

APPENDIX 1: ***Resources and References***

Aerial photography

- **Metropolitan Council, Regional Data Center**, St. Paul, Minnesota; phone (651) 602-1140; e-mail data.center@metc.state.mn.us
- **Minnesota Department of Natural Resources, Division of Forestry, Resource Assessment Unit**, 413 Southeast 13th Street, Grand Rapids, Minnesota 55744; phone (218) 327-4449; fax (218) 327-4517; e-mail steve.gallay@dnr.state.mn.us; web site <http://www.ra.dnr.state.mn.us>
- **U.S. Geological Survey, EROS Data Center**, Sioux Falls, South Dakota; phone (605) 594-6151
- **U.S. Geological Survey**, Denver, Colorado; phone (303) 202-4200; fax (303) 202-4695
- **USDA Aerial Photo Field Office**, Salt Lake City, Utah; phone (801) 524-5856

Conservation easements

- **Land Stewardship Project**, 2200 4th Street, White Bear Lake, Minnesota 55110; phone (651) 653-0618; fax (651) 653-0589
- **Local and regional units of government (county, municipality, township, etc.)**
- **Minnesota Land Trust**, 70 North 22nd Avenue, Minneapolis, Minnesota 55411-2237; phone (612) 522-3743; fax (612) 521-2376

- **The Nature Conservancy**, 1313 5th Street Southeast, Suite 320, Minneapolis, Minnesota 55414; phone (612) 331-0750; fax (612) 331-0770
- **The Trust for Public Land**, 420 North 5th Street, Suite 865, Minneapolis, Minnesota 55401; phone (612) 338-8494; fax (612) 338-8467

Historic land uses

- **Minnesota County Biological Survey**, St. Paul, Minnesota; phone (651) 296-8319
- **State Historical Preservation Office**, St. Paul, Minnesota; phone (651) 296-5462

Land and tree management information

- ***Energy Saving Landscapes: The Minnesota Homeowner's Guide, 1994.*** For information contact: Energy Information Center; phone (800) 657-3710 or Minnesota Department of Natural Resources; phone (888) 646-6367
- ***Protecting life and property from wildfire: An introduction to designing zoning and building standards for local officials.*** Great Lakes Forest Fire Compact, 1990
- **Land Management Information Center**, 330 Centennial Building, St. Paul, Minnesota; phone (651) 296-1211; web site <http://www.lmic.state.mn.us>
- **Local County Extension Office**
- **Minnesota Department of Natural Resources**, 500 Lafayette Road, Box 25, St. Paul, Minnesota 55155; phone (651) 296-2835 or (888) 646-6367 or (800) 657-3929 for hearing impaired; and regional offices:
 - Bemidji (218) 755-2891
 - Brainerd (218) 828-2616

- Grand Rapids (218) 327-4418
- New Ulm (507) 359-6053
- Rochester (507) 285-7428
- St. Paul (651) 772-7925
- Metro Greenways, 1200 Warner Road, St. Paul, Minnesota 55106; phone (651) 772-7952
- Scientific and Natural Areas Program, St. Paul, Minnesota; phone (651) 297-2357
- **Minnesota Department of Transportation**
 - Mn/DOT Office of Investment Management, 395 John Ireland Boulevard, St. Paul, Minnesota 55155; or web site <http://www.oim.dot.state.mn.us>
 - Mn/DOT Map and Manual Sales Office, Mail Stop 260, 395 John Ireland Boulevard, St. Paul, Minnesota 55155; phone (651) 296-2215
 - Mn/DOT Library, Mail Stop 155, 395 John Ireland Boulevard, St. Paul, Minnesota 55155; phone (651) 296-2385; e-mail library@dot.state.mn.us
 - Mn/DOT, local and regional offices; St. Paul, Minnesota; phone (651) 215-1973
- **Minnesota Forestry Association**; phone (800) 281-8733
- **University of Minnesota, College of Natural Resources**, St. Paul, Minnesota
- **Tree Trust**, 6300 Walker Street, St. Louis Park, Minnesota 55416; phone (612) 920-9326; fax (612) 920-4558
- **USDA Forest Service, Northeastern Area, State and Private Forestry**, St. Paul, Minnesota; phone (651) 649-5262
- **U.S. Fish and Wildlife Service**, St. Paul, Minnesota; phone (651) 725-3500

