20' + 40' + 40') = 100 LF + 2 aprons

100 LF @ $60.00/LF = $6,000.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	120,000	2.50	300,000.00
GRANULAR MATERIAL	CY	150,000	3.00	450,000.00
AGGREGATE BASE	SY	20,000	2.50	50,000.00
BITUMINOUS PAVEMENT	TON	2200	2300	50,600.00
TURF ESTABLISHMENT	LS	1	19,500.00	$ 19,500.00
DRAINAGE FACILITIES	LS.	1	6000.00	6,000.00
			Sub-total	$ 876,100.00
			+20% Eng. & Contingency	175,200.00
			TOTAL	$ 1,051,300.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for WEST SIDE TAXIWAY By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 3 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATIONS - from rough cross-sections assume 2' subcut full width and length of safety area on taxiway and connector will be required.

EXCAVATION: 2200' x 80' x 2' (taxiway)
200' x 80' x 2' (connector) } 14,222 CY

15,000 CY @ $2.50/CY = $37,500.00

GRANULAR MATERIAL - from x-sections assume 4' granular backfill required to bring section to proposed grade. No salvagable excavation

GRAN. borrow 2200' x 80' x 4'
200' x 80' x 4' } 28444 CY

30,000 CY @ $3.00/CY = $90,000.00

AGGREGATE BASE - under taxiway and connector. Use 6" thickness w/ 3' shoulder

AREA: 2200' x 46' (taxiway)
200' x 46' (connector)

12,267 SY 13,000 SY @ $2.50/SY = $32,500.00

BITUMINOUS PAVEMENT - pave taxiway and connector. Use 3" compacted thickness placed in 2 lifts. Radii incidental for this estimate.

AREA: 2200' x 40' (taxiway)
200' x 40' (connector)

96000 SF x 3/12 x 0.075 TN/CF = 1800 TON

1800 TON @ $23.00/TN = $41,400.00

TURF ESTABLISHMENT - place sod along 10' shoulder of taxiway and connector. Seed & mulch other areas within construction limits.

AREA: sod 2200' x 2 x 10'
200' x 2 x 10' } 5337 SY

5250 SY @ $2.00/SY = $10,500.00

seed 2300' x 225' = 11.9 ac

12 acres @ $500.00/ac = 6,000.00

TOTAL $16,500.00

DRAINAGE FACILITIES - culverts needed @ connector and taxiway crossing from IGP estimate. Use 36" RCP w/ aprons and 48" RCP w/ aprons to handle flow.

LENGTH : (40'+55'+55') = 150LF 36" RCP
(40+55+55') = 150 LF 48" RCP

150 LF @ $60.00/LF = $ 9,000.00
150 LF @ $75.00/LF = $ 11,250.00

$ 20,250.00

PAVEMENT MARKINGS - assume a 6" continuous ℄ stripe on taxiway and connects (reflectorized)

LENGTH : 2200' * 200' = 2400 LF

2400 LF x 6" = 1200 SF @ $0.55/SF = $ 660.00

use $ 650.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	15,000	2.50	$ 37,500.00
GRANULAR MATERIAL	CY	30,000	3.00	90,000.00
AGGREGATE BASE	SY	13000	2.50	32,500.00
BITUMINOUS PAVEMENT	TON	1800	23.00	41,400.00
TURF ESTABLISHMENT	LS	1	16,500.00	16,500.00
DRAINAGE FACILITIES	LS	1	20,250.00	20,250.00
PAVEMENT MARKINGS	LS.	1	650.00	650.00
			SUB-TOTAL	$ 238,800.00
			+20% ENG. & CONTINGENCY	47,700.00
			TOTAL	$ 286,500.00

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Project Anoka Co. - Blaine Airport Comm No _____ Sheet _____ of _____

Computations for ALTERNATE #4 By GKJ Date 3/86

Quantity and Cost Estimate Chkd _____ Date _____

ALTERNATE #4

Location	Construction Costs	20% Eng. & Cont.	Total
East Building Area	$ 421,000.00	$ 84,000.00	$ 505,000.00
East Side Taxiway	357,800.00	71,500.00	429,300.00
West Building Area	876,100.00	175,200.00	1,051,300.00
West Side Taxiway	238,800.00	47,700.00	286,500.00
Runway 26 L Extension	457,050.00	91,450.00	548,500.00
Runway 17 L Extension	614,000.00	123,000.00	737,000.00
Relocate Threshold 35 R	43,100.00	8,600.00	51,700.00
Connector Twy. To 35 R	52,700.00	10,300.00	63,000.00
Connector Twy to 8 R	41,600.00	8,400.00	50,000.00
TOTALS	$ 3,102,150.00	$ 620,150.00	$ 3,722,300.00

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Project ANOKA Co - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST BUILDING AREA By GKS Date 3/86

Quantity and Cost Estimate ALT # 3 Chkd _____ Date _____

common - subgrade EXCAVATIONS - using compilations from JGP & RAB dated 3/84.

common EXCAVATION	60,000 cy
subgrade EXCAVATION	20,000 cy
topsoil striping under embankments	20,000 cy
	100,000 cy

100,000 cy @ $2.50/cy = $250,000.00

GRANULAR MATERIAL - using compilations from JGP & RAB dated 3/84.

GRANULAR REQUIRED:

27,000	EMBANKMENTS
20,000	SUBGRADE EX.
20000	topsoil striping
2,000	ALLEYWAYS
69,000 cy	≈ 70,000 cy

70,000 cy REQUIRED
- 50,000 cy AVAILABLE from EXCAV.
20,000 cy GRAN. borrow

20,000 cy @ $3.00/cy = $60,000.00

Aggregate BASE - use under service road and alley-ways. Use 6" thickness w/ 3' shoulder on turn, 1' shoulder on alleys

AREA: 585' x 17' x 13 ea alleys
1480' x 17' alley
170' x 30' connection to service rd
17,727 sy

18,000 cy @ $2.50/cy = $45,000.00

bituminous PAVEMENT - service road and alley-ways. Use 3" thickness service rd. 3" in two lifts. Radii included at 2" thickness alleys for estimate

AREA: 585' x 15' x 13 ea alley (2")
1480' x 15' alley (3")
170' x 24' conn. to s.r. (3")

26280 SF x 3/12 x 0.075 TN/CF = 493 TN
114075 SF x 2/12 x 0.075 TN/CF = 1426 TN
1919 TN

2000 TON @ 23.00/TN = $45,000.00

turf establishment - seed & mulch building area. For this estimate assume no sodding. No reduction for paved area.

AREA: 2000' x 750' = 34.5 ac

35 acres @ $500.00/ac = $17,500.00

drainage facilities - culvert needed @ connection to servid road. assume 36" RCP w/ Aprons will handle flow.

LENGTH: 30' + 10' + 10' = 50 LF + 2 aprons

50 LF @ $60.00/LF = $3,000 + Aprons = $3,500.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	100,000	2.50	$250,000.00
Granular Material	CY	20,000	3.00	60,000.00
Aggregate Base	SY	18,000	2.50	45,000.00
Bituminous Pvmt	TON	2,000	23.00	45,000.00
Turf Establishment	L.S.	1	17,500.00	17,500.00
Drainage Facilities	LS.	1	3,500.00	3,500.00

Sub-total	$421,000.00
+ 20% Eng. & Contingency	84,000.00
TOTAL	$505,000.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST SIDE TAXIWAY By GKS Date 3/86

QUANTITY AND COST ESTIMATE ALT #3 Chkd _____ Date _____

Common - subgrade EXCAVATIONS . modify JGP comps 11/83. Assume 2' subcut full width of safety area on taxiway and connectors.

EXCAVATIONS:
430' x 80' x 2' (connector)
500' x 80' x 2' x 2 (connector)
250' x 40' x 2' (turnaround)
1800' x 80' x 2' (taxiway)
} 19,880 CY

20,000 cy @ $2.50/cy = $50,000.00

GRANULAR MATERIAL. from X-sections assume 5' gran. backfill required to bring section to grade. No salvage material from excavations

GRAN.
430' x 80' x 5'
500' x 80' x 5' x 2
250' x 40' x 5'
1800' x 80' x 5'
} 49,704 CY

50,000 cy @ $3.00/cy = $150,000.00

AGGREGATE BASE - use under taxiways 6" thickness (3' shoulders)

AREA:
430' x 46' connector
500' x 46' connector
500' x 46' connector
250' x 40' turn-around
1800' x 46' taxiway

17,629 SY 18,000 SY @ 2.50 = $45,000.00

bituminous PAVEMENT - taxiways. 3" thickness (2 lifts). at this time radius incidental.

AREA:
430' x 40' connector
500' x 40' x 2 EA. connectors
250' x 40' turn-around
1800' x 40' taxiway

139,250 SF x 3/12 x 0.075 TON/CF = 2,610 TON

2600 TON @ $23.00/TON = $59,800.00

turf establishment - sod 10' shoulder along connectors and taxiway. Seed & mulch other areas within construction limits.

AREA: sod [(500' x 4') + (1800 x 2)] x 10' = 6,222 SY
6250 SY @ $2.00/SY = 12,500.00

seed (2100 x 100) + (2100 x 100) + (250 x 300 x 2) = 13.1 acre

13 ac @ $500.00 = $6500.00

$19,000.00

Drainage facilities – culvert needed @ each connector to taxiway. assume for this estimate 36" RCP w/ Apron

LENGTH: (40 + 55 + 55) x 3 ea = 450 LF + 6 apron

450 LF @ $60.00/LF = $ 27,000.00

Taxiway Lighting – assume lighting at Turn-offs only. Use 3 lights per / radius. Estimate includes any duct work & wiring.

LIGHTS: 4 radii @ 3 ea = 12 taxiway lights

12 lights @ $500.00/EA = $ 6,000.00

Pavement Marking – assume 6" ℄ striping on connectors and taxiway (reflectorized)

LENGTH: 600 + 600 + 500 + 1800 = 3,500 LF

3500 LF x 6" = 1750 SF @ $0.55/SF = $962.50

use $1,000.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	20,000	2.50	50,000.00
Granular Material	CY	50,000	3.00	150,000.00
Aggregate Base	SY	18,000	2.50	45,000.00
Bituminous Pavement	TON	2,600	23.00	59,800.00
Turf Establishment	L.S	1	19,000.00	19,000.00
Drainage Facilities	L.S.	1	27,000.00	27,000.00
Taxiway Lighting	L.S.	1	6,000.00	6,000.00
Pavement Marking	L.S.	1	1,000.00	1,000.00

Sub-total	$ 357,800.00
+ 20% Eng. & Contingency	71,500.00
TOTAL	$ 429,300.00

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Project ANOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for WEST BUILDING AREA By GKS Date 3/86

QUANTITY and Cost ESTIMATE ALT #3 Chkd _____ Date _____

COMMON- SUBGRADE EXCAVATIONS - modifying computations from JOP 11/83

common (topsoil stripping)	66,000 cy
subgrade (alley subcut)	13,000 cy
muck elevation (below 902 elev)	40,000 cy
	119,000 cy

120,000 cy @ $2.50/cy = $300,000.00

GRANULAR MATERIAL - from computations JOP 11/83

gran. borrow (build to grade)	110,000 cy
gran. borrow (muck excavation)	40,000 cy
	150,000 cy

150,000 cy @ $300/cy = $450,000.00

AGGREGATE BASE - use under service rd. & alleyways (3' should on S.R. & 1' should on alleys) 6" thickness

AREA:

720' x 17' x 8 EA	Alleyway
720' x 22' x 3 EA	Alleyway
1420' x 22' x 1 EA	SERVICE RD
19,631 SY	

20,000 SY @ $2.50 = $50,000.00

BITUMINOUS - service road and alleyways. 2" thickness alleys. 3" service rd radius incidental.

AREA:

720' x 15' x 8 ea	alleys (2")
720' x 20' x 3 ea	alleys (2")
1420' x 20' x 1 ea	S.R. (3")

28400 SF x 2/12 x 0.075 TON/CF = 533 TON
129600 SF x 3/12 x 0.075 TON/CF = 1620 TON
2153 TON

2200 TON @ $23.00 = $50,600.00

turf establishment - seed & mulch building area. assume no sodding for this estimate. No reduction for paved areas in this estimate.

AREA : $(600' \times 900') + (600' \times 400') = 38.5$ ac.

39 AC @ $500/ac = $19,500.00

drainage facilities - culvert needed @ scenic rd. connection from SGP estimate use 36" RCP w/ Apron

LENGTH : $(20' + 40' + 40') = 100$ LF + 2 aprons

100 LF @ $6000/LF = $6,000.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	cy	120,000	2.50	300,000.00
GRAN-LAR MATERIAL	cy	150,000	3.00	450,000.00
AGGREGATE BASE	Sy	20,000	2.50	50,000.00
BITUMINOUS PAVEMENT	TON	2200	2300	50,600.00
TURF ESTABLISHMENT	LS	1	19,500.00	19,500.00
DRAINAGE FACILITIES	LS.	1	6000.00	6,000.00
			Sub-total	$876,100.00
			+20% Eng. & Contingency	175,200.00
			TOTAL	$1,051,300.00

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Project ANOKA Co. - BLAINE Airport Comm No _____ Sheet _____ of _____

Computations for WEST SIDE TAXIWAY By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 3 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATIONS - From rough cross-sections assume 2' subcut full width and length of safety area on taxiway and connector will be required.

EXCAVATION: 2200' x 80' x 2' (taxiway)
200' x 80' x 2' (connector) } 14,222 CY

15,000 CY @ $2.50/CY = $37,500.00

GRANULAR MATERIAL - From X-sections assume 4' granular backfill required to bring section to proposed grade. No salvagable excavation

GRAN. borrow 2200' x 80' x 4'
200' x 80' x 4' } 28144 CY

30,000 CY @ $3.00/CY = $90,000.00

AGGREGATE BASE - under taxiway and connector. Use 6" thickness w/ 3' shoulders

AREA: 2200' x 46' (taxiway)
200' x 46' (connector)

12,267 SY 13,000 SY @ $2.50/SY = $32,500.00

BITUMINOUS PAVEMENT - pave taxiway and connector. Use 3" compacted thickness placed in 2 lifts. Radii incidental for this estimate.

AREA: 2200' x 40' (taxiway)
200' x 40' (connector)

96000 SF x 3/12 x 0.075 TN/CF = 1800 TON

1800 TON @ $23.00/TN = $41,400.00

TURF ESTABLISHMENT - place sod along 10' shoulder of taxiway and connector. Seed & mulch other areas within construction limits.

AREA: sod 2200' x 2 x 10'
200' x 2 x 10' } 5333 SY

5250 SY @ $2.00/SY = $10,500.00

seed 2300' x 225' = 11.9 ac

12 acres @ $500.00/ac = 6,000.00

TOTAL $16,500.00

DRAINAGE FACILITIES - culverts needed @ connector and taxiway crossing from IGP estimate. Use 36" RCP w/ aprons and 48" RCP w/ Aprons to handle flow.

LENGTH : (40' + 55' + 55') = 150LF 36" RCP
(40 + 55 + 55') = 150 LF 48" RCP

150 LF @ $60.00/LF = $ 9,000.00
150 LF @ $75.00/LF = $ 11,250.00

$ 20,250.00

PAVEMENT MARKINGS - assume a 6" continuous ℄ stripe on taxiway and connects (reflectorized)

LENGTH : 2200' + 200' = 2400 LF

2400 LF x 6" = 1200 SF @ $0.55/SF = $ 660.00

use $ 650.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	15,000	2.50	$ 37,500.00
GRANULAR MATERIAL	CY	30,000	3.00	90,000.00
AGGREGATE BASE	SY	13000	2.50	32,500.00
BITUMINOUS PAVEMENT	TON	1800	23.00	41,400.00
TURF ESTABLISHMENT	LS	1	16,500.00	16,500.00
DRAINAGE FACILITIES	LS	1	20,250.00	20,250.00
PAVEMENT MARKINGS	LS.	1	650.00	650.00
			SUB-TOTAL	$ 238,800.00
			+20% ENG. & CONTINGENCY	47,700.00
			TOTAL	$ 286,500.00

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Project ANOKA CO. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RUNWAY 26L EXTENSION (800') By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 4 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATION - excavation 300' beyond end of runway. See x-sections

Common excavation	35,000 cy
subgrade excavation	35,000 cy
	70,000 cy

70,000 cy @ $2.50/cy = $175,000.00

GRANULAR MATERIAL - no salvagable material from excavation

gran. borrow (subgrade excavation)	35,000 cy
gran borrow (Additional to bring to proposed grade)	10,000 cy
	45,000 cy

45,000 cy @ $3.00/cy = $135,000.00

AGGREGATE BASE - place 6" of aggregate base on balanced granular subgrade. Place base 3' beyond bituminous pavement edge.

