

## TABLE II - 10

**Number of Units and Per Unit Capital Cost for Sewer Trunk Line  
Extension and/or Pump Stations in SW-1 and SW-2**

SCENARIO	# OF UNITS IN S.W. 1	COST PER UNIT IN S.W. 1	# OF UNITS IN S.W. 2	COST PER UNIT IN S.W. 2
1 EXT. ZON.	384	1a NA	458	\$5,473.80
2 1985 LAND-USE	737	\$8,660.79	888	\$2,823.20
3 PRD - LOW	2,007	\$3,679.62	2,013	\$3,737.21
4 FUTURE LAND USE PLAN	350	4a NA	450	\$3,333.33

NOTES: 1, 2, 4: The unit cost to extend the sewer trunk lines into SW - 2 is calculated by dividing the project cost, in this case \$2,507,000, except for the Future Land-Use Plan, which is \$1.50 million (a little more than 1/2 the cost), by the number of units to be sewered in that basin for each scenario. The similar unit cost for SW-1 is calculated by dividing \$6,383,000 (project cost) by the number of units in that basin for each scenario.

3 : However, for the PRD-LOW scenario, the cost of a pump station must be added to the cost of the trunk lines because the number of units exceeds what the existing trunk lines can handle.

1a, 4a: For the Existing Zoning scenario, it is assumed that basin SW-1, the westerly basin, will remain unsewered. If sewer were to be supplied to this basin, the per unit cost for this scenario would be \$16,622.

## TABLE II - 9

### SEWER SERVICE STATUS OF PARCELS IN THE VARIOUS BUILD-OUT SCENARIOS

SCENARIO:	EXT. ZON. - GPH	2 - ACRE ZON - GPH	1985 LAND USE PLAN	FUTURE LAND-USE PLAN
# OF PARCELS EAST OF SALMON BROOK ^	282	192	282	282
UNSEWERED IN SW - 2:	458	187	888	450
UNSEWERED IN SW - 1:	384	96	737	350
UNSEWERED OUTSIDE OF SW - 1 OR SW - 2:	187	44	235	0
TOTAL THAT WOULD REQUIRE CONNECTION TO SEWER SYSTEM SALMON BROOK INTERCEPTOR	740	379	1,170	732
^ TOTAL UNITS:	1,311	519	2,142	1,082

NOTES: The designations SW - 1 and SW - 2 refer to areas mapped by City Engineer James Hogan. SW - 2 is the area that drains towards the Salmon Brook interceptor, SW - 1 is the area that drains towards the Nashua River and the interceptor that runs along West Hollis Street. Mr. Hogan estimated the costs involved in extending City Sewer Service to these areas. Because the sewer collection and distribution system is gravity fed, planning for the future of the sewer system in the southwest quadrant should be based on these designations.

The "Total That Would Require Connection to the Sewer System, Salmon Brook Interceptor", is for the units east of Salmon Brook plus the unsewered units in SW - 2. Because of the lower proposed density in SW - 1, and the area's remoteness, it is assumed that that area will remain unsewered.

^ That would need to connect to the sewer system. This number includes the previously approved, but not built (ANB) units. There are 87 ANB attached dwellings already approved for Sky Meadow, which is presently connected to the sewer system.

#### 4. Fiscal Impacts

Much of the analysis of the build-out options concerned the fiscal impacts of the different scenarios. A spreadsheet model was developed for this process based on the average cost, per capita method developed by Listoken and Burchell of the Urban Land Institute. The basic application of this method can indicate the relative impacts of various development scenarios, but cannot tell us the exact dollar impacts for any given year in the future. The method considers both operating and capital costs. Operating costs include the annual costs of City services such as education, police and fire protection, general government, trash pickup, library services and community health programs. Capital costs include such items as the construction of new schools or additions, road and bridge repairs and improvements, and sewer line extensions.

The three most important factors in this type of fiscal analysis are per capita and per pupil costs, the average assessed values of homes and commercial property, and public school enrollment multipliers. Both tax and non-tax revenues (fees, licenses etc...) were estimated based on the net total valuation of property resulting from the build-out. Capital costs were input into the model by totaling the amount for all projects and placing that amount into a 20-year bond spreadsheet table, which assumes that all of the projects would be bonded and paid for over the same period. This is a simplification necessary in order for capital costs to be input into a model originally intended only for operating cost analyses. A thorough discussion of the fiscal impact method and calculations can be found in Chapter IV of the Technical Reference. A summary of the results of applying this method to the Future Land Use Plan, and comparisons to a few other scenarios is found below. For those interested, the next five pages show tables of some of the important information that went into the analysis, and the fiscal impact spreadsheet itself. Important assumptions can be found in the table notes.

It is important to note that this fiscal impact analysis is based on the number of new units estimated for the build-out scenarios and the Future Land Use Plan, and does not include the previously approved, but not built (ANB) units. This is because those units have already been accounted for and are thus not technically part of any future plan. Also, because this fiscal impact method is meant to compare the relative impacts of various scenarios *to each other*, as long as the assumptions and key variables remain constant, it remains valid as a model.