Nonpoint source pollution

- **Minnesota Pollution Control Agency, Division of Water Quality**, St. Paul, Minnesota; phone (800) 657-3864 or (800) 627-3864 for hearing impaired; and regional offices:
 - Brainerd (218) 828-2492
 - Detroit Lakes (218) 847-1519
 - Duluth (218) 723-4660
 - Marshall (507) 537-7146
 - Rochester (507) 285-7343
- **Soil Water and Conservation District** (for each county)

Soil information and septic suitability

- **Minnesota Board of Soil and Water Resources**, St. Paul, Minnesota; phone (651) 296-3767
- **Natural Resources Conservation Service** (local office)
- **Soil and Water Conservation District** (for each county)

Topography

- **Local and regional units of government** (county, municipality, township, etc.)
- **Minnesota Geological Survey**, St. Paul, Minnesota; phone (651) 627-4782
- **U.S. Geological Survey, EROS Data Center**, Sioux Falls, South Dakota; phone (605) 594-6151

Watershed and wetland protection

- **Minnesota Board of Water and Soil Resources**, St. Paul, Minnesota; phone (651) 297-5615

- **Minnesota Department of Natural Resources** (local and regional offices)
- **Soil and Water Conservation District** (for each county)
- **U.S. Army Corps of Engineers**, St. Paul, Minnesota; phone (651) 290-5375

References

- Allmann, Laurie, 1997. *Natural Areas: Protecting a Vital Community Asset; A Source Book for Minnesota Local Governments and Citizens*. Minnesota Department of Natural Resources, 148 pp.
- Allmann, Laurie, 1996. *Land Protection Options: A Handbook for Minnesota Landowners*. The Nature Conservancy, Minnesota Department of Natural Resources, The Trust for Public Land, and The Minnesota Land Trust, 78 pp.
- Bonestroo, Rosene, Anderlik & Associates, 1998. *Final Report: Natural Resources Inventory*. City of Cottage Grove, Minnesota.
- Coder, K. D., 1995. "Tree quality BMPs for developing wooded areas and protecting residual trees." In: *Trees and Building Sites*, ed. Watson, G. W., and Neely, D., 1995. International Society of Arboriculture.
- Gross, R., 1995. "Construction applications of hydraulic soil excavation." In: *Trees and Building Sites*, ed. Watson, G. W., and Neely, D., 1995. International Society of Arboriculture.
- Matheny, N., and J. R. Clark., 1998. *Trees and Development: A Technical Guide to Preservation of Trees During Land Development*. International Society of Arboriculture.
- Miller, N. L., D. M. Rathke and G. R. Johnson, 1993. *Protecting Trees from Construction Damage: A Homeowner's Guide*. Minnesota Extension Service, 13 pp.

- Minnesota Department of Natural Resources, 1993. *Minnesota's Native Vegetation: A Key to Natural Communities*. Version 1.5. Natural Heritage and Nongame Research Program. St. Paul, MN, 111 pp.
- Minnesota Society of Arboriculture, 1996. *Minnesota Supplement to the Guide for Plant Appraisal with Regional Tree Appraisal Factors*, (ed.) Ken Simons, 25 pp.
- Tester, J., 1995. *Minnesota's Natural Heritage: An Ecological Perspective*. Minneapolis: University of Minnesota Press, 332 pp.
- U.S. Department of Agriculture, Soil Conservation Service, 1975. *Hydrology Guide for Minnesota*, Chapter 3 (Hydrologic Soil-Cover Complexes).
- Washington County Planning and Administration Services, 1997. *Open Space Design Development: A Guide for Local Governments*, 64 pp.
- Watson, G. W., and D. Neely, 1995. *Trees and Building Sites*. International Society of Arboriculture, 191 pp.
- Westwood Professional Services, Inc., 1994. *Evaluation and Ranking of Forest Stands, Final Report*. City of Maple Grove, Minnesota.
- Wovcha, D. S., B. C. Delaney, and G. E. Nordquist, 1995. *Minnesota's St. Croix River Valley and Anoka Sandplain: A Guide to Native Habitats*. Minneapolis: University of Minnesota Press, 234 pp.

APPENDIX 2: ***Financial Assistance Programs***

The Minnesota Department of Natural Resources offers a number of financial assistance programs to:

- local and regional units of government, and
- private organizations and landowners.