AREA: 250' x40' turnaround
800' x100' runway
330' x46' connector
800' x46' taxiway
16,307 sy

16,500 sy @ $2.50/sy = $41,250.00

BITUMINOUS PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C. averages 5.8% and Mn DOT 2341 mix design. Radii incidental.

AREA: 250'x40' turnaround
800'x100' runway
330'x40' connector
800'x40' taxiway

127,200 SF x 3/12 x 0.075 TON/CF = 2385 TONS

2400 TON @ $23.00 TN = $55,200.00

TURF ESTABLISHMENT - place 4" topsoil material that was salvaged during excavation operations. Place 10' sod along runway connects & taxiway edges. Seed & mulch remainder of area within construction limits.

AREA: sod (800'x4) + (330'x2) x10' = 4,289 sy

4300 sy @ $2.00 = $8600.00

-Seed 600'x1100' = 15.2 ac

15 ac @ $500.00 = $7500.00

$16,100.00

to provide for carrying drainage under runway & taxiway. Assume 36" RCP will handle flow. Assume 2 crossings of taxiway.

LENGTH: (40+55+55) @ 2 EA. = 300 LF + 4 aprons

300 LF @ $60.00/LF = $18,000.00

TAXIWAY lights - place edge lights @ runway turn-offs @ 3 per radii

2 radii @ 3 light each = 6 edge lights. Includes any duct & wiring

6 EA @ $500.00 = $3000.00

RUNWAY lighting - Space @ ± 180' along edge of runway plus threshold (8 ea.)

Includes any duct & wiring necessary. No regulator estimated

800'/180 x 2 = 10 edge lights + 8 threshold

18 EA @ $500.00 = $9,000.00

PAVEMENT MARKING - assume 6" ℄ striping on connector and taxiway (reflectorized)

assume threshold markings, number marking and ℄ marking on runway (STRATED MARKING 120' stripe 180' space) will be required

LENGTH 400' + 800' = 1200 LF taxiway & connector

1200 LF x 6" = 600 SF @ $0.55 = 330.00

Threshold - lump sum / est. per Denver striping = $4000.00

$4330.00

ULTIMATE NAV. AIDS - ILS - MLS not included in this estimate.

Installation done by federal govt.

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	70,000	2.50	175,000.00
GRANULAR MATERIAL	CY	45,000	3.00	135,000.00
AGGREGATE BASE	SY	16,500	2.50	41,250.00
BITUMINOUS PAVEMENT	TON	2,400	23.00	55,200.00
TURF ESTABLISHMENT	L.S.	1	16,100.00	16,100.00
DRAINAGE FACILITIES	L.S.	1	18,000.00	18,000.00
TAXIWAY LIGHTING	L.S.	1	3,000.00	3,000.00
RUNWAY LIGHTING	L.S.	1	9,000.00	9,000.00
PAVEMENT MARKING	L.S.	1	4,500.00	4,500.00

SUB-TOTAL	$457,0
+20% ENG. & CONTINGENCY	91,4
TOTAL	$548,500

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RUNWAY 17L EXTENSION (950') By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 4 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATIONS - excavation entire 300' beyond runway end. See X-sections.

common EXCAVATION	32,000 cy
subgrade EXCAVATION	40,000 cy
topsoil EX. (EMBANKMENT)	5,000 cy
	77,000 cy

77,000 cy @ $2.50/cy = $192,500.00

GRANULAR MATERIAL - See x-sections. no salvagable material from excavations

GRAN. borrow (subgrade EXCAVATIONS)	40,000 cy
GRAN borrow (Add. to proposed GRADE)	45,000 cy
	85,000 cy

85,000 cy @ $3.00/cy = $255,000.00

AGGREGATE BASE - place 6" of aggregate base on tolerenced granular subgrade. Place base 3' beyond bituminous pavement edges.

AREA: 250' x 40' turn-around
950' x 106' runway
430' x 46' connector
950' x 46' taxiway

16,798 sy

17000 sy @ $2.50/sy = $42,500.00

BITUMINOUS PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume AC averages 5.8% and mn Dot 2341 mix design. Radii incidental for this estimate

AREA: 250' x 40' turn around
950' x 100' runway
430' x 40' connector
950' x 40 taxiway

160,200 SF x 3/12 x 0.075 TON/CF = 3004 TON

3000 TON @ 23.00 = $69,000.00

TURF ESTABLISHMENT - place 4" topsoil material that was salvaged during excavation operations. Place 10' sod along runway, connector & taxiway edges. Seed & mulch remainder of area within construction limits.

AREA: sod 950' x 10' x 4 runway & tax.
430 x 10' x 2 connector 5178 sy @ 2.00 = 10,356.00

seed 700' x 1250' = 20.1 ac @ $500.00/ac $10,000.00

20,500.00

to provide for carrying drainage under taxiway & connector. Assume 36" RCP will handle flow. Assume 2 crossings of either taxiway or connector.

LENGTH (40+55+55)@2 ea = 300 LF + 4 spares

300 LF @ $60.00/LF = $18,000.00

TAXIWAY lighting - edge lights required only at runway turnoffs

2 radii @ 3 lights ea. = 6 edge lights

6 ea @ $500.00/ea. = $3,000.00

RUNWAY lighting - space @ ± 180' along edge of runway plus threshold lightings

Includes any duct or wiring required. no ~~transformer~~ regulator in...

950 LF / 180 x2 + 8 = 18 edge lights

18 ea @ $500.00/ea = $9000.00

PAVEMENT MARKING - assume 6" continuous & striping on connector and taxiway (reflectorized

Assume threshold markings, runway number and ℄ markings on runway (STRAIGHT 120 stripes + 80 spacing) will be required.

LENGTH 950+430 = 1380 LF x6" x 700 SF @ $.055/SF = 385

threshold - lump sum / est per Denver stripe $4,000.00

$4,500.00

ULTIMATE NAV. AIDS - none shown on ALP

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	77,000	2.50	$192,500.00
GRANULAR MATERIAL	CY	85,000	3.00	255,000.00
AGGREGATE BASE	SY	17,000	2.50	42,500.00
BITUMINOUS PAVEMENT	TON	3,000	23.00	69,000.00
TURF ESTABLISHMENT	L.S.	1	20,500.00	20,500.00
DRAINAGE FACILITIES	L.S.	1	18,000.00	18,000.00
TAXIWAY LIGHTING	L.S.	1	3,000.00	3,000.00
RUNWAY LIGHTING	L.S.	1	9,000.00	9,000.00
PAVEMENT MARKING	L.S.	1	4,500.00	4,500.00
			SUB-TOTAL	$614,000.00
			+20% ENG. & CONTINGENCY	123,000.00
			TOTAL	$737,000.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RELOCATE THRESHOLD RUNWAY 35R(950') By GKS Date 3/86

QUANTITY and Cost Estimate ALT # 4 Chkd _____ Date _____

ELECTRICAL REMOVAL - remove existing runway threshold and edge lighting. From existing electrical drawing remove & salvage 13 edge lts. and 8 threshold lights. assume Type III Leave D-104 in place & abandon wiring

21 lights @ $100.00/ea = $2,100.00

REMOVE bituminous - remove existing bituminous full length and width of runway and connector. Assume 3" thickness. Assume aggregate base remains in place.

AREA: 100' x 950' runway
40' x 430' connector

12,467 SY 12500 SY @ $1.00 SY = $12,500.00

turf establishment - place topsoil salvaged from excavations under this alternate. Cover all areas were bituminous removed and any area disturbed during elec. removal.

AREA: (100' + 10' + 10') x 950'
(40 + 10' + 10') x 430' = 3.2 AC

3 ac @ $500.00/ac = $1500.00

PAVEMENT MARKINGS - assume ~~new~~ threshold markings, runway numbers and 6 stripe (estimated 120' stripe + 80' spacing). Lump sum price. estimate from Denman Stripe

Threshold = $4,000.00

ULTIMATE NAVIGATIONAL AIDS - includes relocating of existing REILS and installation of VASI-4 System

RELOCATE REILS: $3,000.00
install VASI-4: $20,000.00
$23,000.00

Description	Unit	Quantity	Unit Cost	Amount
ELECTRICAL REMOVAL	L.S.	1	2,100.00	2,100.00
REMOVE bituminous	S.Y.	12500	1.00	12,500.00
turf establishment	LS	1	1500.00	1,500.00
PAVEMENT MARKINGS	L.S.	1	4,000.00	4,000.00
NAVIGATIONAL AIDS	L.S.	1	23,000.00	23,000.00
			Sub-total	$ 43,100.00
			+20% Eng. & Contingency	8,600.00
			TOTAL	$ 51,700.00

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Project ANOKA Co. - BLAINE Airport Comm No _____ Sheet _____ of _____

Computations for CONNECTOR TAXIWAY TO RUNWAY 35R By GKJ Date 3/86

QUANTITY and COST ESTIMATE ALT # 4 Chkd _____ Date _____

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common - subgrade EXCAVATION . assume 2' subcut in safety area

common - subgrade

$80' \times 430' \times 2' = 2548\ cy$

use 3000 cy @ $2.50/cy = $7,500.00

GRANULAR MATERIAL

assume 4' backfill to bring section to grade. No salvagable material from excavation.

$80' \times 430' \times 4' = 5,096\ cy$

use 5500 cy @ $3.00/cy = $16,500.00

AGGREGATE BASE - place 6" aggregate base on tolerenced granular subgrade. Place base 3' beyond bituminous pavement edges.

AREA $430' \times 46'$ connector

2198 SY 2200 sy @ $2.50/sy = $5,500.00

bituminous PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C. averages 5.8% and mn Dot 2341 mix design. Radius incidental for this estimate

AREA $430' \times 40'$ connector

$17,200\ SF \times 3/12 \times 0.075\ TON/SF = 323\ TON$

350 TON @ $23.00/TN = $8,050.00

turf ESTABLISHMENT - place 10' sod along edge of connector. Seed & mulch remainder of area within construction limits.

AREA : Sod $10' \times 2 \times 430' = 956\ sy$

seed $430' \times 200' = 2.0$ ac

1000 sy @ $2.00/sy = $2,000.00

2 ac @ $500.00/ac = $1000.00

$3000.00

drainage facilities - drainage of storm runoff through ditches. Use RCP w/ aprons to provide drainage under connector. Use 36" RCP w/ 2 aprons

Length [46+55 - 55] = 150 LF + aprons

150 LF @ $60.00/LF = $9,000.00

taxiway lighting - install edge lights were connector exits off runway. Includes any duct & wiring necessary

2 radii @ 3 light ea = 6 edge lights

6 EA @ $500.00/ea = $3,000.00

pavement marking - ~~new~~ centerlines & stripe on connector (reflectorized).

Length 430 LF x 6" = 215 SF

@ $0.55/SF = $118.00 use $150.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	cy	3000	2.50	7,500.00
Granular Material	cy	5500	3.00	16,500.00
Aggregate Base	sy	2200	2.50	5,500.00
Bituminous Pavement	ton	350	23.00	8,050.00
Turf Establishment	LS.	1	3,000.00	3,000.00
Drainage Facilities	L.S.	1	9,000.00	9,000.00
Taxiway Lighting	L.S	1	3,000.00	3,000.00
Pavement Marking	L.S	1	150.00	150.00

Sub-total	$52,700.00
+20% Eng. & Contingency	10,300.00
Total	$63,000.00

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Project ANOKA CO- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for CONNECTOR TAXIWAY TO RUNWAY 8R By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 4 Chkd _____ Date _____

common subgrade excavation . assume 2' subcut in safety area.

common - subgrade EXCAVATION:

80' x 330' x 2' = 1956 cy

use 2000 cy @ $2.50/cy = $5,000.00

GRANULAR MATERIAL

assume 4' backfill to bring section to grade. No salvagable excavation material.

80' x 330' x 4' = 3911 cy

use 4000 cy @ $3.00/cy = $12,000.00

AGGREGATE BASE - place 6" aggregate base on tolerenced granular subgrade. Place base 3' beyond bituminous pavement edges.

AREA 330' x 46' connector

16,87 SY 1700 SY @ $2.50 = $4,250.00

bituminous PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume AC averages 5.8% and use Mn Dot 2341 mix design. Radius incidental for this estimate

AREA 330' x 40' connector

17200 SF x 3/12 x .075 TON/CF = 248 TON

250 TON @ $23.00/TN = $5,750.00

turf establishment - place 10' sod along edges. Seed & mulch remainder of area within construction limits.

AREA: sod 10' x 2' x 330' = 733 SY

seed 930 x 200' = 1.5 ac.

sod 750 SY @ 2.00/SY $1,500.00

seed 2 ac @ 500.00/ac = $1,000.00

$2,500.00

drainage facilities - drainage of storm runoff through ditches. Use RCP w/ aprons to provide drainage under connector to maintain existing flow. Use 36" RCP w/ 2 aprons

LENGTH (40' + 55' + 55') = 150 LF + aprons

150 LF @ $60.00 = $9,000.00

taxiway lighting - twy. edge lights were connector exits of runway. Wiring included in estimate

2 radii @ 3 lights each = 6 edge lights

6 ea @ $500.00/ea = $3000.00

pavement marking - assume intermittent 4" stripe on connector. (reflectorized).

LENGTH: 330 LF x 6" = 165 SF

@ $0.55/SF = $90.75

use $100.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	2000	2.50	5,000.00
Granular Material	CY	4000	3.00	12,000.00
Aggregate Base	SY	1700	2.50	4,250.00
Bituminous Pavement	TON	250	23.00	5,750.00
Turf Establishment	L.S.	1	2500.00	2,500.00
Drainage Facilities	L.S.	1	9000.00	9,000.00
Taxiway Lighting	L.S.	1	3000.00	3,000.00
Pavement Marking	L.S.	1	100.00	100.00

Sub-total $41,600.00

+20% Eng. & Contingency 8,400.00

TOTAL $50,000.00

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Project Anoka Co. - Blaine Airport Comm No _____ Sheet _____ of _____

Computations for ALTERNATE # 5 By GKS Date 3/28/86

Quantity and Cost Estimate Chkd _____ Date _____

ALTERNATE #5

Location	Construction Costs	20% Eng. & Cont.	Total
EAST BUILDING AREA	$ 421,000.00	$ 84,000.00	$ 505,000.00
EAST SIDE TAXIWAY	357,800.00	71,500.00	429,300.00
WEST BUILDING AREA	876,100.00	175,200.00	1,051,300.00
WEST SIDE TAXIWAY	238,800.00	47,700.00	286,500.00
RUNWAY 8R EXTENSION	657,500.00	131,500.00	789,000.00
RELOCATE THRESHOLD 26L	9,500.00	2,000.00	11,500.00
RUNWAY 17L EXTENSION	1,416,300.00	283,700.00	1,700,000.00
RELOCATE THRESHOLD 35R	65,600.00	13,100.00	78,700.00
REROUTE A PORTION OF 101ST AVENUE.	151,000.00	30,000.00	181,000.00
TOTALS	4 502,900.00	838,700	5,032,300

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Project ANOKA Co - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST BUILDING AREA By GKS Date 3/86

Quantity and Cost Estimate ALT # 3 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATIONS - using compilations from JGP & RAB dated 3/84.

COMMON EXCAVATION	60,000 CY
SUBGRADE EXCAVATION	20,000 CY
TOPSOIL STRIPING UNDER EMBANKMENTS	20,000 CY
	100,000 CY

100,000 CY @ $2.50/CY = $250,000.00

GRANULAR MATERIAL - using compilations from JGP; RAB dated 3/84.

GRANULAR REQUIRED:

27,000	EMBANKMENTS
20,000	SUBGRADE EX.
20000	TOPSOIL STRIPING
2,000	ALLEYWAYS
69,000 CY	≈ 70,000 CY

70,000 CY REQUIRED
- 50,000 CY AVAILABLE from EXCAV.
20,000 CY GRAN. borrow

20,000 CY @ $3.00/CY = $60,000.00

AGGREGATE BASE - use under service road and alley-ways. Use 6" thickness w/ 3' shoulder on turn
1' shoulder on alleys

AREA: 585' x 17' x 13 ea alleys
1480' x 17' alley
170' x 30' connection to service rd
17,727 SY

18,000 CY @ $2.50/CY = $45,000.00

BITUMINOUS PAVEMENT - service road and alley-ways. Use 3" thickness service rd 3" in two lifts. Radii included 2" thickness alleys for estimate

AREA: 585' x 15' x 13 ea alley (2")
1480' x 15' alley (3")
170' x 24' conn. to S.R. (3")

26280 SF x 3/12 x 0.075 TN/CF = 493 TN
114075 SF x 2/12 x 0.075 TN/CF = 1426 TN
1919 TN

2000 TON @ $23.00/TN = $45,000.00

turf establishment - seed & mulch building area. For this estimate assume no sodding. No reduction for paved area.

AREA: 2000' x 750' = 34.5 ac

35 acres @ $500.00/ac = $17,500.00

drainage facilities - culvert needed @ connection to servid road. assume 36" RCP w/ Aprons will handle flow.

LENGTH: 30' + 10' + 10' = 50 LF + 2 aprons

50 LF @ $60.00/LF = $3,000 + Aprons = $3,500.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	100,000	2.50	$250,000.00
Granular Material	CY	20,000	3.00	60,000.00
Aggregate Base	SY	18,000	2.50	45,000.00
Bituminous Pvmt	TON	2,000	23.00	45,000.00
Turf Establishment	L.S.	1	17,500.00	17,500.00
Drainage Facilities	LS.	1	3,500.00	3,500.00
			Sub-total	$421,000.00
			+ 20% Eng. & Contingency	84,000.00
			TOTAL	$505,000.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST SIDE TAXIWAY By GKS Date 3/86

QUANTITY AND COST ESTIMATE ALT #3 Chkd _____ Date _____

Common - subgrade EXCAVATIONS . modify JGP comps 11/83. Assume 2' subcut full width of safety area on taxiway and connectors.

EXCAVATIONS:
430' x 80' x 2' (connector)
500' x 80' x 2' x 2 (connector)
250' x 40' x 2' (turnaround)
1800' x 80' x 2' (taxiway)
} 19,880 CY

20,000 cy @ $2.50/cy = $50,000.00

GRANULAR MATERIAL. from X-sections assume 5' gran. backfill required to bring section to grade. No salvage material from excavations

GRAN.
430' x 80' x 5'
500' x 80' x 5' x 2
250' x 40' x 5'
1800' x 80' x 5'
} 49,704 cy

50,000 cy @ $3.00/cy = $150,000.00

AGGREGATE BASE - use under taxiways 6" thickness (3' shoulders)

AREA:
430' x 46' connector
500' x 46' connector
500' x 46' connector
250' x 40' turn-around
1800' x 46' taxiway

17,629 SY 18,000 SY @ 2.50 = $45,000.00

bituminous PAVEMENT - taxiways. 3" thickness (2 lifts). at this time radius incidental.

AREA:
430' x 40' connector
500' x 40' x 2 EA. connectors
250' x 40' turn-around
1800' x 40' taxiway

139,280 SF x 3/12 x 0.075 TON/CF = 2,610 TON

2600 TON @ $23.00/TON = $59,800.00

turf establishment - Sod 10' shoulder along connectors and taxiway. Seed & mulch other areas within construction limits.

AREA: sod [(500' x 4') + (1800' x 2)] x 10' = 6,222 SY
6250 SY @ $2.00/SY = 12,500.00

seed (2100 x 100) + (2100 x 100) + (250 x 300 x 2) = 13.1 acre

13 ac @ $500.00 = $6500.00

$19,000.00

DRAINAGE FACILITIES – culvert needed @ each connector to taxiway. assume for this estimate 36" RCP w/ apron

LENGTH: (40 + 55 + 55) x 3 ea = 450 LF + 6 aprons

450 LF @ $60.00/LF = $ 27,000.00

TAXIWAY LIGHTING – assume lighting at turn-offs only. Use 3 lights per / radius. Estimate includes any duct work & wiring.

LIGHTS: 4 radii @ 3 ea = 12 taxiway light

12 lights @ $500.00/EA = $ 6,000.00

PAVEMENT MARKING – assume 6" ℄ striping on connectors and taxiway (REFLECTORIZED)

LENGTH: 600 + 600 + 500 + 1800 = 3,500 LF

3500 LF x 6" = 1750 SF @ $0.55/SF = $962.50

use $1,000.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	20,000	2.50	50,000.00
GRANULAR MATERIAL	CY	50,000	3.00	150,000.00
AGGREGATE BASE	SY	18,000	2.50	45,000.00
BITUMINOUS PAVEMENT	TON	2,600	23.00	59,800.00
TURF ESTABLISHMENT	L.S	1	19,000.00	19,000.00
DRAINAGE FACILITIES	L.S.	1	27,000.00	27,000.00
TAXIWAY LIGHTING	L.S.	1	6,000.00	6,000.00
PAVEMENT MARKING	L.S.	1	1,000.00	1,000.00

SUB-TOTAL $ 357,800.00

+ 20% ENG. & CONTINGENCY 71,500.00

TOTAL $ 429,300.00

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Project ANOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for WEST BUILDING AREA By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #3 Chkd _____ Date _____

COMMON- SUBGRADE EXCAVATIONS - modifying computations from JOP 11/83

common (topsoil stripping)	66,000 cy
subgrade (alley subcut)	13,000 cy
muck elevation (below 902 elev)	40,000 cy
	119,000 cy

120,000 cy @ $2.50/cy = $300,000.00

GRANULAR MATERIAL - from computations JOP 11/83

gran. borrow (build to grade)	110,000 cy
gran. borrow (muck excavation)	40,000 cy
	150,000 cy

150,000 cy @ $3.00/cy = $450,000.00

AGGREGATE BASE - use under service rd. & alleyways (3' should on S.R. & 1' should a alley) 6" thickness

AREA:

720' x 17' x 8 EA	Alleyway
720' x 22' x 3 EA	Alleyway
1420' x 22' x 1 EA	SERVICE RD
19,631 SY	

20,000 SY @ $2.50 = $50,000.00

BITUMINOUS - service road and alleyways. 2" thickness alleys. 3" service rd radius incidental.

AREA:

720' x 15' x 8 ea	alley (2")
720' x 20' x 3 ea	alley (2")
1420' x 20' x 1 ea	S.R. (3")

28400 SF x 3/12 x 0.075 TON/CF = 533 TON
129600 SF x 2/12 x 0.075 TON/CF = 1620 TON
2153 TON

2200 TON @ $23.00 = $50,600.00

turf establishment - seed & mulch building area. assume no sodding for this estimate. No reduction for paved areas in this estimate.

AREA : $(600' \times 900') + (600' \times 400') = 38.5$ ac.

39 AC @ $500/ac = $19,500.00

drainage facilities - culvert needed @ service rd. connection from SGP estimate use 36" RCP w/ Apron

LENGTH : $(20' + 40' + 40') = 100$ LF + 2 apron

100 LF @ $60.00/LF = $6,000.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	120,000	2.50	300,000.00
GRANULAR MATERIAL	CY	150,000	3.00	450,000.00
AGGREGATE BASE	SY	20,000	2.50	50,000.00
BITUMINOUS PAVEMENT	TON	2200	2300	50,600.00
TURF ESTABLISHMENT	LS	1	19,500.00	$ 19,500.00
DRAINAGE FACILITIES	LS.	1	6000.00	6,000.00

Sub-total $ 876,100.00

+20% Eng. & Contingency 175,200.00

TOTAL $ 1,051,300.00

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Project ANOVA Co. - BLAINE Airport Comm No _____ Sheet _____ of _____

Computations for WEST SIDE TAXIWAY By GKS Date 3/86

QUANTITY and Cost Estimate ALT # 3 Chkd _____ Date _____

Common - Subgrade EXCAVATIONS - from rough cross-section assume 2' subcut full width and length of safety area on taxiway and connector will be required.

EXCAVATION: 2200' x 80' x 2' (taxiway)
200' x 80' x 2' (connector) } 14,222 CY

15,000 CY @ $2.50/CY = $37,500.00

GRANULAR MATERIAL - from x-section assume 4' granular backfill required to bring section to proposed grade. No salvagable excavation

GRAN. borrow 2200' x 80' x 4'
200' x 80' x 4' } 28144 CY

30,000 CY @ $3.00/CY = $90,000.00

AGGREGATE BASE - under taxiway and connector. Use 6" thickness w/ 3' shoulders

AREA: 2200' x 46' (taxiway)
200' x 46' (connector)

12,267 SY 13,000 SY @ $2.50/SY = $32,500.00

bituminous PAVEMENT - pave taxiway and connector. Use 3" compacted thickness placed in 1 lift. Radii incidental for this estimate.

AREA: 2200' x 40' (taxiway)
200' x 40' (connector)

96000 SF x 3/12 x 0.075 TN/CF = 1800 TON

1800 TON @ $23.00/TN = $41,400.00

turf Establishment - place sod along 10' shoulder of taxiway and connector. Seed & mulch other areas within construction limits.

AREA: sod 2200' x 2 x 10'
200' x 2 x 10' } 5333 SY

5250 SY @ $2.00/SY = $10,500.00

seed 2300' x 225' = 11.9 ac

12 acres @ $500.00/ac = 6,000.00

TOTAL $16,500.00

DRAINAGE FACILITIES - culverts needed @ connector and taxiway crossing from IGP estimate. Use 36" RCP w/ aprons and 48" RCP w/ Aprons to handle flow.

LENGTH : (40' + 55' + 55') = 150 LF 36" RCP
(40' + 55' + 55') = 150 LF 48" RCP

150 LF @ $60.00/LF = $ 9,000.00
150 LF @ $75.00/LF = $ 11,250.00
$ 20,250.00

PAVEMENT MARKINGS - Assume a 6" continuous ℄ stripe on taxiway and connects (reflectorized)

LENGTH : 2200' * 200' = 2400 LF

2400 LF x 6" = 1200 SF @ $0.55/SF = $ 660.00

use $ 650.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	15,000	2.50	$ 37,500.00
GRANULAR MATERIAL	CY	30,000	3.00	90,000.00
AGGREGATE BASE	SY	13000	2.50	32,500.00
BITUMINOUS PAVEMENT	TON	1800	23.00	41,400.00
TURF ESTABLISHMENT	LS	1	16,500.00	16,500.00
DRAINAGE FACILITIES	LS	1	20,250.00	20,250.00
PAVEMENT MARKINGS	LS.	1	650.00	650.00
			SUB-TOTAL	$ 238,800.00
			+20% ENG. & CONTINGENCY	47,700.00
			TOTAL	$ 286,500.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RUNWAY 8R EXTENSION (1350') By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 5 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATION - excavation continues 300' beyond end of runway.

A) assume build paving section to elev 906.00
B) " existing elevation 904.00
C) " 2' subcut in safety area 902.00

common - subgrade

1650' x 300' x 2' (runway)
1350 x 80' x 2' (taxiway)
330' x 80' x 2' (connector) } 46,622 cy

use 48,000 cy @ 2.50 = 120,000.00

GRANULAR MATERIAL

assume backfill 4' with safety zone to bring paving section to grade. No salvagable material from excavations.

1650' x 300' x 4' (runway)
1350' x 80' x 4' (taxiway) } 93,244 cy
330' x 80' x 4' (connector)

use 96,000 cy @ 3.00 = 288,000.00

AGGREGATE BASE - place 6" of aggregate base on balanced granular subgrade. Place base 3' beyond bituminous pavement edges.

AREA:
250' x 40' turn-around
1350' x 106' runway
330' x 46' connector
1350' x 46' taxiway

25,598 SY.

26,000 SY @ 2.50/SY = 65,000.00

BITUMINOUS PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. assume A.C. averages 5.8% and MN Dot 2341 mix design. Radii incidental in this estimate.

AREA:
250' x 40' turn around
1350' x 100' runway
330' x 40' connector
1350' x 40' taxiway

212200 SF x 3/12 x 0.075 TON/CF = 2,979 TON

4000 TON @ 23.00/TN = 92,000.0

turf establishment – place 4" topsoil material that was salvaged during excavation operations. Place 10' sod along runway connector and taxiway edges. Seed & mulch remainder of area within construction limits.

AREA: Sod 1350' x 10' x 2 runway
330 x 10' x 2' connector
1350 x 10' x 2 taxiway
= 6,733 SY
6750 SY @ 2.00/SY = 13500.00

Seed 1650' x 600' = 22.7 ac
23 ac @ 500/ac = 11500.00
≈ 25,000.00

drainage facilities drainage of storm runoff handled by ditches. Use RCP w/ aprons to provide for carrying drainage under taxiway & connection. Assume 36" RCP will handle flow. Assume 2 crossings of either taxiway or connection.

Length (40'+55'+55') @ 2 ea = 300 LF + 4 aprons
300 LF @ $60.00/LF = $18,000.00

taxiway lighting – edge lights only were limits of runway. Includes ducts and wiring as necessary ??
2 radii @ 3 lights ea = 6 edge lights
6 ea @ $500.00/ea = $3,000.00

runway lighting – space @ ≈180' along edge of runway + 8 lights @ threshold
1350/180 ≈ 8 + 8 = 24 edge lights
24 ea @ $500.00/ea = $12,000.00

pavement marking – assume 6" continuous & stripe on connector and taxiway (reflectorized). Assume threshold marking, runway no. & ℄ stripe on runway (STRATOD)
120 + 80 space will be required

Length 1350' + 330' = 1680 LF x 6" = 840 SF @ 0.55/SF = $462.00

threshold: lump sum
estimate per Dennis Striping
$4,000.00
$4,500.00

ultimate navigational aids – provide for new REILS and VASI-4 system

REILS: $10,000.00
VASI-4: $20,000.00
$30,000.00 lump sum

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	48,000	2.50	120,000.00
GRANULAR MATERIAL	CY	96,000	3.00	288,000.00
AGGREGATE BASE	SY	26,000	2.50	65,000.00
BITUMINOUS PAVEMENT	TON	4,000	23.00	92,000.00
TURF ESTABLISHMENT	LS	1	25,000.00	25,000.00
DRAINAGE FACILITIES	LS	1	18,000.00	18,000.00
TAXIWAY LIGHTING	L.S.	1	3,000.00	3,000.00
RUNWAY LIGHTING	L.S	1	12,000.00	12,000.00
PAVEMENT MARKING	L.S	1	4,500.00	4500.00
NAVIGATIONAL AIDS	L.S	1	30,000.00	30,000.00
			Sub-total	$ 657,500.00
			+20% Eng. & Contingency	131,500.00
			TOTAL	$ 789,000.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RELOCATE THRESHOLD 26L (550') By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #5 Chkd _____ Date _____

OBLITERATE EXSTING MARKINGS - remove existing threshold, chevrons, runway numbers on runway and any appropriate markings on taxiway.

Guesstimate 5000 SF of removal @ $0.35/SF
= $1,700.00

PAVEMENT MARKINGS - paint threshold markings, runway numbers and 6 stripes on runway (STRATED) [120' stripe + 80' spacing] will be required

estimate from Dennison Striping
lump sum $4,000.00

ELECTRICAL modifications -
a) remove existing edge lights (6 ea)
b) remove and salvage existing threshold lights (8 ea)
c) reinstall salvaged threshold lights (8 ea)

assume no new ducts required. Wiring included in estimate

REMOVAL
14 ea @ $100.00/ea = $1,400.00

RE-INSTALL
8 ea @ $ 300.00/ea = $ 2400.00

$ 3,800.00

ULTIMATE NAVAGATIONAL AIDS - ILS & MLS are nav. aids done by federal govt. ∴ not included in estimate.

Description	Unit	Quantity	Unit Cost	Amount
OBLITERATE MARKINGS	L.S	1	1,700.00	$ 1,700.00
PAVEMENT MARKINGS	L.S.	1	4,000.00	4,000.00
ELECTRICAL Modifications	L.S.	1	3,800.00	3,800.00
			Sub-total	$ 9,500.00
			+20% Eng. & Contingency	2,000.00
			TOTAL	$ 11,500.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RUNWAY 17L EXTENSION (2580') By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 5 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATIONS - excavations continue 300' beyond end of runway. See x-sections.

Common	45,000 CY
Subgrade	90,000 CY
topsoil (emb.)	15,000 CY
	150,000 CY

150,000 CY @ 2.50 / CY = $375,000.00

GRANULAR MATERIAL - See X-sections. Assume no salvagable material can be used for gran. backfill.

GRAN. borrow (subgrade)	90,000 CY
GRAN. borrow (Add' to grade)	110,000 CY
	200,000 CY

200,000 CY @ $3.00/CY = $600,000.00

AGGREGATE BASE - place 6" of aggregate base on toleranced granular subgrade & place base 3' beyond bituminous pavement edge.

AREA: 250' x 40' turn around
2500' x 106' runway
430' x 46' connector
430' x 46 connector
2580' x 46' taxiway
68,861 SY

69,000 SY @ $2.50/SY = $172,500.00

BITUMINOUS PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C averages 5.8% and Mn Dot 2341 mix design. Radii incidental for this estimate

AREA: 250' x 40' + turn around
2500' x 100' runway
430' x 40' connector
430' x 40' connector
2580' x 40' taxiway

405,500 SF x 3/12 x 0.075 TON/CF = 7605 TON

7600 TON @ $23.00 =
$174,800.00

excavation operations. Place 10' of sod along runway, connector & taxiway edge. Seed & mulch remainder of area within construction limits.