For more information on financial assistance, contact:

Minnesota Department of Natural Resources	(888) 646-6367 (MN Toll Free)
500 Lafayette Road	(651) 296-6157 (Metro Area)
St. Paul, MN 55155-4040	(800) 657-3929 (MN Toll Free TTY)
http://www.dnr.state.mn.us	(651) 296-5484 (Metro Area TTY)

or the local office of the Minnesota Department of Natural Resources.

The Minnesota Department of Natural Resources has a directory of its financial assistance programs. Most financial assistance is project or activity specific. Below is a partial list of available financial assistance programs.

- **Community Environmental Partnerships Grant Program (CEPGP):** Provides up to 50 percent of eligible costs with a maximum grant of \$10,000 and a minimum grant of \$1,000. For eligibility information and an application form, contact a local county or DNR Forestry office.
- **Conservation Partners Grant Program (CPGP):** Provides up to 50 percent of total eligible costs to enhance fish, wildlife, and native plant habitats, research, and surveys. For eligibility information and an application form, contact a local DNR Forestry office.

- **Deer Habitat Improvement Program (DHIP):** Provides up to 100 percent of total eligible costs for development, restoration, and maintenance of deer habitat. For eligibility information and an application form, contact a local DNR Wildlife office.
- **Forest Stewardship Program:** Provides landowners with 20 or more acres the information they need (a stewardship plan) to make forest management decisions on their property. Maybe applicable to several smaller landowners who want to work together. For eligibility information, contact a local DNR Forestry office.
- **Forestry Incentives Program (FIP):** Provides cost-share assistance for tree planting and/or timber stand improvement. Limited to landowners with 20 or more acres. For eligibility information and an application form, contact a local Natural Resources Conservation Service or DNR Forestry office.
- **Grants for Conservation Biology Research in Minnesota:** Provides up to 100 percent of eligible costs for projects contributing to the conservation and management of Minnesota's endangered, threatened, and special concern species and rare natural communities. For eligibility information and an application form, contact the DNR Fish and Wildlife central office; phone (651) 297-4961.
- **Minnesota Forestry Association Program:** Provides cost-share assistance for implementing practices recommended in a Forest Stewardship Plan (see Forest Stewardship Program). Acceptable practices include tree planting, tree thinning, wildlife habitat improvement, and water

quality improvement. Limited to landowners with 20 or more acres. For eligibility information, contact a local DNR Forestry office.

- **Minnesota ReLeaf:** Provides cost-share assistance to Minnesota communities for projects involving the planting and caring of trees to obtain environmental benefits including increasing energy conservation and reducing atmospheric carbon dioxide. For eligibility information and an application form, contact the Minnesota ReLeaf Coordinator, 1200 Warner Road, St. Paul, Minnesota 55106; phone (651) 772-7925; fax (651) 772-7599.
- **Natural and Scenic Area Grant Program:** Provides up to 50 percent of total eligible costs with a maximum grant of \$200,000 and a minimum grant of \$5,000 for acquisition of land containing species (plant and animals) that are endangered, threatened, or of special concern; land having a high quality scenic viewscape; and other land. For eligibility information and an application form, contact the local county or DNR Forestry office.
- **Metro Greenways Planning Grants Program:** Provides up to 50 percent of eligible costs with a maximum grant amount of \$50,000. For eligibility information and an application form, contact DNR Metro Regional Planner, 1200 Warner Road, St. Paul, Minnesota 55106; phone (651) 772-7982; fax (651) 772-7977.
- **Stewardship Incentives Program (SIP):** Provides cost-share assistance to nonindustrial private forest landowners for management activities that enhance fish and wildlife habitat, provide recreation opportunities, im-

prove the aesthetic quality of forests, or increase the supply of timber and other forest products. For eligibility information and an application form, contact a local DNR Forestry office.

- **Tree Farm Program:** Provides recognition and certification for quality forest management of nonindustrial private forest lands. For information and an application form, contact a local DNR Forestry office.
- **Tree Growth Tax Law (TGTL) Program:** Provides tax relief to forest landowners for growing of continuous forest crops. For eligibility information and an application form, contact the Minnesota DNR Private Forest Management Program Coordinator; phone (651) 296-5970.