AREA: Sod 2580' x 10' x 2 runway
430 x 10' x 4 connectors
2500 x 10' x 2 taxiway
13,378 Sy

13500 Sy @ 2.00 = $27,000

Seed 2880' x 600' = 39.7 ac 40 ac @ $500.00 = $20,000

$47,000

DRAINING facilities - drainage & storm runoff handled by ditches. Use RCP w/ apron to provide for carrying drainage under taxiway & connectors. Assume 36" RCP will handle flow. Assume 2 crossings of either taxiway or connector.

LENGTH (40'+55'+55') @ 2 ea = 300 LF + 4 aprons

300 LF @ $60.00 = $18,000.00

TAXIWAY LIGHTING - edge lights required only @ turnoff of runway

4 radii @ 3 light ea = 12 edge lights

12 ea @ $500.00 = $6,000.00

RUNWAY LIGHTING - space @ ± 100' along edge of runway + 8 lights @ threshold

2,500' / 100 = 28 + 8 = 36 edge lights

36 ea @ $500.00 = $18,000.00

AUGMENT + MARKING - assume 6" continuous & stripe on connectors and taxiway (reflect.) Assume threshold marking, runway numbering and & stripe marking on runway (STARTED) 120 stripe + 90' space will be required.

Taxiway LENGTH: 2580 + 430 + 430 = 3440 LF x 6" = 1720 SF

1720 SF @ 0.55 = $946.00

threshold:

estimate from Dennison Stripers

lump sum $4,000.00

$5,000.00

ULTIMATE NAV. AIDS - none scheduled according to ALP

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	150,000	2.50	$ 375,000.00
Granular Material	CY	200,000	3.00	600,000.00
Aggregate Base	SY	69,000	2.50	172,500.00
Bituminous Pavement	TON	7,600	23.00	174,800.00
Turf Establishment	L.S	1	47,000.00	47,000.00
Drainage Facilities	LS	1	18,000.00	18,000.00
Taxiway Lighting	LS	1	6,000.00	6,000.00
Runway Lighting	L.S	1	18,000.00	18,000.00
Pavement Marking	L.S	1	5,000.00	5,000.00
			Sub-total	$ 1,416,300.00
			+20% Eng & Contingency	283,700.00
			Total	1,700,000.00

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Project Anoka Co. - Blaine Airport Comm No _____ Sheet _____ of _____

Computations for RELOCATE THRESHOLD 35R (2500') By GKS Date 3/86

Quantity and Cost Estimate Alt #5 Chkd _____ Date _____

ELECTRICAL REMOVAL - remove existing runway threshold (8 ea) and edge lights (26 ea). Leave ⊙ 104 in place. Leave ducts & abandoned wire in place.

removals 36 ea @ $100.00 = $3,600.00

REMOVE bituminous - remove existing bituminous full length and width of runway. Remove bituminous from connector. assume 3" thickness. assume aggregate base left in place.

AREA: 100' x 2500' runway
430' x 40' connector

30,578 SY 31,000 sy @ $1.00/sy = $31,000.00

turf establishment - place topsoil salvaged from excavation under this alternate over all bit removal areas. limits Seed & mulch area within construction

AREA: 100' + 10' + 10' x 2500' = 7.11 ac (runway)
430' x 40' + 10' + 10' = 0.59 ac (connector)
7.7 AC

8 ac @ $500.00 = $4,000.00

PAVEMENT MARKINGS - assume threshold markings, runway numbers and 6 stripe (STRATED) will be required 120' stripe + 80' space. Lump Sum price estimate from Dennison Lump sum $4,000.00

ULTIMATE NAVIGATIONAL AIDS - includes relocating existing REILS and installation of VASI-4 System.

Relocate REILS :	$ 3,000.00
install VASI-4	$ 20,000.00
	$ 23,000.00

Description	Unit	Quantity	Unit Cost	Amount
ELECTRICAL REMOVAL	L.S.	1	3,600.00	3,600.00
REMOVE bituminous	S.Y.	31,000	1.00	31,000.00
+ of ESTABLISHMENT	L.S	1	4,000.00	4,000.00
PAVEMENT MARKINGS	L.S	1	4,000.00	4,000.00
NAVIGATIONAL AIDS	L.S	1	23,000.00	23,000.00
			Sub-total	$ 65,600.00
			+ 20% Eng. & Contingency	13,100.00
			TOTAL	$ 78,700.00

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Project ALOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RELOCATE 10th STREET - QUANTITY and COST ESTIMATE ALT #8 By GKS Date 3/86

Chkd _____ Date _____

Common - Subgrade EXCAVATIONS. See x-section. Assume 2' subcut full width of roadway section (24'+10'+10')

EXCAVATION 2000' x 44' x 2' = 6,519 CY

= 6500 CY @ $2.50/CY = $16,250.00

GRANULAR MATERIAL. See x-section. Assume 4' subcut full width of section to bring to grade. Use excavation for shoulder fills.

GRAN: 2000' x 44' x 4' = 13,037 CY

13,000 CY @ $3.00/CY = $39,000.00

AGGREGATE BASE - place 6" aggregate base on tolerenced granular subgrade. place 10' beyond bituminous pavement edges.

AREA: (24'+10'+10)' x 2000' roadway

= 9,778 SY 9800 SY @ $2.50/SY = $24,500.00

bituminous PAVEMENT - place a 4" compacted bituminous pavement section in 2 lifts. Assume A.C average 5.8% and use Dot 2341 mix design.

AREA: 2000' x 24' 1200 TON @ 23.00 = 27,60

= 48000 SF x 4/12 x 0.075 TON/CF = 1,199 TON

turf establishment - place 4" topsoil material that was salvaged during excavation operations. Seed & mulch area within construction limits. May use sod to stabilize areas around culvert inlets - outlets.

AREA SOD: assume 1000 SY @ 2.00/SY = $2,000.00

SEED 2000' x 100' = 4.6 ac $2500.00

5 ac @ 500/ac = $4,500.00

Use RCP w/ apron to provide for carrying drainage under roadway ... assume 36" RCP will handle flows. assume 4 crossings of roadway.

length (50'+55'+55') @ 4 ea = 640 LF + 8 aprons

640 LF @ $60.00 = $38,400.00

PAVEMENT MARKING - assume 4 stripe total length (6" width)

2000' x 6" = 1000 SF x $0.55/SF

= $550.00

use $750.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATIONS	CY	6500	2.50	16,250.00
GRANULAR MATERIAL	CY	13,000	3.00	39,000.00
AGGREGATE BASE	SY	9,800	2.50	24,500.00
bituminous PAVEMENT	TON	1200	23.00	27,600.00
turf ESTABLISHMENT	LS	1	4,500.00	4,500.00
DRAINAGE FACILITIES	LS	1	38,400.00	38,400.00
PAVEMENT MARKING	LS	1	750.00	750.00
			SUB-TOTAL	$ 151,000.00
			+20% Eng. & Contingency	30,000.00
			TOTAL	$ 181,000.00

ALTERNATIVE 5

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for ALTERNATE # 6 By GKS Date 3/86

Quantity and Cost Estimate Chkd _____ Date _____

ALTERNATE # 6

Location	Construction Costs	20% Eng. & Cont.	Total
EAST BUILDING AREA	$421,000.00	$84,000.00	$505,000.00
EAST SIDE TAXIWAY	357,800.00	71,500.00	429,300.00
WEST BUILDING AREA	876,100.00	175,200.00	1,051,300.00
WEST SIDE TAXIWAY	238,800.00	47,700.00	286,500.00
RUNWAY 26 L EXTENSION	1,481,000.00	296,000.00	1,777,000.00
RELOCATE THRESHOLD 8R	45,400.00	9,100.00	54,500.00
RUNWAY 17L EXTENSION	1,416,300.00	283,700.00	1,700,000.00
RELOCATE THRESHOLD 35R	65,600.00	13,100.00	78,700.00
REROUTE A SECTION OF 101st AVE N.E	151,000.00	30,000	181,000
	5,053,000.00	1,010,000.00	6,063,300

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Project ANOKA Co - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST BUILDING AREA By GKS Date 3/86

Quantity and Cost Estimate ALT # 3 Chkd _____ Date _____

Common - Subgrade EXCAVATIONS - using computations from JGP & RAB dated 3/84.

common EXCAVATION	60,000 cy
subgrade EXCAVATION	20,000 cy
topsoil striping under embankments	20,000 cy
	100,000 cy

100,000 cy @ $2.50/cy = $250,000.00

GRANULAR MATERIAL - using computations from JGP; RAB dated 3/84.

GRANULAR REQUIRED:

27,000	EMBANKMENTS
20,000	SUBGRADE EX.
20000	topsoil striping
2,000	ALLEYWAYS
69,000 cy	≈ 70,000 cy

70,000 cy REQUIRED
- 50,000 cy AVAILABLE from EXCA
20,000 cy GRAN. borrow

20,000 cy @ $3.00/cy = $60,000.00

Aggregate BASE - use under service road and alley-ways. Use 6" thickness w/ 3' shoulder one two 1' shoulder on alleys

AREA: 585' x 17' x 13 ea alleys
1480' x 17' alley
170' x 30' connection to service rd
17,727 sy

18,000 cy @ $2.50/cy = $45,000.00

bituminous PAVEMENT - service road and alley-ways. Use 3" thickness service rd 3" in two lifts. Radii neglected 2" thickness alleys for estimate

AREA: 585' x 15' x 13 ea alley (2")
1480' x 15' alley (3")
170' x 24' conn. to S.R. (3")

26280 SF x 3/12 x 0.075 TN/CF = 493 TN
114075 SF x 3/12 x 0.075 TN/CF = 1426 TN
1919 TN

2000 TON @ $23.00/TN
$45,000.00

Turf ESTABLISHMENT - seed & mulch building area. For this estimate assume no sodding. No reduction for paved area.

AREA: 2000' x 750' = 34.5 ac

35 acres @ $500.00/ac = $17,500.00

DRAINAGE FACILITIES - culvert needed @ connection to servid road. assume 36" RCP w/ Aprons will handle flow.

LENGTH: 30' + 10' + 10' = 50 LF + 2 aprons

50 LF @ $60.00/LF = $3,000 + Aprons = $3,500.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	100,000	2.50	$250,000.00
Granular Material	CY	20,000	3.00	60,000.00
Aggregate Base	SY	18,000	2.50	45,000.00
Bituminous Pvmt	TON	2,000	23.00	45,000.00
Turf Establishment	L.S.	1	17,500.00	17,500.00
Drainage Facilities	LS.	1	3,500.00	3,500.00
			Sub-total	$421,000.00
			+ 20% Eng. & Contingency	84,000.00
			TOTAL	$505,000.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST SIDE TAXIWAY By GKS Date 3/86

QUANTITY AND COST ESTIMATE ALT #3 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATIONS . modify JGP comps 11/83. Assume 2' subcut full width of safety area or taxiway and connectors.

EXCAVATIONS:
430' x 80' x 2' (connector)
500' x 80' x 2' x 2 (connector)
250' x 40' x 2' (turnaround)
1800' x 80' x 2' (taxiway)
} 19,880 CY

20,000 cy @ $2.50/cy = $50,000.00

GRANULAR MATERIAL . from X-sections assume 5' gran. backfill required to bring section to grade. No salvage material from excavations

GRAN.
430' x 80' x 5'
500' x 80' x 5' x 2
250' x 40' x 5'
1800' x 80' x 5'
} 49,704 CY

50,000 cy @ $3.00/cy = $150,000.00

AGGREGATE BASE - use under taxiways 6" thickness (3' shoulders)

AREA:
430' x 46' connector
500' x 46' connector
500' x 46' connector
250' x 40' turn-around
1800' x 46' taxiway

17,629 SY 18,000 SY @ 2.50 = $45,000.00

BITUMINOUS PAVEMENT - taxiways. 3" thickness (2 lifts). at this time radius incidental.

AREA:
430' x 40' connector
500' x 40' x 2 EA. connectors
250' x 40' turn-around
1800' x 40' taxiway

139,280 SF x 3/12 x 0.075 TON/CF = 2,610 TON

2600 TON @ $23.00/TON = $59,800.00

TURF ESTABLISHMENT - Sod 10' shoulder along connectors and taxiway. Seed & mulch other areas within construction limits.

AREA: sod [(500' x 4') + (1800' x 2)] x 10' = 6,222 SY
6250 SY @ $2.00/SY = 12,500.00

SEED (2100 x 100) + (2100 x 100) + (250 x 300 x 2) = 13.1 acre

13 ac @ $500.00 = $6,500.00

$19,000.00

DRAINAGE FACILITIES – culvert needed @ each connector to taxiway. assume for this estimate 36" RCP w/ apron

LENGTH : (40 + 55 + 55) x 3 ea = 450 LF + 6 aprons

450 LF @ $60.00/LF = $ 27,000.00

TAXIWAY LIGHTING – assume lighting at Turn-offs only. Use 3 lights per / radius. Estimate includes any duct work + wiring.

LIGHTS : 4 radii @ 3 ea = 12 taxiway light

12 lights @ $500.00/EA = $ 6,000.00

PAVEMENT MARKING – assume 6" ℄ striping on connectors and taxiway (REFLECTORIZED)

LENGTH : 600 + 600 + 500 + 1800 = 3500 LF

3500 LF x 6" = 1750 SF @ $0.55/SF = $962.50

use $1,000.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	20,000	2.50	50,000.00
GRANULAR MATERIAL	CY	50,000	3.00	150,000.00
AGGREGATE BASE	SY	18000	2.50	45,000.00
BITUMINOUS PAVEMENT	TON	2,600	23.00	59,800.00
TURF ESTABLISHMENT	L.S	1	19,000.00	19,000.00
DRAINAGE FACILITIES	L.S.	1	27,000.00	27,000.00
TAXIWAY LIGHTING	L.S.	1	6,000.00	6,000.00
PAVEMENT MARKING	L.S.	1	1,000.00	1,000.00

SUB-TOTAL $ 357,800.00

+ 20% ENG. & CONTINGENCY 71,500.00

TOTAL $ 429,300.00

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Project ANOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for WEST BUILDING AREA By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #3 Chkd _____ Date _____

COMMON- SUBGRADE EXCAVATIONS - modifying computations from JOP 11/83

common (topsoil stripping)	66,000 cy
subgrade (alley subcut)	13,000 cy
muck elevation (below 902 elev)	40,000 cy
	119,000 cy

120,000 cy @ $2.50/cy = $300,000.0

GRANULAR MATERIAL - from computations JOP 11/83

gran. borrow (build to grade)	110,000 cy
gran. borrow (muck excavation)	40,000 cy
	150,000 cy

150,000 cy @ $3.00/cy = $450,000.00

AGGREGATE BASE - use under service rd. & alleyways (3' should on S.R. 6" thickness 1' should on alley

AREA:

720' x 17' x 8 EA	Alleyway
720' x 22' x 3 EA	Alleyway
1420' x 22' x 1 EA	Service RD
19,631 SY	

20,000 SY @ $2.50 = $50,000.00

BITUMINOUS - service road and alleyways. 2" thickness alleys. 3" service rd radius incidental.

AREA:

720' x 15' x 8 ea	alleys (2")
720' x 20' x 3 ea	alleys (2")
1420' x 20' x 1 ea	S.R. (3")

28400 SF x 3/12 x 0.075 TON/CF = 533 TON
129600 SF x 2/12 x 0.075 TON/CF = 1620 TON
2153 TON

2200 TON @ $23.00 = $50,600.00

turf establishment - seed & mulch building area. assume no sodding for this estimate. No reduction for paved areas in this estimate.

AREA : $(600' \times 900') + (600' \times 400') = 38.5$ ac.

39 AC @ $500/ac = $19,500.00

drainage facilities - culvert needed @ service rd. connection from SGP estimate use 36" RCP w/ Aprons

LENGTH : $(20' + 40' + 40') = 100$ LF + 2 aprons

100 LF @ $60.00/LF = $6,000.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	120,000	2.50	300,000.00
GRANULAR MATERIAL	CY	150,000	3.00	450,000.00
AGGREGATE BASE	SY	20,000	2.50	50,000.00
BITUMINOUS PAVEMENT	TON	2200	2300	50,600.00
TURF ESTABLISHMENT	LS	1	19,500.00	$ 19,500.00
DRAINAGE FACILITIES	LS.	1	6000.00	6,000.00

Sub-total	$ 876,100.00
+20% Eng. & Contingency	175,200.00
TOTAL	$ 1,051,300.00

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Project ANOVA Co. - BLAINE Airport Comm No _____ Sheet _____ of _____

Computations for WEST SIDE TAXIWAY By GKS Date 3/86

QUANTITY and Cost ESTIMATE ALT # 3 Chkd _____ Date _____

Common - Subgrade EXCAVATIONS - from rough cross-sections assume 2' subcut full width and length of safety area on taxiway and connector will be required.