APPENDIX 3: Tree species and tolerance

Species	Root Sensitivity	Soil Compaction & Flooding	Soil pH	Mature Tree Height (feet)	Mature Crown Spread (feet)	Hazard Tree Rating	Damage- Causing Roots	Land- scape Value
Northern white cedar	Tolerant	Tolerant	6.0-8.0	40-50	10-20	Low	-	High
Balsam fir	Tolerant	Tolerant	4.0-8.0	40-80	20-35	Med um	-	Medium
White fir	Tolerant	Sensitive	4.0-6.5	50-75	10-20	Med um	-	High
Tamarack	Tolerant	Tolerant	4.0-7.5	50-75	15-25	Med um	-	High
White pine	Tolerant	Sensitive	4.5-6.5	80-100	50-80	Med um	-	High
Jack pine	Tolerant	Sensitive	4.5-6.5	30-80	20-30	High	-	Low
Red pine	Tolerant	Sensitive	4.5-6.0	50-80	20-40	(Med um)	-	Medium
Scotch pine	(Tolerant)	(Sensitive)	4.0-6.5	50-100	30-50	Medium	-	Medium
Eastern red cedar	Tolerant	Sensitive	4.7-7.8	40-50	10-20	Low	-	Low
Black spruce	Tolerant	Tolerant	5.5-7.0	30-70	15-30	(Medium)	-	Low
Colorado spruce	Intermediate	Tolerant	4.6-6.5	50-100	20-30	Medium	-	High
White spruce	Tolerant	Intermediate	4.5-7.5	40-80	20-30	Medium	-	Medium
Black ash	Tolerant	Tolerant	4.1-6.5	40-70	30-60	(Medium)	-	Medium

Conc: r used on next three pages

102 Tree Species and Tolerance

Species	Flood Sensitivity	Soil Compaction & Flooding	Soil pH	Mature Tree Height (feet)	Mature Crown Spread (feet)	Hazard Tree Rating	Damage- Causing Roots	Land- scape Value
Green ash	Tolerant	Tolerant	6.0-7.5	20-30	15-20	Low	-	High
White ash	Tolerant	Intermediate	4.5-7.5	40-80	20-30	Medium	-	Low
Bigtooth aspen	Tolerant	Sensitive	4.8-6.3	50-75	20-35	Medium	Yes	Low
Quaking aspen	Tolerant	Sensitive	4.8-6.5	40-80	20-35	Medium	Yes	Low
Blue beech	Sensitive	Sensitive	6.5-7.5	40-60	15-20	Low	-	High
Paper birch	Intermediate	Sensitive	5.0-8.0	50-70	30-50	Medium	-	Medium
River birch	Tolerant	Tolerant	4.0-6.5	40-70	30-50	Low	-	High
Yellow birch	Intermediate	Sensitive	4.5-8.0	50-70	25-50	Medium	-	Medium
Box elder	Tolerant	Tolerant	6.5-7.5	40-60	35-50	High	Yes	Low
Ohio buckeye	Intermediate	Intermediate	6.1-6.5	30-50	30-40	Medium	Yes	Medium
Butternut	Sensitive	Intermediate	6.6-8.0	40-60	50-60	(Medium)	-	Medium
Catapa	Intermediate	Tolerant	6.1-8.0	50-90	30-50	Medium	-	Medium
Black cherry	Intermediate	Sensitive	6.0-7.5	50-70	40-50	Low	-	Low

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Species	Root Separation	Soil Compaction & Flooding	Soil pH	Mature Tree Height (feet)	Mature Crown Spread (feet)	Hazard Tree Rating	Damage-Causing Roots	Land- scape Value
Koilycky conifer	Intermediate	Intermediate	6.5-7.5	50-80	40-50	Low	-	High
Eastern white pine	Tolerant	Tolerant	5.5-8.0	80-100	80-100	High	Yes	Low
Red-cedar cypress	Tolerant	Intermediate	3.1-8.5	8-10	10-12	(Low)	-	Medium
American elm	Tolerant	Intermediate	5.5-8.0	70-100	70-150	Medium	Yes	Low
Silky elm	(Tolerant)	(Intermediate)	6.8-8.0	50-70	40-60	Medium	Yes	Low
Hackberry	Tolerant	Intermediate	6.8-8.0	30-130	80+	Low	-	High
Hawthorn	Intermediate	Intermediate	6.0-7.5	20-40	20-30	Low	-	High
Black locust	Intermediate	Intermediate	6.0-8.5	40-75	30+	(Medium)	-	Medium
Honeylocust	Tolerant	Intermediate	6.0-8.0	50-75	50-75	Medium	Yes	Medium
Ironwood	Sensitive	Sensitive	6.1-8.0	25-50	20-30	(Low)	-	High
Basswood	(Intermediate)	Sensitive	5.5-7.3	70-100	50-75	(High)	-	Medium
Black locust	Tolerant	Sensitive	4.6-8.2	30-60	20-50	(Medium)	-	Low

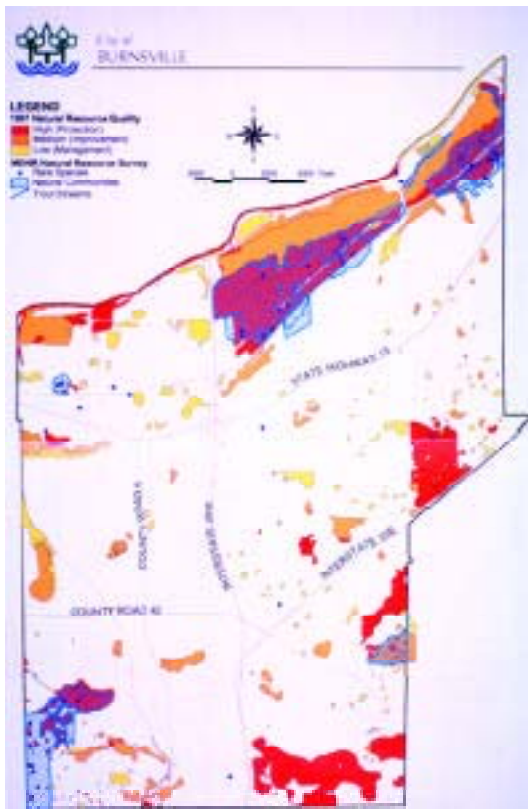
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Species	Root Severity	Soil Compaction & Flooding	Soil pH	Mature Tree Height (feet)	Mature Crown Spread (feet)	Hazard Tree Rating	Damage- Causing Roots	Land- scape Value
Red maple	Tolerant	Tolerant	4.5-7.5	50-70	40-60	Medium	Yes	High
Silver maple	Tolerant	Tolerant	5.5-6.5	60-80	75-100	High	Yes	Low
Sugar maple	(Intermediate)	Sensitive	5.5-7.3	60-80	60-80	Medium	Yes	High
Mountain ash	Tolerant	Intermediate	4.0-7.0	15-25	15-25	Medium	-	High
Black oak	Sensitive	Sensitive	5.0-6.5	50-80	50-70	(Medium)	-	High
Bur oak	Tolerant	Intermediate	4.0-8.0	70-80	40-80	Low	-	High
Northern pin oak	Sensitive	Sensitive	5.5-7.5	50-75	30-50	(Medium)	-	Medium
Red oak	Tolerant	Sensitive	4.5-7.0	50-80	40-50	(Medium)	-	High
Black oak	(Intermediate)	Tolerant	6.0-6.5	50-75	40-50	Low	-	High
White oak	Sensitive	Sensitive	6.5-7.5	60-100	50-80	Low	-	High
Willow	Tolerant	Sensitive	6.5-8.6	20-25	15-25	Low	-	Medium
Sweetgum	Intermediate	Sensitive	6.1-8.5	6-35	6-15	(Low)	-	High
Black walnut	Sensitive	Intermediate	6.5-8.0	70-100	60-100*	Medium	-	Medium
Sitka willow	Tolerant	Tolerant	6.5-8.0	30-60	20-40	High	Yes	Low

Source: N. L. Miller, D. M. Rawley, and G. R. Johnson, 1993.