EXCAVATION: 2200' x 80' x 2' (taxiway)
200' x 80' x 2' (connecta) } 14,222 CY

15,000 CY @ $2.50/CY = $37,500.00

GRANULAR MATERIAL - from X-sections assume 4' granular backfill required to bring section to proposed grade. No salvagable excavati

GRAN. borrow 2200' x 80' x 4'
200' x 80' x 4' } 28144 CY

30,000 CY @ $3.00/CY = $90,000.00

AGGREGATE BASE - under taxiway and connecta. Use 6" thickness w/ 3' shoulders

AREA: 2200' x 46' (taxiway)
200' x 46' (connecta)

12,267 SY 13,000 SY @ $2.50/SY = $32,500.00

bituminous PAVEMENT - pave taxiway and connecta. Use 3" compacted thickness placed in 2 lifts. Radii incidental for this estimate.

AREA: 2200' x 40' (taxiway)
200' x 40' (connecta)

96000 SF x 3/12 x 0.075 TN/CF = 1800 TON

1800 TON @ $23.00/TN = $41,400.00

turf ESTABLISHMENT - place sod along 10' shoulder of taxiway and connecta. Seed & mulch other areas within construction limits.

AREA: sod 2200' x 2 x 10'
200' x 2 x 10' } 5333 SY

5250 SY @ $2.00/SY = $10,500.00

seed 2300' x 225' = 11.9 ac

12 acres @ $500.00/ac = 6,000.00

TOTAL $16,500.00

Drainage Facilities - ... inlets needed @ connector and taxiway crossing from ISP estimate. Use 36" RCP w/ aprons and 48" RCP w/ Aprons to handle flow.

LENGTH : (40' + 55' + 55') = 150 LF 36" RCP
(40 + 55 + 55') = 150 LF 48" RCP

150 LF @ $60.00/LF = $ 9,000.00
150 LF @ $75.00/LF = $ 11,250.00
$ 20,250.00

Pavement Markings - Assume a 6" centerline stripe on taxiway and connector (reflectorized)

LENGTH : 2200' + 200' = 2400 LF

2400 LF x 6" = 1200 SF @ $0.55/SF = $ 660.00
use $ 650.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	cy	15,000	2.50	$ 37,500.00
Granular Material	cy	30,000	3.00	90,000.00
Aggregate Base	sy	13000	2.50	32,500.00
3 Huminous Pavement	ton	1800	23.00	41,400.00
Turf Establishment	LS	1	16,500.00	16,500.00
Drainage Facilities	LS	1	20,250.00	20,250.00
Pavement Markings	LS.	1	650.00	650.00
			Sub-total	$ 238,800.00
			+20% Eng. & Contingency	47,700.00
			Total	$ 286,500.00

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Project ANOKA CO- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RUNWAY 26 EXTENSION (3350') By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 6 Chkd _____ Date _____

Common - Subgrade EXCAVATIONS - excavation 300' beyond end of runway. See x-sections.

Common	48,000 cy
Subgrade	100,000 cy
	148,000 cy

148,000 cy @ $2.50/cy = $370,000.00

GRANULAR MATERIAL. See x-sections. No salvagable materials from excavation

GRAN. borrow (Subgrade excavation)	100,000 cy
GRAN. borrow (Add to bring to grade)	110,000 cy
	210,000 cy

210,000 cy @ $3.00/cy = $630,000.00

AGGREGATE BASE - place 6" of aggregate base on tolerenced granular subgrade. Place base 3' beyond bituminous pavement edge.

AREA: 250' x 40' turn-around
3350' x 106' runway
330' x 46' connector
330' x 46' connector
3350' x 46' taxiway
61062 sy

61,000 sy @ $2.50 = $152,500.00

bituminous PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C average 5.8% and use Dot 2341 mix design. Radii incidental for this estimate

AREA: 250' x 40' turnaround
3350 x 100' runway
330' x 40' connector
330' x 40 connector
3350' x 40' taxiway
505,400 SF x 3/12 x 0.075 TON/CF = 9476 TON

9500 TON @ $23.00 = $218,500.00

excavation operations. Stake 10' of sod at runway, connectors and taxiway edges. Seed & mulch remainder of area within construction limits.

AREA: sod 3350'x10'x2 runway
330' x10' x 4 connectors } 16,355 SY
3350 x10 x 2 taxiway

16,500 SY @ $2.00/SY = $33,000

seed 3650' x 600' 50.3 ac

50 AC @ $500.00/AC = $25,000

$58,000

DRAINAGE FACILITIES - drainage of storm runoff handled by ditches. Use RCP w/apron to provide for carrying drainage under runway, connectors & taxiway. Assume 36" RCP will handle flow. assume 2 crossings of taxiway or connectors

Length: (40'+55'+55') @ 2 ea = 300 LF + 4 aprons

300 LF @ $60.00/LF = $18,000.00

TAXIWAY lights - place edge lights @ turn offs of runway.

4 radii @ 3 lights ea = 12 edge lights

12 ea @ $500.00/ea = $6,000.00

RUNWAY lighting - space @ = 100' along edge of runway. Included threshold lighting (8 ea)

3350/100 = 38 + 8 = 46 edge lights

46 ea @ $500.00/ea = $23,000.00

PAVEMENT marking - assume 6" continuous & striping on taxiways and connectors (reflectorized). Assume threshold markings, runway no. marking and 6 stripe on runway (120 'stripe + 200' space STRATED) will be required.

LENGTH: 3350+ 330 + 330 = 4010 LF X6" = 2080 SF @ $0.55/SF = $1,100.00

threshold:

estimate from Dennis Stripe
lump sum $4000.00

$5000.00

ULTIMATE NAV. aids - ILS - MLS not included in this estimate. Done by federal govt.

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	148,000	2.50	370,000.00
Granular Material	CY	210,000	3.00	630,000.00
Aggregate Base	SY	61,000	2.50	152,500.00
Bituminous Pavement	TON	9500	23.00	218,500.00
Turf Establishment	L.S	1	58,000.00	58,000.00
Drainage Facilities	L.S.	1	18,000.00	18,000.00
Taxiway Lighting	L.S	1	6,000.00	6,000.00
Runway Lighting	L.S.	1	23,000.00	23,000.00
Pavement Marking	L.S.	1	5,000.00	5,000.00
			Sub-total	$ 1,481,000.00
			+20% Eng. & Contingency	296,000.00
			Total	$ 1,777,000.00

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Project ANOKA Co. - BLAINE Airport Comm No _____ Sheet _____ of _____

Computations for RELOCATE THRESHOLD RUNWAY 8R By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #6 Chkd _____ Date _____

OBILERATE EXISTING PAVEMENT MARKINGS - remove existing threshold, chevrons, runway & number and any appropriate markings on runways & taxiway
use @ 0.35 /SF
assume @ 2,000.00

PAVEMENT MARKINGS - paint threshold markings, runway number and 6 stripe on runway (striated). Paint chevrons on existing runway & abandoned.

double estimate from Dennison stripe
@ $8,000.00 Lump Sum

ELECTRICAL modifications - remove existing edge lights (24 ea)
remove and salvage existing threshold lights (6 ea)
install salvaged threshold lights (8 ea)

removal	30 ea @ $100.00	= $3,000.00
re-install	8 @ 300.00	= 2400.00
		$5,400.00

ultimate NAVIGATIONAL aids - ultimate plan calls for REILS and VASI-4 systems

REILS	$10,000.00
VASI-4	$20,000.00
	$30,000.00

Description	Unit	Quantity	Unit Cost	Amount
OBLITERATE MARKINGS	L.S.	1	2,000.00	2,000.00
PAVEMENT MARKINGS	L.S	1	8,000.00	8,000.00
ELECTRICAL Modifications	L.S	1	5,400.00	5,400.00
NAVIGATIONAL AIDS	L.S	1	30,000.00	30,000.00
			Sub-total	$45,400.00
			+20% Eng & Contingency	9,100.00
			TOTAL	$54,500.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RUNWAY 17L EXTENSION (2580') By GKS Date 3/86

Quantity and Cost Estimate ALT #5 Chkd _____ Date _____

Common - subgrade excavations - excavations continue 200' beyond end of runway. See x-sections.

Common	45,000 cy
Subgrade	90,000 cy
topsoil (emb.)	15,000 cy
	150,000 cy

150,000 cy @ 2.50 /cy = $375,000.00

granular material - See x-sections. Assume no salvagable material can be used for gran. backfill.

gran. borrow (subgrade)	90,000 cy
gran. borrow (Add to grade)	110,000 cy
	200,000 cy

200,000 cy @ $3.00/cy = 600,000.00

Aggregate base - place 6" of aggregate base on toleranced granular subgrade ~~place base 3' beyond~~ bituminous pavement edge.

AREA: 250' x 40' turn around
2500' x 106' runway
430' x 46' connector
430' x 46 connector
2580' x 46' taxiway
69,861 SY

69,000 SY @ $2.50/SY = $172,500.00

bituminous pavement - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C averages 5.8% and Mn Dot 234 mix design. Radii incidental for this estimate

AREA: 250' x 40' turn around
2580' x 100' runway
430' x 40' connector
430' x 40' connector
2580' x 40' taxiway

405,000 SF x 3/12 x 0.075 TON/CF = 7605 TON

7600 TON @ 23.00 =
$174,800.00

excavation operation. Place 10" of sod along runway, connector & taxiway edge. seed & mulch remainder of area within construction limits.

AREA : Sod 2580' x 10' x 2 runway
430 x 10' x 4 connectors
2500 x 10' x 2 taxiway
13,378 sy

13500 sy @ $2.00 = $27,000
Seed 2880' x 600' = 39.7 ac 40 ac @ $500.00 = $20,000
$47,000

Existing facilities - drainage & storm runoff handled by ditches. Use RCP w/ inlets to provide for carrying drainage under taxiway & connectors. Assume 36" RCP will handle flow. Assume 2 crossings of either taxiway or connector.

Length (40'+55+55') @ 2 ea = 300 LF + 4 inlets
300 LF @ $60.00 = $18,000.00

Taxiway Lighting - edge lights required only @ turnoff of runway
4 radii @ 3 light ea = 12 edge lights
12 ea @ $500.00 = $6,000.00

Runway Lighting - space @ ± 100' along edge of runway + 8 lights @ threshold
2,500' / 100 = 28 + 8 = 36 edge lights
36 ea @ $500.00 = $18,000.00

Paugment + marking - assume 6" continuous & stripe on connectors and taxiway (reflect.) Assume threshold marking, runway numbering and 6 stripe marking on runway (STRATED) 120 stripe + 90' space will be required.

Taxiway Length : 2580 + 430 + 430 = 3440 LF x 6" = 1720 SF
1720 SF @ 0.55 = $946.00

threshold :
estimate from Dennison Stripers
lump sum $4,000.00
$5,000.00

Ultimate NAV. Aids - none scheduled according to ALP

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	150,000	2.50	$ 375,000.00
Granular Material	CY	200,000	3.00	600,000.00
Aggregate Base	SY	69,000	2.50	172,500.00
Bituminous Pavement	TON	7,600	23.00	174,800.00
T.C.F. Establishment	L.S	1	47,000.00	47,000.00
Drainage Facilities	L.S	1	18,000.00	18,000.00
Taxiway Lighting	L.S	1	6,000.00	6,000.00
Runway Lighting	L.S	1	18,000.00	18,000.00
Pavement Marking	L.S	1	5,000.00	5,000.00
			Sub-total	$ 1,416,300.00
			+20% Eng. & Contingency	283,700.00
			Total	1,700,000.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RELOCATE THRESHOLD 35R (2500') By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #5 Chkd _____ Date _____

ELECTRICAL REMOVAL - remove existing runway threshold (8 ea) and edge lights (26 ea). Leave D 104 in place. Leave ducts & abandoned wire in place

removals 36 ea @ $100.00 = $3,600.00

REMOVE bituminous - remove existing bituminous full length and width of runway. Remove bituminous from connector. assume 3" thickness. assume aggregate base left in place.

AREA: 100' x 2500' runway
430' x 40' connector

30,578 SY 31,000 sy @ $1.00/sy = $31,000.00

turf ESTABLISHMENT - place topsoil salvaged from excavating under this alternate over all bit removal areas. seed & mulch area within construction limits

AREA: 100' + 10' + 10' x 2500' = 7.11 ac (runway)
430' x 40' + 10' + 10' = 0.59 ac (connecta)
7.7 AC

8 ac @ $500.00 = $4,000.00

PAVEMENT MARKINGS - assume threshold markings, runway numbers and 6 stripe (STRATED) will be required. 120' stripe + 80' space. Lump sum price estimate from Dennis Lump sum $4,000.00

ULTIMATE NAVIGATIONAL AIDS - includes relocating existing REILS and installation of VASI-4 System.

Relocate REILS :	$ 3,000.00
install VASI-4	$ 20,000.00
	$ 23,000.00

Description	Unit	Quantity	Unit Cost	Amount
Electrical Removal	L.S.	1	3,600.00	3,600.00
Remove bituminous	S.Y.	31,000	1.00	31,000.00
Mob & establishment	L.S	1	4,000.00	4,000.00
PAVEMENT MARKINGS	L.S	1	4,000.00	4,000.00
NAVIGATIONAL AIDS	L.S	1	23,000.00	23,000.00
			Sub-total	$ 65,600.00
			+20% Eng. & Contingency	13,100.00
			TOTAL	$ 78,700.00

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Project ALOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RELOCATE 101st STREET By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #8 Chkd _____ Date _____

Common- Subgrade EXCAVATIONS. See x-section. Assume 2' subcut full width of roadway section (24'+10'+10')

EXCAVATION 2000' x 44' x 2' = 6519 cy

= 6500 cy @ $2.50/cy = $16,250.00

GRANULAR MATERIAL. See x-sections. Assume 4' subcut full width of section to bring to grade. Use excavation for shoulder fills.

GRAN: 2000' x 44' x 4' = 13,037 cy

13,000 cy @ $3.00/cy = $39,000.00

AGGREGATE BASE - place 6" aggregate base on tolerenced granular subgrade. place 10' beyond bituminous pavement edges.

AREA: (24'+10'+10)' x 2000' roadway

= 9,778 sy 9800 sy @ $2.50/sy = $24,500.00

bituminous PAVEMENT - place a 4" compacted bituminous pavement section in 2 lifts. assume A.C average 5.0% and mn Dot 2341 mix design.

AREA: 2000' x 24' 1200 TON @ 23.00 = 27,60

= 48000 sf x 4/12 x 0.075 TON/cf = 1,199 TON

turf establishment - place 4" topsoil material that we salvaged during excavation operations. Seed & mulch area within construction limits. May use sod to stabilize areas around culvert inlets - outlets.

AREA SOD: assume 1000 sy @ 2.00/sy = $2,000.00

SEED 2000' x 100' = 4.6 ac $2500.00

5 ac @ 500/ac = $4,500.00

RCP w/ apron to provide 0" cover drainage under roadway ... assume 36" RCP will handle flow. assume 4 crossings of roadway.

length (50'+55+55) @ 4 ea = 640 LF + 8 aprons

640 LF @ $60.00 = $38,400.00

PAVEMENT MARKING - assume 6 stripe total length (6" width)

2000' x 6" = 1000 SF x $0.55/SF

= $550.00

use $750.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATIONS	CY	6500	2.50	16,250.00
GRANULAR MATERIAL	CY	13,000	3.00	39,000.00
AGGREGATE BASE	SY	9,800	2.50	24,500.00
bituminous pavement	TON	1200	23.00	27,600.00
turf establishment	LS	1	4,500.00	4,500.00
drainage facilities	LS	1	38,400.00	38,400.00
pavement marking	LS.	1	750.00	750.00
			SUB-TOTAL	$ 154,000.00
			+20% Eng. & Contingency	30,000.00
			TOTAL	$ 181,000.00

ALTERNATIVE D

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Project Anoka Co. - Blaine Airport Comm No _____ Sheet _____ of _____

Computations for ALTERNATE #7 By GKS Date 4/18/86

Quantity and Cost Estimate Chkd _____ Date _____

ALTERNATE #7

Location	Construction Costs	20% Eng. & cont.	Total
East Building Area	$421,000.00	$84,000.00	$505,000.00
East Side Taxiway	357,800.00	71,500.00	429,300.00
West Building Area	759,100.00	151,900.00	911,000.00
West Side Taxiway	206,550.00	41,450.00	248,000.00
Runway 26L Extension	457,050.00	91,450.00	548,500.00
Runway 17R-35L Construction	1,930,500.00	386,000.00	2,316,500.00
Reroute a section of 101st Ave N.E.	151,000.00	30,000.00	181,000.00
	$4,283,000.00	$856,300.00	$5,109,300.00

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Project ANOKA Co - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST BUILDING AREA By GKS Date 3/86

Quantity and Cost Estimate ALT # 3 Chkd _____ Date _____

common - subgrade EXCAVATIONS - using compilations from JGP & RAB dated 3/84.

common EXCAVATION	60,000 cy
subgrade EXCAVATION	20,000 cy
topsoil striping under embankments	20,000 cy
	100,000 cy

100,000 cy @ $2.50/cy = $250,000.00

GRANULAR MATERIAL - using compilations from JGP & RAB dated 3/84.