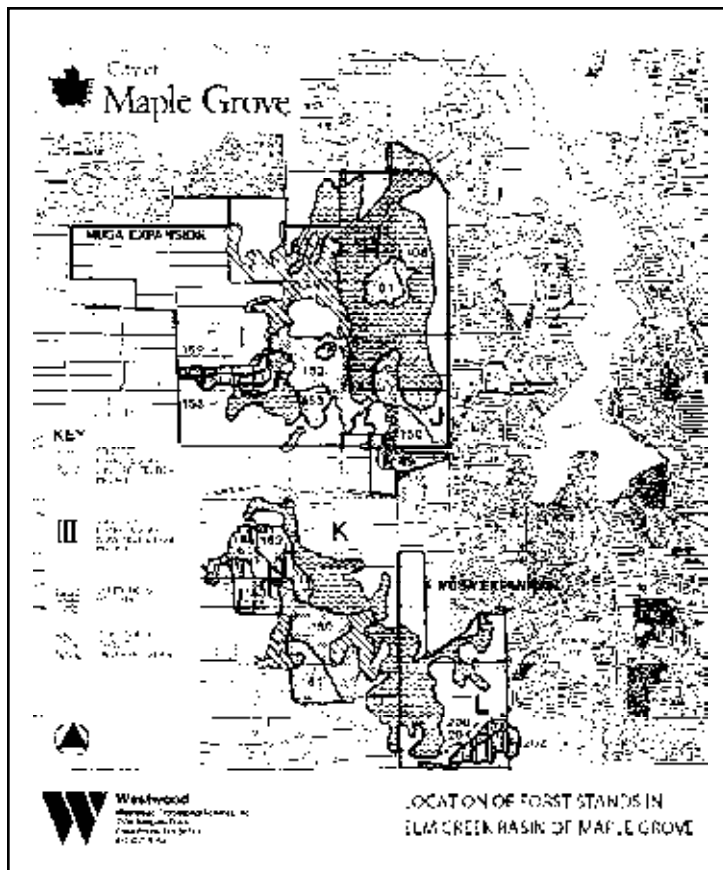
APPENDIX 4: *Examples of development plans*

Appendix 4 a: An example of a landscape-level inventory of natural resources, city of Burnsville.

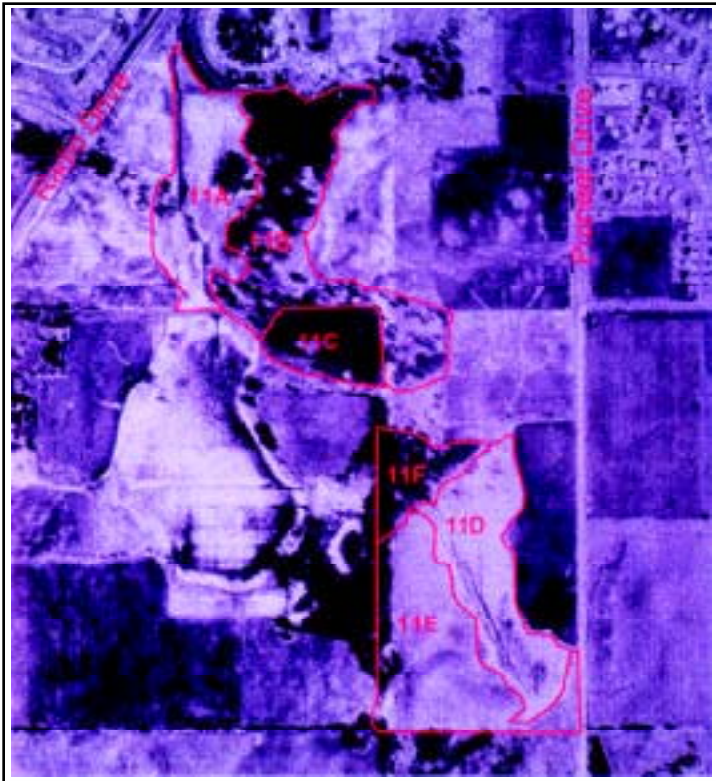


Courtesy of Robert Engstrom Company.

Appendix 4 b: An example of a city inventory of forest resources, city of Maple Grove.