GRANULAR REQUIRED:

27,000	EMBANKMENTS
20,000	SUBGRADE EX.
20000	topsoil STRIPING
2,000	ALLEYWAYS
69,000 cy	≈ 70,000 cy

70,000 cy REQUIRED
- 50,000 cy AVAILABLE from EXCAV.
20,000 cy GRAN. borrow

20,000 cy @ $3.00/cy = $60,000.00

Aggregate BASE - use under service road and alley-ways. Use 6" thickness w/ 3' shoulder on twy 1' shoulder on alleys

AREA: 585' x 17' x 13 ea alleys
1480' x 17' alleys
170' x 30' connection to service rd
17,727 sy

18,000 cy @ $2.50/cy = $45,000.00

bituminous PAVEMENT - service road and alley-ways. Use 3" thickness service rd. 3" in two lifts. Radii rounded at 2" thickness alleys for estimate

AREA: 585' x 15' x 13 ea alley (2")
1480' x 15' alley (3")
170' x 24' conn. to s.r. (3")

26280 SF x 3/12 x 0.075 TN/CF = 493 TN
114075 SF x 2/12 x 0.075 TN/CF = 1426 TN
1919 TN

2000 TON @ $23.00/TN = $45,000.00

turf ESTABLISHMENT - seed & mulch building area. For this estimate assume no sodding. No reduction for paved area.

AREA: 2000' x 750' = 34.5 ac

35 acres @ $500.00/ac = $17,500.00

DRAINAGE facilities - culvert needed @ connection to service road. assume 36" RCP w/ Aprons will handle flow.

LENGTH: 30' + 10' + 10' = 50 LF + 2 aprons

50 LF @ $60.00/LF = $3,000 + Aprons = $3,500.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	100,000	2.50	$250,000.00
Granular Material	CY	20,000	3.00	60,000.00
Aggregate Base	SY	18,000	2.50	45,000.00
Bituminous Pvmt	TON	2,000	23.00	45,000.00
Turf Establishment	L.S.	1	17,500.00	17,500.00
Drainage facilities	LS.	1	3,500.00	3,500.00
			Sub-total	$421,000.00
			+ 20% Eng. & Contingency	84,000.00
			TOTAL	$505,000.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST SIDE TAXIWAY By GKS Date 3/86

QUANTITY AND COST ESTIMATE ALT #3 Chkd _____ Date _____

Common - subgrade EXCAVATIONS . modify JOP comps 11/83. Assume 2' subcut full width of safety area on taxiway and connectors.

EXCAVATIONS:
430' x 80' x 2' (connector)
500' x 80' x 2' x 2 (connector)
250' x 40' x 2' (turnaround)
1800' x 80' x 2' (taxiway)
} 19,880 cy

20,000 cy @ $2.50/cy = $50,000.00

GRANULAR MATERIAL. from X-sections assume 5' gran. backfill required to bring section to grade. No salvage material from excavations

GRAN.
430' x 80' x 5'
500' x 80' x 5' x 2
250' x 40' x 5'
1800' x 80' x 5'
} 49,704 cy

50,000 cy @ $3.00/cy = $150,000.00

AGGREGATE BASE - use under taxiways 6" thickness (3' stabilized)

AREA:
430' x 46' connector
500' x 46' connector
500' x 46' connector
250' x 40' turn-around
1800' x 46' taxiway

17,629 sy 18,000 sy @ $2.50 = $45,000.00

bituminous PAVEMENT - taxiways. 3" thickness (2 lifts). at this time radius incidental.

AREA:
430' x 40' connector
500' x 40' x 2 EA. connectors
250' x 40' turn-around
1800' x 40' taxiway

139,280 SF x 3/12 x 0.075 ton/cf = 2,610 TON

2600 TON @ $23.00/TON = $59,800.00

turf establishment - sod 10' shoulder along connectors and taxiway. Seed & mulch other areas within construction limits.

AREA: sod [(500' x 4') + (1000 x 2)] x 10' = 6,222 SY
6250 sy @ $2.00/SY = 12,500.00

SEED (2100 x 100) + (2100 x 100) + (250 x 300 x 2) = 13.1 acre

13 ac @ $500.00 = $6500.00

$19,000.00

drainage facilities – culvert needed @ each connector to taxiway. assume for this estimate 36" RCP w/ Aprons

LENGTH : (40 + 55 + 55) x 3 ea = 450 LF + 6 aprons

450 LF @ $60.00/LF = $ 27,000.00

taxiway lighting – assume lighting at turn-offs only. Use 3 lights per radius. Estimate includes any duct work & wiring.

LIGHTS : 4 radii @ 3 ea = 12 taxiway lights

12 lights @ $500.00/ea = $ 6,000.00

pavement marking – assume 6" ℄ striping on connectors and taxiway (reflectorized)

LENGTH : 600 + 600 + 500 + 1800 = 3500 LF

3500 LF x 6" = 1750 SF @ $0.55/SF = $962.50

use $ 1,000.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	20,000	2.50	50,000.00
Granular Material	CY	50,000	3.00	150,000.00
Aggregate Base	SY	18,000	2.50	45,000.00
Bituminous Pavement	TON	2,600	23.00	59,800.00
Turf Establishment	L.S.	1	19,000.00	19,000.00
Drainage Facilities	L.S.	1	27,000.00	27,000.00
Taxiway Lighting	L.S.	1	6,000.00	6,000.00
Pavement Marking	L.S.	1	1,000.00	1,000.00

Sub-total	$ 357,800.00
+ 20% Eng. & Contingency	71,500.00
TOTAL	$ 429,300.00

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Project ANOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for WEST BUILDING AREA (REDUCED) By GKS Date 3/86

Quantity and Cost Estimate ALT #7 Chkd _____ Date _____

common- subgrade EXCAVATION - reduced from alt #3 by 200' x 700' = 15,55

common (topsoil stripping) 66,000 cy - 10,000 = 56,000 cy
subgrade (Alley subcut) 13,000 - 0 = 13,000 cy
muck Elevation (below 902) 40,000 cy - 10,000 = 30,000 cy

99,000 cy

99000 cy @ $2.50/cy = $247,500.

GRANULAR MATERIAL - reduced from alt. #3 by 200' x 700' = 15,550 sy

gran borrow (build to grade) 100,000 cy
gran borrow (muck excavation) 30,000 cy

130,000 cy

130,000 cy @ $3.00/cy = $390,000.00

AGGREGATE BASE - place 6" of aggregate base on toleranced granular subgrade on service roads and alleyways (3' shoulder on S.R ; 1' shoulder on alleys)

AREA: 720' x 17' x 8 EA (Alleyway)
720 x 22' x 3 EA (Alley)
1420' x 22' x 1 EA (Service Rd)

19,631 sy

20,000 Sy @ 2.50 = $50,000.00

bituminous pavement - service road and alleys. 2" thickness alleys
3" thickness service rd.
Radii incidental to this estimate.

AREA: 720' x 15' x 8 ea (alleys @ 2")
720' x 20' x 3 ea (alleys @ 2")
1420' x 20' x 1 ea (S.R @ 3")

28,400 SF x 3/12 x 0.075 TON/CF = 533 TON
129600 SF x 2/12 x 0.075 TON/CF = 1620 TON

2153 TON

2200 TON @ $23.00 = $50,600.00

turf ESTABLISHMENT - seed & mulch building area with construction limits. Assume no sodding for this estimate. No reduction for paved areas in this estimate.

AREA: (1300' x 900') + (700' x 200') = 30.1 ac

30 ac @ $500.00/ac = $15,000.00

DRAINAGE FACILITIES - culverts needed @ service road connection from IGP estimates. Use 36" RCP w/ aprons.

LENGTH: (20' + 40' + 40') = 100 LF + 2 aprons

100 LF @ $60.00/LF = $6,000.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	99,000	2.50	$247,500.00
GRANULAR MATERIAL	CY	130,000	3.00	390,000.00
AGGREGATE BASE	SY	20,000	2.50	50,000.00
bituminous pavement	TON	2,200	23.00	50,600.00
turf ESTABLISHMENT	L.S	1	15,000.00	15,000.00
DRAINAGE FACILITIES	L.S.	1	6,000.00	6,000.00
			SUB-TOTAL	$759,100.00
			+20% Eng. & Contingency	151,900.00
				$911,000.00

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Project Anoka Co - Blaine Airport Comm No _____ Sheet _____ of _____

Computations for West Side Taxiway (Reduced) By GKJ Date 3/86

Quantity and Cost Estimate Alt #7 Chkd _____ Date _____

Common - subgrade excavation — from rough x-sections assume 2' subcut full width and length of safety area along taxiway will be required.

EXCAVATION : 2200' x 80' x 2' = 13037 CY

13,000 CY @ $2.50/CY = $32,500.00

granular material — from x-sections assume 4' granular backfill required to bring section to proposed grade. No salvagable excavation material for gran. backfill. may be used for shoulders.

gran. borrow 2200' x 80' 4' = 26,074

26000 CY @ $3.00/CY = $78,000.00

Aggregate base - place 6" aggregate base on toleraned granular subgrade. (3' shoulder)

AREA: 2200' x 46' taxiway

11,264 SY

11,000 SY @ $2.50 = $27,500.00

bituminous pavement - place a 3" compacted bituminous pavement section in 2 lifts. Assume S.C average 5.8% and Mn Dot 2341 mix design. Radii incidental for this estimate.

AREA 2200' x 40'

88,000 SF x 3/12 x 0.075 TON/CF = 1650 TON

1650 x $23.00/TN = $37,950.00

turf establishment - Sod 10' along taxiway edges. Seed and mulch remainder of area within construction limits

AREA SOD : 2200' x 10' x 2' = 4750 SY @ $2.00 = $9,500.00

SEED 2200' x 100' = 5 ac @ $500.00 = $2500.00

$12,000.00

DRAINAGE FACILITIES - drainage of storm runoff handled by ditches. Use RC w/ apron to provide for carrying drainage under taxiway. Assume 36" RCP will handle flow. Assume 2 crossings

Length (40' + 55'+55') @ 2 ea. = 300 LF + 4 aprons

300 LF @ $60.00/LF = $18,000.00

PAVEMENT MARKINGS - assume a 6" centerline & stripe on taxiway (reflectorized)

Length 2200 LF x 6" = 1100 SF @ $.55 = $605.00

use $600.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	13000	2.50	$32,500.00
GRANULAR MATERIAL	CY	26,000	3.00	78,000.00
AGGREGATE BASE	SY	11,000	2.50	27,500.00
BITUMINOUS PAVEMENT	TON	1650	23.00	37,950.00
TURF ESTABLISHMENT	LS	1	12,000.00	12,000.00
DRAINAGE FACILITIES	LS	1	18,000.00	18,000.00
PAVEMENT MARKINGS	L.S.	1	600.00	600.00
			Sub-total	$206,550.00
			+20% Eng & Contingency	41,450.00
			TOTAL	$248,000.00

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Project Anoka Co. - Blaine Airport Comm No _____ Sheet _____ of _____

Computations for Runway 26L Extension (800') By GKS Date 3/86

Quantity and Cost Estimate ALT # 4 Chkd _____ Date _____

Common - Subgrade Excavation - excavation 300' beyond end of runway. See x-sect

Common Excavation	35,000 cy
Subgrade Excavation	35,000 cy
	70,000 cy

70,000 cy @ $2.50/cy = $175,000.00

Granular Material - no salvagable material from excavation

Gran. borrow (Subgrade excavation)	35,000 cy
Gran borrow (Additional to bring to proposed grade)	10,000 cy
	45,000 cy

45,000 cy @ $3.00/cy = $135,000.00

Aggregate Base - place 6" of aggregate base or tolerenced granular subgrade. Place base 2' beyond bituminous pavement edge.

AREA: 250' x40' turnaround
800' x100' runway
330' x46' connector
800' x46' taxiway
16,307 sy

16,500 Sy @ $2.50/Sy = $41,250.00

Bituminous Pavement - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C. averages 5.0% and Mn DOT 2341 mix design. Radii incidental.

AREA: 250'x40' turnaround
800'x100' runway
330'x40' connector
800'x40' taxiway

127,200 SF x 3/12 x 0.075 TON/CF = 2385 TONS

2400 TON @ $23.00 TN = $55,200.00

Turf Establishment - place 4" topsoil material that was salvaged during excavation operations. Place 10' sod along runway connecta & taxiway edges. Seed & mulch remainder of area within construction limits.

AREA: Sod (800'x4) + (330'x2) x10' = 4,287 Sy

4300 Sy @ $2.00 = $8600.00

-Seed 600'x1100' = 15.2 ac

15 ac @ $500.00 = $7500.00

$16,100.00

to provide for carrying drainage under runway & taxiways. Assume 36" RCP will handle flow. assume 2 crossings of taxiway.

LENGTH: (40+55+55) @ 2 EA. = 300 LF + 4 aprons

300 LF @ $60.00/LF = $18,000.00

TAXIWAY lights - place edge lights @ runway turn-offs @ 3 per radii

2 radii @ 3 light each = 6 edge lights. Includes conduit & wiring

6 EA. @ $500.00 = $3000.00

RUNWAY lighting - space @ ± 180' along edge of runway plus threshold (8 ea.) includes conduit & wiring necessary. no regulator estimated

800' / 180 x 2 = 10 edge lights + 8 threshold

18 EA @ $500.00 = $9,000.00

PAVEMENT MARKING - assume 6" ℄ striping on connector and taxiway (reflectorized). assume threshold markings, number marking and ℄ marking on runway (STRATED MARKING 120' stripe 180' space) will be required.

LENGTH 400' + 800' = 1200 LF taxiway & connector

1200 LF x 6" = 600 SF @ $0.55 = 330.00

Threshold - lump sum / est. per Denison Striping

= $4000.00

$4330.00

Estimate NAV. AIDS - ILS - MLS not included in this estimate. Installation done by federal govt.

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	10,000	2.50	175,000.00
GRANULAR MATERIAL	CY	45,000	3.00	135,000.00
AGGREGATE BASE	SY	16,500	2.50	41,250.00
BITUMINOUS PAVEMENT	TON	2,400	23.00	55,200.00
TURF ESTABLISHMENT	L.S.	1	16,100.00	16,100.00
DRAINAGE FACILITIES	L.S.	1	18,000.00	18,000.00
TAXIWAY LIGHTING	L.S.	1	3,000.00	3,000.00
RUNWAY LIGHTING	L.S.	1	9,000.00	9,000.00
PAVEMENT MARKING	L.S.	1	4,500.00	4,500.00
			SUB-TOTAL	$457,050.00
			+20% ENG & CONTINGENCY	91,450.00
				$548,500.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RUNWAY 17R - 35L CONSTRUCTION By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #7 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATIONS - excavations continue 300' beyond end of runway.

COMMON EXCAVATION	45000	CY
SUBGRADE EXCAVATION	115,000	CY
TOPSOIL (under embank.)	15,000	CY
	175,000	CY

175,000 CY @ $2.50/CY = $437,50

GRANULAR MATERIAL - assume none of the material can be salvaged for gran. backfill from excavation except for shoulder outside safety zone.

SUBGRADE EXCAVATION	115,000	CY
TOPSOIL STRIPPING	15,000	CY
BORROW (Add. to grade)	115,000	CY
	245,000	CY

245,000 CY @ $3.00/CY = $735,000

AGGREGATE BASE - place 6" aggregate base on fabricated granular subgrade. Place base 3' beyond bituminous pavement edges.

AREA		
	250 X 40	turn-around
	4855' X 106'	RUNWAY
	330' X 46'	connector
	330' X 46'	connector
	330' X 46'	connector
	4855' X 46'	taxiway

88,167 SY @ ~~$2.50/SY~~ = ~~$220,418.00~~
88,000 @ 2.50 = $220,000.00

BITUMINOUS PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C. average 5.0% and use DOT 2341 mix design. Radii incident for this estimate

AREA:

250 X 40'	turnaround
4855 X 100'	runway
330' X 40' X 3	connectors
4855' X 40'	taxiway

729,300 SF X 3/12 X 0.075 TON/CF = 13,675 T

14,000 TON @ $23.00 = $322,00

excavation operations. Place 10' of sod along runway, connectors and taxiway edges. Seed & mulch remainder of area within construction limits.

AREA: sod 4855 x 10 x 2 runway
330 x 10 x 2 x 3 connectors 23,778 SY
4855 x 10 x 2 taxiway
24,000 SY @ $2.00 = $48,000.00

seed 5455' x 500' = 62.6 ac 62 @ $500.00 = $31,000.00
$79,000.00

DRAINAGE FACILITIES - drainage of storm runoff handled by ditches. Use RCP w/ aprons to provide for carrying drainage under taxiway & connectors. Assume 36" RCP will handle flow. Assume 8 crossings of taxiway or connector

LENGTH (40+55+55) @ 4 ea = 600 LF + 8 aprons

600 LF @ $60.00 = $36,000.00

TAXIWAY LIGHTINGS - place edge lights @ runway turn-offs

16 radii @ 3 light ea = 48 edge lights

48 @ $500.00/ea = $24,000.00

RUNWAY LIGHTING - space @ ≈ 100' along edge of runway. Include threshold lighting

4855 / 100 = 54 + 16 = 70 edge lights

70 lights @ $500.00/ea = $35,000.00

AUGMENT MARKING - assume 6" continuous & stripe on taxiway & connectors (reflectorized). Assume threshold markings, runway numbers, and runway & stripe (120' stripe + 80' space STRATED) will be required.

LENGTH: 4855' + 330' + 330' + 330' + 330' = 6175 LF x 6" = 3088 SF
31005F @ $0.55 = $1705.00

2 threshold + dc

est $4,000.00 / threshold - 4000+4000+2000 = $10,000.00
$12,000.00

ULTIMATE NAV AIDS - VASI, REILS on 35 L included in this estimate.

VASI-4	$20,000.00
REILS	$10,000.00
	$30,000.00

Description	Unit	Quantity	Unit Cat	Amount
EXCAVATIONS	CY	175,000	2.50	$ 437,500.00
GRANULAR MATERIAL	CY	245,000	3.00	735,000.00
AGGREGATE BASE	SY	88,000	2.50	220,000.00
BITUMINOUS PAVEMENT	TON	14,000	23.00	322,000.00
TURF ESTABLISHMENT	L.S	1	79,000.00	79,000.00
DRAINAGE FACILITIES	L.S.	1	36,000.00	36,000.00
TAXIWAY LIGHTING	L.S	1	24,000.00	24,000.00
RUNWAY LIGHTING	L.S	1	35,000.00	35,000.00
PAVEMENT MARKING	L.S.	1	12,000.00	12,000.00
NAVIGATIONAL AIDS	L.S	1	30,000.00	30,000.00
			SUB-TOTAL	$ 1,930,500.00
			+20% ENG. & CONTIGENCY	386,000.00
			TOTAL	$ 2,316,500.00

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Project ALOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RELOCATE 101st STREET By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #8 Chkd _____ Date _____

Common- Subgrade EXCAVATIONS. See x-section. Assume 2' subcut full width of roadway section (24'+10'+10')

EXCAVATION 2000' x 44' x 2' = 6,519 cy

= 6500 cy @ $2.50/cy = $16,250.00

GRANULAR MATERIAL. See x-sections. Assume 4' subcut full width of section to bring to grade. Use excavation for shoulder fills.

GRAN: 2000' x 44' x 4' = 13,037 cy

13,000 cy @ $3.00/cy = $39,000.00

AGGREGATE BASE - place 6" aggregate base on tolerenced granular subgrade. Place 10' beyond bottom pavement edges.

AREA: (24'+10'+10)' x 2000' roadway

= 9,778 sy

9800 sy @ $2.50/sy = $24,500.00

bituminous PAVEMENT - place a 4" compacted bituminous pavement section in 2 lifts. Assume A.C average 5.8% and mn Dot 2341 mix design.

AREA: 2000' x 24' 1200 TON @ 23.00 = 27,60

= 48000 sf x 4/12 x 0.075 TON/cf = 1,199 TON

turf establishment - place 4" topsoil material that was salvaged during excavation operations. Seed & mulch area within construction limits. May use sod to stabilize areas around culvert inlets - outlets.

AREA SOD: assume 1000 sy @ 2.00/sy = $2,000.00

SEED 2000' x 100' = 4.6 ac $2500.00

5 ac @ 500/ac = $

drainage facilities

Use RCP w/ apron to provide for carrying drainage under roadway ... assume 36" RCP will handle flow. assume 4 crossings of roadway.

Length (50'+55'+55') @ 4 ea = 640 LF + 8 aprons

640 LF @ $60.00 = $38,400.00

pavement marking - assume 6 stripe total length (6" width)

2000' x 6" = 1000 SF x $0.55/SF

= $550.00

use $750.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATIONS	CY	6500	2.50	16,250.00
GRANULAR MATERIAL	CY	13,000	3.00	39,000.00
AGGREGATE BASE	SY	9,800	2.50	24,500.00
BITUMINOUS PAVEMENT	TON	1200	23.00	27,600.00
TURF ESTABLISHMENT	LS	1	4,500.00	4,500.00
DRAINAGE FACILITIES	LS	1	38,400.00	38,400.00
PAVEMENT MARKING	LS.	1	750.00	750.00
			SUB-TOTAL	$ 154,000.00
			+20% Eng. & Contingency	30,000.00
			TOTAL	$ 181,000.00

ALTERNATIVES

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for ALTERNATE #8 By GKJ Date 3/86

Quantity And Cost Estimate Chkd _____ Date _____

ALTERNATE #8

LOCATION	CONSTRUCTION COSTS	20% Eng. & Cont.	TOTAL
EAST BUILDING AREA	$ 421,000.00	$ 84,000.00	$ 505,000.00
EAST SIDE TAXIWAY	357,800.00	71,500.00	429,300.00
WEST BUILDING AREA	876,100.00	175,200.00	1,051,300.00
WEST SIDE TAXIWAY	238,800.00	47,700.00	286,500.00
RUNWAY 26L EXTENSION	457,050.00	91,450.00	548,500.00
CONNECTOR TWY to RUNWAY 8R	41,600.00	8,400.00	50,000.00
RUNWAY 17L EXTENSION	1,416,300.00	283,700.00	1,700,000.00
RELOCATE THRESHOLD 35R	65,600.00	13,100.00	78,700.00
RELOCATE 101st STREET	151,000.00	30,000.00	181,000.00
TOTALS	$ 4,025,250.00	$ 805,050.00	$ 4,830,300.00

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Project ANOKA Co - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST BUILDING AREA By GKS Date 3/86

Quantity and Cost Estimate ALT # 3 Chkd _____ Date _____

COMMON - SUBGRADE EXCAVATIONS - using computations from JGP & RAB dated 3/84.

COMMON EXCAVATION	60,000 CY
SUBGRADE EXCAVATION	20,000 CY
TOPSOIL STRIPING UNDER EMBANKMENTS	20,000 CY
	100,000 CY

100,000 CY @ $2.50/CY = $250,000.00

GRANULAR MATERIAL - using computations from JGP & RAB dated 3/84.

GRANULAR REQUIRED:

27,000	EMBANKMENTS
20,000	SUBGRADE EX.
20000	TOPSOIL STRIPING
2,000	ALLEYWAYS
69,000 CY	≈ 70,000 CY

70,000 CY REQUIRED
- 50,000 CY AVAILABLE from EXCAV
20,000 CY GRAN. borrow

20,000 CY @ $3.00/CY = $60,000.00

AGGREGATE BASE - use under service road and alley-ways. Use 6" thickness w/ 3' shoulder on turns 1' shoulder on alleys

AREA: 585' x 17' x 13 ea alleys
1480' x 17' alleys
170' x 30' connection to service rd
17,727 SY

18,000 CY @ $2.50/CY = $45,000.00

BITUMINOUS PAVEMENT - service road and alley-ways. Use 3" thickness service rd. 3" in two lifts. Radii included 2" thickness alleys for estimate

AREA: 585' x 15' x 13 ea alley (2")
1480' x 15' alley (3")
170' x 24' conn. to s.r. (3")

26280 SF x 3/12 x 0.075 TN/CF = 493 TN
114075 SF x 2/12 x 0.075 TN/CF = 1426 TN
1919 TN

2000 TON @ $23.00/TN = $45,000.00

Turf establishment - need ± multiple building areas. For this estimate assume no sodding. No reduction for paved area.

AREA: 2000' x 750' = 34.5 ac

35 acres @ $500.00/ac = $17,500.00

Drainage facilities - culvert needed @ connection to servid road. assume 36" RCP w/ Aprons will handle flow.

LENGTH: 30' + 10' + 10' = 50 LF + 2 aprons

50 LF @ $60.00/LF = $3,000 + Aprons = $3,500.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	100,000	2.50	$250,000.00
Granular Material	CY	20,000	3.00	60,000.00
Aggregate Base	SY	18,000	2.50	45,000.00
Bituminous Pvmt	TON	2,000	23.00	45,000.00
Turf Establishment	L.S.	1	17,500.00	17,500.00
Drainage Facilities	LS.	1	3,500.00	3,500.00
			Sub-total	$421,000.00
			+ 20% Eng. & Contingency	84,000.00
			Total	$505,000.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for EAST SIDE TAXIWAY By GKS Date 3/86

QUANTITY AND COST ESTIMATE ALT #3 Chkd _____ Date _____

Common - subgrade EXCAVATIONS . modify JGP comp 11/83. Assume 2' subcut full width of safety area on taxiway and connectors.

EXCAVATIONS:
430' x 80' x 2' (connector)
500' x 80' x 2' x 2 (connector)
250' x 40' x 2' (turnaround)
1800' x 80' x 2' (taxiway)
} 19,880 CY

20,000 cy @ $2.50/cy = $50,000.00

GRANULAR MATERIAL. from X-sections assume 5' gran. backfill required to bring section to grade. No salvage material from excavations

GRAN.
430' x 80' x 5'
500' x 80' x 5' x 2
250' x 40' x 5'
1800' x 80' x 5'
} 49,704 CY

50,000 cy @ $3.00/cy = $150,000.00

AGGREGATE BASE - use under taxiways 6" thickness (3' shoulders)

AREA:
430' x 46' connector
500' x 46' connector
500' x 46' connector
250' x 40' turn-around
1800' x 46' taxiway

17,629 SY 18,000 SY @ $2.50 = $45,000.00

bituminous PAVEMENT - taxiways. 3" thickness (2 lifts). at this time radius incidental.

AREA:
430' x 40' connector
500' x 40' x 2 EA. connectors
250' x 40' turn-around
1800' x 40' taxiway

139,280 SF x 3/12 x 0.075 TON/CF = 2,610 TON

2600 TON @ $23.00/TON = $59,800.00

turf establishment - sod 10' shoulder along connectors and taxiway. Seed & mulch other areas within construction limits.

AREA: sod [(500' x 4') + (1800' x 2)] x 10' = 6,222 SY
6250 SY @ $2.00/SY = $12,500.00

SEED (2100 x 100) + (2100 x 100) + (250 x 300 x 2) = 13.1 acre

13 ac @ $500.00 = $6500.00

$19,000.00

Drainage facilities – culvert needed @ each connector to taxiway. assume for this estimate 36" RCP w/ Aprons

LENGTH : (40 + 55 + 55) x 3 ea = 450 LF + 6 aprons

450 LF @ $60.00/LF = $ 27,000.00

Taxiway Lighting – assume lighting at Turn-offs only. Use 3 lights per / radius. Estimate includes any duct work & wiring.

LIGHTS : 4 radii @ 3 ea = 12 taxiway lights

12 lights @ $500.00/EA = $ 6,000.00

Pavement Marking – assume 6" ℄ striping on connectors and taxiway (REFLECTORIZED)

LENGTH : 600 + 600 + 500 + 1800 = 3500 LF

3500 LF x 6" = 1750 SF @ $0.55/SF = $962.50

use $1,000.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	20,000	2.50	50,000.00
Granular Material	CY	50,000	3.00	150,000.00
Aggregate Base	SY	18000	2.50	45,000.00
Bituminous Pavement	TON	2,600	23.00	59,800.00
Turf Establishment	L.S	1	19,000.00	19,000.00
Drainage Facilities	L.S.	1	27,000.00	27,000.00
Taxiway Lighting	L.S.	1	6,000.00	6,000.00
Pavement Marking	L.S.	1	1,000.00	1,000.00
			Sub-total	$ 357,800.00
			+ 20% Eng. & Contingency	71,500.00
			TOTAL	$ 429,300.00

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Project ANOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for WEST BUILDING AREA By GKS Date 3/86

Quantity and Cost ESTIMATE ALT #3 Chkd _____ Date _____

COMMON- SUBGRADE EXCAVATIONS - modifying computations from JOP 11/83

common (topsoil stripping)	66,000 cy
subgrade (Alley subcut)	13,000 cy
muck elevation (below 902 elev)	40,000 cy
	119,000 cy

120,000 cy @ $2.50 /cy = $300,000.0

GRANULAR MATERIAL - from computations JOP 11/83

GRAN: borrow (build to grade)	110,000 cy
GRAN. borrow (muck excavation)	40,000 cy
	150,000 cy

150,000 cy @ $3.00/cy = $450,000.00

AGGREGATE BASE - use wide service rd. & alleyways (3' should on S.R. 1' should a alley
6" thickness

AREA:

720' x 17' x 8 EA	Alleyway
720' x 22' x 3 EA	Alleyway
1420' x 22' x 1 EA	SERVICE RD
19,631 SY	

20,000 SY @ $2.50 = $50,000.00

BITUMINOUS - service road and alleyways . 2" thickness alleys. radius incidental.
3" service rd

AREA:

720' x 15' x 8 ea	alleys (2")
720' x 20' x 3 ea	alleys (2")
1420' x 20' x 1 ea	S.R. (3")

28400 SF x 3/12 x 0.075 TON/CF = 533 TON
129600 SF x 2/12 x 0.075 TON/CF = 1620 TON
2153 TON

2200 TON @ $23.00 = $50,600.00

turf establishment - seed & mulch building area. assume no sodding for this estimate. No reduction for paved areas in this estimate.

AREA : (600' x 900') + (600' x 400') = 38.5 ac.

39 AC @ $500/ac = $19,500.00

drainage facilities - culvert needed @ service rd. connection from SGP estimate use 36" RCP w/ Aprons

LENGTH : (20' + 40' + 40') = 100 LF + 2 aprons

100 LF @ $60.00/LF = $6,000.00

Description	Unit	Quantity	Unit Cost	Amount
EXCAVATION	CY	120,000	2.50	300,000.00
GRANULAR MATERIAL	CY	150,000	3.00	450,000.00
AGGREGATE BASE	SY	20,000	2.50	50,000.00
BITUMINOUS PAVEMENT	TON	2200	2300	50,600.00
TURF ESTABLISHMENT	LS	1	19,500.00	$ 19,500.00
DRAINAGE FACILITIES	LS.	1	6000.00	6,000.00
			Sub-total	$ 876,100.00
			+20% Eng. & Contingency	175,200.00
			TOTAL	$ 1,051,300.00

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Project ANOKA Co. - BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for WEST SIDE TAXIWAY By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT # 3 Chkd _____ Date _____

Common - Subgrade EXCAVATIONS - from rough cross-sections assume 2' subcut full width and length of safety area on taxiway and connector will be required.

EXCAVATION: 2200' x 80' x 2' (taxiway)
200' x 80' x 2' (connector) } 14,222 CY

15,000 CY @ $2.50/CY = $37,500.00

GRANULAR MATERIAL - from X-sections assume 4' granular backfill required to bring section to proposed grade. No salvagable excavati

GRAN. borrow 2200' x 80' x 4'
200' x 80' x 4' } 28144 CY

30,000 CY @ $3.00/CY = $90,000.00

AGGREGATE BASE - under taxiway and connector. Use 6" thickness w/ 3' shoulders

AREA: 2200' x 46' (taxiway)
200' x 46' (connector)

12,267 SY 13,000 SY @ $2.50/SY = $32,500.00

bituminous PAVEMENT - pave taxiway and connector. Use 3" compacted thickness placed in 1 lift. Radii incidental for this estimate.

AREA: 2200' x 40' (taxiway)
200' x 40' (connector)

96000 SF x 3/12 x 0.075 TN/CF = 1800 TON

1800 TON @ $23.00/TN = $41,400.00

turf establishment - place sod along 10' shoulder of taxiway and connector. Seed & mulch other areas within construction limits.