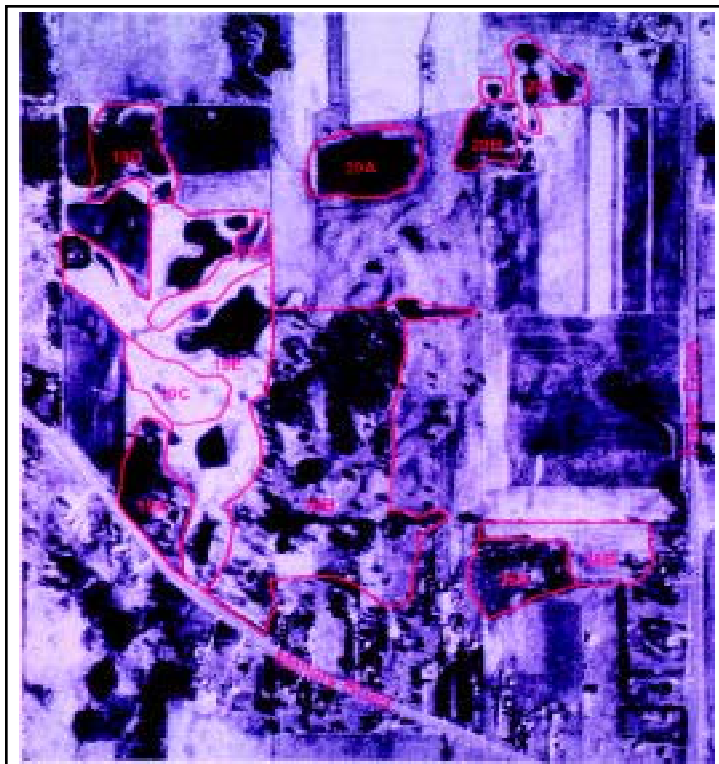


Appendix 4 c: An example of a landscape inventory and ranking of natural resources, city of Woodbury.



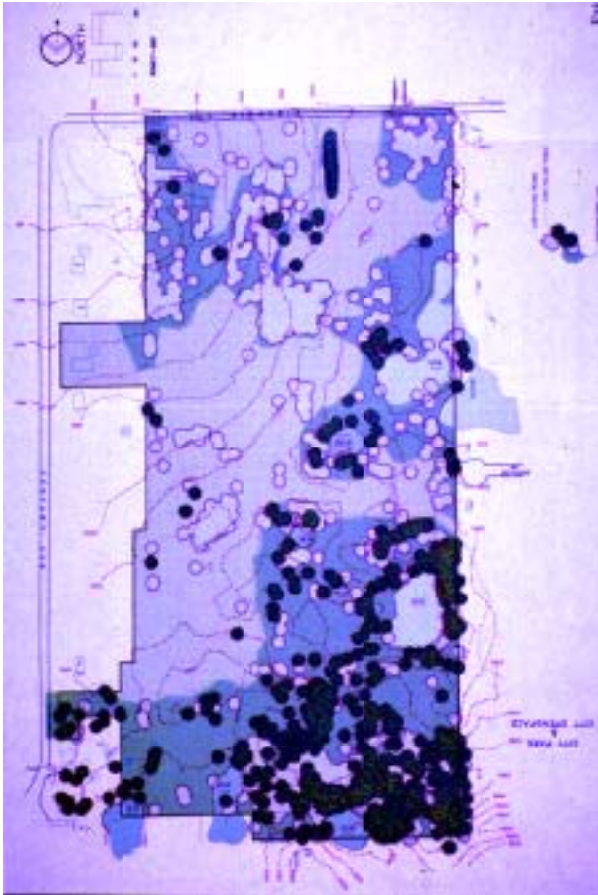
Courtesy of City of Woodbury

Appendix 4 c: An example of a landscape inventory and ranking of natural resources, city of Woodbury.



Courtesy of City of Woodbury

Appendix 4 d: A series of comprehensive resource maps for a subdivision development plan.



Courtesy of Robert Engstrom Consulting

Existing Vegetation / Woodlands

Appendix 4 d: A series of comprehensive resource maps for a subdivision development plan.



Courtesy of Robert Engstrom Companies.

Site Analysis Exhibit - Planned Unit Development

Appendix 4 d: A series of comprehensive resource maps for a subdivision development plan.



Courtesy of Robert Engstrom Company.

Planned Unit Development/Housing Area Designation Exhibit

Appendix 4 d: A series of comprehensive resource maps for a subdivision development plan.



Courtesy of Redwood Engineering Company.

Development Plan

Appendix 4 d: A series of comprehensive resource maps for a subdivision development plan.



Courtesy of Robert Engstrom Company.

Revised - Development Plan