AREA: sod 2200' x 2 x 10'
200' x 2 x 10' } 5333 SY

5250 SY @ $2.00/SY = $10,500.00

seed 2300' x 225' = 11.9 ac

12 acres @ $500.00/ac = 6,000.00

TOTAL $16,500.00

DRAINAGE FACILITIES - culverts needed @ corners and taxiway crossing from ESP estimate. Use 36" RCP w/ aprons and 48" RCP w/ aprons to handle flow.

LENGTH : (40'+55'+55') = 150LF 36" RCP
(40'+55'+55') = 150 LF 48" RCP

150 LF @ $60.00/LF = $ 9,000.00
150 LF @ $75.00/LF = $ 11,250.00
$ 20,250.00

PAVEMENT MARKINGS - assume a 6" centerline & stripe on taxiway and corners (reflectorized)

LENGTH : 2200' * 200' = 2400 LF

2400 LF x 6" = 1200 SF @ $0.55/SF = $ 660.00

use $ 650.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	15,000	2.50	$ 37,500.00
GRANULAR MATERIAL	CY	30,000	3.00	90,000.00
AGGREGATE BASE	SY	13000	2.50	32,500.00
BITUMINOUS PAVEMENT	TON	1800	23.00	41,400.00
TURF ESTABLISHMENT	LS	1	16,500.00	16,500.00
DRAINAGE FACILITIES	LS	1	20,250.00	20,250.00
PAVEMENT MARKINGS	LS.	1	650.00	650.00
			SUB-TOTAL	$ 238,800.00
			+20% ENG. & CONTINGENCY	47,700.00
			TOTAL	$ 286,500.00

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ENGINEERS ARCHITECTS PLANNERS

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Project Anoka Co. - Blaine Airport Comm No _____ Sheet _____ of _____

Computations for Runway 26L Extension (800') By GKS Date 3/86

Quantity and Cost Estimate ALT #4 Chkd _____ Date _____

Common - Subgrade Excavation - excavation 300' beyond end of runway. See x-sect

Common Excavation	35,000 cy
Subgrade Excavation	35,000 cy
	70,000 cy

70,000 cy @ $2.50/cy = $175,000.00

Granular Material - no salvagable material from excavation

Gran. borrow (Subgrade excavation)	35,000 cy
Gran borrow (Additional to bring to proposed grade)	10,000 cy
	45,000 cy

45,000 cy @ $3.00/cy = $135,000.00

Aggregate Base - place 6" of aggregate base on tolerenced granular subgrade. Place base 2' beyond bituminous pavement edge.

AREA: 250' x40' turnaround
800' x106' runway
330' x46' connector
800' x46' taxiway
16,307 sy

16,500 sy @ $2.50/sy = $41,250.00

Bituminous Pavement - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C. averages 5.8% and Mn DOT 2341 mix design. Radii incidental.

AREA: 250'x40' turnaround
800'x100' runway
330'x40' connector
800'x40' taxiway

127,200 SF x 3/12 x 0.075 TON/CF = 2385 TONS

2400 TON @ $23.00 TN = $55,200.00

Turf Establishment - place 4" topsoil material that was salvaged during excavation operations. Place 10' sod along runway connects & taxiway edges. Seed & mulch remainder of area within construction limits.

AREA: Sod (800'x4) + (330'x2) x10' = 4289 SY

4300 SY @ $2.00 = $8600.00

-Seed 600'x1100' = 15.2 ac

15 ac @ $500.00 = $7500.00

$16,100.00

36" RCP will handle flow. Assume 2 crossings of taxiway.

LENGTH: (40+55+55) @ 2 EA. = 300 LF + 4 aprons

300 LF @ $60.00/LF = $18,000.00

TAXIWAY lights - place edge lights @ runway turn-offs @ 3 per radii

2 radii @ 3 lights each = 6 edge lights. Includes any duct & wiring

6 EA @ $500.00 = $3000.00

RUNWAY lighting - space @ ≈ 100' along edge of runway plus threshold (8 ea.)

Includes any duct or wiring necessary. No regulator estimated

600'/100 x 2 = 10 edge lights + 8 threshold

18 EA @ $500.00 = $9,000.00

PAVEMENT MARKING - assume 6" ℄ striping on connector and taxiway (reflectorized).

Assume threshold markings, number marking and ℄ marking on runway (STRATED MARKING 120' stripe 180' space) will be required.

LENGTH 400' + 800' = 1200 LF taxiway & connector

1200 LF x 6" = 600 SF @ $0.55 = 330.00

Threshold - lump sum / est. per Derrian striping

= $4000.00

$4330.00

ULTIMATE NAV. AIDS - ILS - MLS not included in this estimate.

Installation done by federal govt.

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATION	CY	70,000	2.50	175,000.00
GRANULAR MATERIAL	CY	45,000	3.00	135,000.00
AGGREGATE BASE	SY	16,500	2.50	41,250.00
BITUMINOUS PAVEMENT	TON	2,400	23.00	55,200.00
TURF ESTABLISHMENT	L.S.	1	16,100.00	16,100.00
DRAINAGE FACILITIES	L.S.	1	18,000.00	18,000.00
TAXIWAY LIGHTING	L.S.	1	3,000.00	3,000.00
RUNWAY LIGHTING	L.S.	1	9,000.00	9,000.00
PAVEMENT MARKING	L.S.	1	4,500.00	4,500.00
			SUB-TOTAL	$457,0[illegible]
			+20% ENG. & CONTINGENCY	91,4[illegible]
			TOTAL	$548,500.[illegible]

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Project ANOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for CONNECTOR TAXIWAY to RUNWAY 8R By GKS Date 3/86

Quantity and Cost Estimate ALT # 4 Chkd _____ Date _____

common subgrade excavation . assume 2' subcut in safety area.

common - subgrade EXCAVATION:

80' x 330' x 2' = 1956 cy

use 2000 cy @ $2.50/cy = $5,000.00

GRANULAR MATERIAL

assume 4' backfill to bring section to grade. No salvagable excavation material.

80' x 330' x 4' = 3911 cy

use 4000 cy @ $3.00/cy = $12,000.00

AGGREGATE BASE - place 6" aggregate base on tolerenced granular subgrade. Place base 3' beyond bituminous pavement edges.

AREA 330' x 46' connector

16,87 SY 1700 sy @ $2.50 = $4,250.00

bituminous PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume AC averages 5.8% and use Dot 2341 mix design - Radius incidental for this estimate

AREA 330' x 40' connector

17200 SF x 3/12 x 0.075 TON/CF = 248 TON

250 TON @ $23.00/TN = $5,750.00

turf ESTABLISHMENT - place 10' sod along edges. Seed & mulch remainder of area within construction limits.

AREA: sod 10' x 2' x 330' = 733 SY

seed 930 x 200' = 1.5 ac.

sod 750 sy @ 2.00/sy $1,500.00

seed 2 ac @ 500.00/ac = $1,000.00

$2,500.00

drainage facilities - drainage of storm runoff through ditches. Use RCP w/ aprons to provide drainage under connector to maintain existing flow. Use 36" RCP w/ 2 aprons

LENGTH (40' + 55' + 55') = 150 LF + aprons

150 LF @ $60.00 = $9,000.00

taxiway lighting - twy. edge lights were connector exits rwy. Wiring included in estimate

2 radii @ 3 light each = 6 edge lights

6 ea @ $500.00/ea = $3000.00

pavement marking - assume centerline & stripe on connector. (reflectorized).

LENGTH: 330 LF x 6" = 165 SF

@ $0.55/SF = $90.75

use $100.00

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	2000	2.50	5,000.00
Granular Material	CY	4000	3.00	12,000.00
Aggregate Base	SY	1700	2.50	4,250.00
Bituminous Pavement	TON	250	23.00	5,750.00
Turf Establishment	L.S.	1	2500.00	2,500.00
Drainage Facilities	L.S.	1	9000.00	9,000.00
Taxiway Lighting	L.S.	1	3000.00	3,000.00
Pavement Marking	L.S.	1	100.00	100.00

Sub-total $41,600.00

+20% Eng. & Contingency 8,400.00

Total $50,000.00

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Project ALOKA Co. - BLAINE Airport Comm No _____ Sheet _____ of _____

Computations for RUNWAY 12L EXTENSION (2580') By GKS Date 3/86

Quantity and Cost Estimate ALT # 5 Chkd _____ Date _____

Common - subgrade excavations - excavations continue 300' beyond end of runway. See x-sections.

Common	45,000 cy
Subgrade	90,000 cy
topsoil (emb.)	15,000 cy
	150,000 cy

150,000 cy @ 2.50 /cy = $375,000.00

GRANULAR MATERIAL. See x-sections. Assume no salvagable material can be used for gran. backfill.

GRAN. borrow (subgrade)	90,000 cy
GRAN. borrow (Add'l to grade)	110,000 cy
	200,000 cy

200,000 cy @ $3.00/cy = $600,000.00

AGGREGATE BASE - place 6" of aggregate base on toleranced granular subgrade. place base 3' beyond bituminous pavement edge.

AREA: 250' x 40' turn around
2500' x 106' runway
430' x 46' connector
430' x 46 connector
2580' x 46' taxiway
68,861 SY

69,000 SY @ $2.50/SY = $172,500.00

BITUMINOUS PAVEMENT - place a 3" compacted bituminous pavement section in 2 lifts. Assume A.C averages 5.8% and Mn Dot 234 mix design. Radii incidental for this estimate

AREA: 250' x 40' turn around
2500' x 100' runway
430' x 40' connector
430' x 40' connector
2580' x 40' taxiway

405,000 SF x 3/12 x 0.075 TON/SF = 7605 TON

7600 TON @ 23.00 =
$174,800.00

Soil stabilization — [illegible] excavation operations. Place 10' of sod along runway, connector & taxiway edge. Seed & mulch remainder of area within construction limits.

AREA: Sod 2580' x 10' x 2 runway
430 x 10' x 4 connectors
2500 x 10' x 2 taxiway
13,360 sy

13500 sy @ 2.00 = $27,000

Seed 2880' x 600' = 39.7 ac 40 ac @ $500.00 = $20,000

$47,000

Drainage facilities — drainage of storm runoff handled by ditches. Use RCP w/ inlets to provide for carrying drainage under taxiway & connectors. Assume 36" RCP will handle flow. Assume 2 crossings of either taxiway or connector.

LENGTH (40'+55'+55') @ 2 ea = 300 LF + 4 inlets

300 LF @ $60.00 = $18,000.00

Taxiway lighting — edge lights required only @ turnoffs of runway

4 radii @ 3 light ea = 12 edge lights

12 ea @ $500.00 = $6,000.00

Runway Lighting — space @ ± 100' along edge of runway + 8 lights @ threshold

2,500' / 100 = 28 + 8 = 36 edge lights

36 ea @ $500.00 = $18,000.00

Augment + marking — assume 6" continuous & stripe on connectors and taxiway (reflect.) Assume threshold marking, runway numbering and & stripe marking on runway (STRATED) 120 stripe + 80' space will be required.

Taxiway Length: 2580 + 430 + 430 = 3440 LF x 6" = 1720 SF

1720 SF @ 0.55 = $946.00

threshold:

estimate from Dennison Striping

lump sum $4,000.00

$5,000.00

Ultimate NAV. Aids — none scheduled according to ALP

Description	Unit	Quantity	Unit Cost	Amount
Excavation	CY	150,000	2.50	$ 375,000.00
Granular Material	CY	200,000	3.00	600,000.00
Aggregate Base	SY	69,000	2.50	172,500.00
Bituminous Pavement	TON	7,600	23.00	174,800.00
T&F Establishment	L.S	1	47,000.00	47,000.00
Drainage Facilities	LS	1	18,000.00	18,000.00
Taxiway Lighting	LS	1	6,000.00	6,000.00
Runway Lighting	L.S	1	18,000.00	18,000.00
Pavement Marking	L.S	1	5,000.00	5,000.00
			Sub-total	$ 1,416,300.00
			+20% Eng & Contingency	283,700.00
			Total	1,700,000.00

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Project Anoka Co. - Blaine Airport Comm No _____ Sheet _____ of _____

Computations for RELOCATE THRESHOLD 35R (2500') By GKS Date 3/8/86

Quantity and Cost Estimate Alt #5 Chkd _____ Date _____

ELECTRICAL REMOVAL - remove existing runway threshold (8 ea) and edge lights (26 ea). Leave D 104 in place. Leave ducts & abandoned wire in place

removals 36 ea @ $100.00 = $3,600.00

REMOVE bituminous - remove existing bituminous full length and width of runway. Remove bituminous from connector. assume 3" thickness. assume aggregate base left in place.

AREA: 100' x 2500' runway
430' x 40' connector

30,578 SY 31,000 sy @ $1.00/sy = $31,000.00

turf establishment - place topsoil salvaged from excavation under this alternate over all bit. removal areas. limits Seed & mulch area within constructi

AREA: 100' + 10' + 10' x 2500' = 7.11 ac (runway)
430' x 40' + 10' + 10' = 0.59 ac (connecta)
7.7 AC

8 ac @ $500.00 = $4,000.00

PAVEMENT MARKINGS - assume threshold markings, runway numbers and 6 stripe (STRATED) will be required. 120' stripe + 80' space. Lump Sum price estimate from Dennison Lump sum $4,000.00

ultimate NAVIGATIONAL AIDS - includes relocating existing REILS and installation of VASI-4 System.

Relocate REILS :	$ 3,000.00
install VASI-4	$ 20,000.00
	$ 23,000.00

Description	Unit	Quantity	Unit Cost	Amount
ELECTRICAL REMOVAL	L.S.	1	3,600.00	3,600.00
REMOVE bituminous	S.Y.	31,000	1.00	31,000.00
- of ESTABLISHMENT	L.S	1	4,000.00	4,000.00
PAVEMENT MARKINGS	L.S	1	4,000.00	4,000.00
NAVIGATIONAL AIDS	L.S	1	23,000.00	23,000.00
			Sub-total	$ 65,600.00
			+20% Eng. & Contingency	13,100.00
			TOTAL	$ 78,700.00

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Project ALOKA Co- BLAINE AIRPORT Comm No _____ Sheet _____ of _____

Computations for RELOCATE 101ST STREET By GKS Date 3/86

QUANTITY and COST ESTIMATE ALT #8 Chkd _____ Date _____

Common - Subgrade EXCAVATIONS. See x-section. Assume 2' subcut full width of roadway section (24'+10'+10')

EXCAVATION 2000' x 44' x 2' = 6,519 cy

= 6500 cy @ $2.50/cy = $16,250.0

GRANULAR MATERIAL. See x-section. Assume 4' subcut full width of section to bring to grade. Use excavation for shoulder fills.

GRAN: 2000' x 44' x 4' = 13,037 cy

13,000 cy @ $3.00/cy = $39,000.00

AGGREGATE BASE - place 6" aggregate base on toleranced granular Subgrade. Place 10' beyond bottom pavement edges.

AREA: (24'+10'+10)' x 2000' roadway

= 9,778 sy 9800 sy @ $2.50/sy = $24,500.00

Bituminous PAVEMENT - place a 4" compacted bituminous pavement section in 2 lifts. Assume A.C averages 5.0% and MN Dot 2341 mix design.

AREA: 2000' x 24' 1200 TON @ 23.00 = $27,6

= 48000 sf x 4/12 x 0.075 TON/cf = 1,199 TON

Turf establishment - place 4" topsoil material that was salvaged during excavation operations. Seed & mulch area within construction limits. May use sod to stabilize areas around culvert inlets - outlets.

AREA SOD: assume 1000 sy @ $2.00/sy = $2,000.00

SEED 2000' x 100' = 4.6 ac $2500.00

5 ac @ 50/ =

DRAINAGE

Use RCP w/ aprons to provide for carrying drainage under roadway ... assume 36" RCP will handle flows. assume 4 crossings of roadway.

Length (50'+55'+55') @ 4 ea = 640 LF + 8 aprons

640 LF @ $60.00 = $38,400.00

PAVEMENT MARKING - assume 6" stripe total length (6" width)

2000' x 6" = 1000 SF x $0.55/SF

= $550.00

use $750.00

DESCRIPTION	UNIT	QUANTITY	UNIT COST	AMOUNT
EXCAVATIONS	CY	6500	2.50	16,250.00
GRANULAR MATERIAL	CY	13,000	3.00	39,000.00
AGGREGATE BASE	SY	9,800	2.50	24,500.00
BITUMINOUS PAVEMENT	TON	1200	23.00	27,600.00
TURF ESTABLISHMENT	LS	1	4,500.00	4,500.00
DRAINAGE FACILITIES	LS	1	38,400.00	38,400.00
PAVEMENT MARKING	LS.	1	750.00	750.00
			SUB-TOTAL	$ 154,000.00
			+20% Eng. & Contingency	30,000.00
			TOTAL	$ 181,000.00

APPENDIX 2L

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