#### **Summary of Fiscal Impact Analysis Results for the Future Land Use Plan**

The total assessed value of additional units due to the build out is approximately \$148,600,000. With a non-county tax rate of \$27.35 per \$1,000 of assessed value, and annual collected fees at \$464,467, estimated annual revenues of \$4,145,623 are generated. Total costs, which include operating, school and capital costs, are estimated at \$5,078,443. Thus, the net annual fiscal impact is approximately (\$932,820).

These results are obtained with a 75,000 sq. ft. commercial center, and 960 additional residential units. The net impact of the 2-Acre Zoning Scenario is calculated to be (\$ 497,064) and for Existing Zoning it is (\$ 1,350,912). Thus, the fiscal impact of the Future Land Use Plan is about twice that of the 2-Acre Zoning scenario, but less than that of Existing Zoning.

However, perhaps now is the time to say that this analysis was conservative and perhaps somewhat "pessimistic" in its outlook. By lumping all of the capital costs together into one bond issue and by starting payments in the first year, the negative fiscal impacts are likely to be exaggerated in the early years. In real life, these projects would be staggered throughout the period of the build-out, and the City would be paying for them several years beyond the 20-year horizon of this Plan. In addition, real world growth rates are likely to vary from the straight line growth rates used in determining the number of homes developed over time. Of course, this could affect the fiscal impact in two ways, tending toward the positive if there are fewer units in a given year, and tending toward the negative if there are more. The actual fiscal impacts of the Future Land Use Plan could thus very well be less than indicated above. In order for the most positive fiscal impact to occur, it will be necessary to ensure that the density recommendations of the Plan are followed, and that a quality commercial center, which generates compensatory tax revenue (to help offset the impact of residential development), is built and becomes a successful operation.

## TABLE II - 11

TOTAL CAPITAL COSTS FOR ALL SCENARIOS  
AS INPUT INTO THE 20 YEAR BONDING PROJECT TABLES

CATEGORY OF CAPITAL COSTS	SCENARIO			
	EXT. ZONING (1,100 units) (3,344 people)	2 - AC ZONING (360 units) (1,094 people)	1985 LAND - USE PLAN (1,980 units) (5,631 people)	FUTURE LAND-USE PLAN (960 units) (2,838 people)
FIRE STATION	\$2,000,000.00		\$2,000,000.00	\$2,000,000.00
SEWER TRUNK LINES / PUMP STATION	\$2,507,000.00		\$2,507,000.00	\$2,507,000.00
ROAD IMPROVEMENTS	\$3,300,000.00	\$1,080,000.00	\$5,940,000.00	\$2,880,000.00
SCHOOLS AND ADDITIONS	\$5,740,000.00	\$1,876,000.00	\$8,288,000.00	\$4,522,000.00
CITY PARKLAND ACQUISTION **				
<b>TOTALS:</b>	<b>\$13,547,000.00</b>	<b>\$2,956,000.00</b>	<b>\$18,735,000.00</b>	<b>\$11,909,000.00</b>

NOTES: A full explanation of these numbers can be found in the text of the capital costs section. A brief explanation will be given here. The population numbers are based on the number of NEW, as yet unbuilt units possible under the applicable build-out scenario. With the exception of 2 Acre Zoning, all scenarios require a Fire Station, and the extension of trunk sewer lines into basin SW-2. Sewer is not provided in basin SW-1. School capital costs are \$7,000 per pupil. Road capital costs are \$3,000 per dwelling unit.

\*\* The cost of acquiring additional recreational land, park land and open space should be determined as part of the process of updating the City's 1977 Parks and Recreation Plan.

## TABLE II - 12

### FLUP CAPITAL PAYMENTS TABLE

NEW FUTURE LAND USE PLAN # OF UNITS: CAPITAL COSTS OVER 20 YEARS

AMOUNT TO BE BONDED OVER 20 YEARS: \$11,909,000.00  
 INTEREST RATE: 5.5 %  
 SCHEDULE OF PRINCIPAL, INTEREST AND PAYMENTS:

YEAR	YEAR #	PRINCIPAL	INTEREST	TOTAL PAYMENT	NEW PRINC. BAL.
1995	1	\$595,450.00	\$654,995.00	\$1,250,445.00	\$11,313,550.00
1996	2	\$595,450.00	\$622,245.25	\$1,217,695.25	\$10,718,100.00
1997	3	\$595,450.00	\$589,495.50	\$1,184,945.50	\$10,122,650.00
1998	4	\$595,450.00	\$556,745.75	\$1,152,195.75	\$9,527,200.00
1999	5	\$595,450.00	\$523,996.00	\$1,119,446.00	\$8,931,750.00
2000	6	\$595,450.00	\$491,246.25	\$1,086,696.25	\$8,336,300.00
2001	7	\$595,450.00	\$458,496.50	\$1,053,946.50	\$7,740,850.00
2002	8	\$595,450.00	\$425,746.75	\$1,021,196.75	\$7,145,400.00
2003	9	\$595,450.00	\$392,997.00	\$988,447.00	\$6,549,950.00
2004	10	\$595,450.00	\$360,247.25	\$955,697.25	\$5,954,500.00
2005	11	\$595,450.00	\$327,497.50	\$922,947.50	\$5,359,050.00
2006	12	\$595,450.00	\$294,747.75	\$890,197.75	\$4,763,600.00
2007	13	\$595,450.00	\$261,998.00	\$857,448.00	\$4,168,150.00
2008	14	\$595,450.00	\$229,248.25	\$824,698.25	\$3,572,700.00
2009	15	\$595,450.00	\$196,498.50	\$791,948.50	\$2,977,250.00
2010	16	\$595,450.00	\$163,748.75	\$759,198.75	\$2,381,800.00
2011	17	\$595,450.00	\$130,999.00	\$726,449.00	\$1,786,350.00
2012	18	\$595,450.00	\$98,249.25	\$693,699.25	\$1,190,900.00
2013	19	\$595,450.00	\$65,499.50	\$660,949.50	\$595,450.00
2014	20	\$595,450.00	\$32,749.75	\$628,199.75	\$0.00
<b>TOTAL PAYMENT OVER TERM:</b>				<b>\$18,786,447.50</b>	
<b>AVE. PAYMENT OVER TERM:</b>				<b>\$939,322.38</b>	

NOTES: The capital costs input into this table are bonded over a 20 year period at 7 % interest and with a fixed principal payment. The method of calculating the discrete capital costs (schools, roads, etc..) that make up the total is described in the capital cost section of the fiscal impact analysis of the report.

# MASTER FINAL FISCAL IMPACT ANALYSIS FOR THE SW QUADRANT BUILD-OUT SCENARIOS

TIME OF FINAL BUILD-OUT, CAPITAL COST INCLUSIVE

## TABLE II - 13

Modified for the Revised Future Land-Use Plan, May 1996

NOTES: Both County Costs and the County Tax Levy have been deleted from this analysis so that it will more closely reflect the impact on the City of Nashua and its taxpayers. The S.A.C. multipliers used are .743 for SF homes, .29 for Townhouse units and .13 for Garden-Style units. The average assessed values used are \$160,000 for SF homes, \$135,000 for Townhomes and \$85,000 for elderly / garden units.

SCENARIO:	EXT. ZONING BUILDOUT FY 1995 FIGURES * .743 SAC - 175K ASSD. VALUE (1,103 sf units)	2-ACRE ZONING BUILDOUT .743 SAC - 175K ASSD. VALUE (361 sf units)	1985 LAND-USE PLAN BUILDOUT .743/.29 SAC - MIXED ASSD. VALUES (1,355 sf units, 611 Townh units)	NEW FUTURE LAND-USE PLAN - APRIL 1996 .743/.18 SAC - MIXED ASSD. VALUES (860 sf units, 50 Townh units, 50 Elderly units)
<b>INCREASE IN CITY COSTS DUE TO DEVT.</b>				
1. TOTAL CITY APPROPRIATIONS:	\$32,247,714.00	\$32,247,714.00	\$32,247,714.00	\$32,247,714.00
2. NON-RESIDENTIAL SHARE OF COST:				
a. Total City Appropriations:	\$32,247,714.00	\$32,247,714.00	\$32,247,714.00	\$32,247,714.00
b. Proportion of non-residential valuation to total City valuation:	0.3109	0.3109	0.3109	0.3109
c. Refinement Coefficient:	0.9	0.9	0.9	0.9
d. Non-Res. Share of Cost of City Govt.: (*2A X 2B X 2C)	\$9,023,232.85	\$9,023,232.85	\$9,023,232.85	\$9,023,232.85
3. RESIDENTIAL SHARE OF COST:	\$23,224,481.15	\$23,224,481.15	\$23,224,481.15	\$23,224,481.15
4. CITY POPULATION (2nd AER Estimate):	80,912	80,912	80,912	80,912
5. RES. SHARE - COST PER CAPITA:	\$287.03	\$287.03	\$287.03	\$287.03
6. NEW POP. DUE TO BUILD-OUT *:	3,344	1,094	5,631	2,838
7. INCREASE IN COST OF CITY GOVT. DUE TO BUILD-OUT:	\$959,841.12	\$314,015.01	\$1,616,287.49	\$814,602.01
8. AVE. YEARLY CAPITAL COST DUE TO DEVT.: ave. yearly payment of total debt over 20 years	\$1,068,519.63	\$233,154.50	\$1,474,723.13	\$939,322.38
<b>INCREASE IN SCHOOL COSTS DUE TO DEVT.</b>				
9. SCHOOL TAXES TO BE RAISED:	\$65,003,098.00	\$65,003,098.00	\$65,003,098.00	\$65,003,098.00
10. PUBLIC SCHOOL ENROLLMENT:	12,631	12,631	12,631	12,631
11. COST PER PUPIL:	\$5,146.31	\$5,146.31	\$5,146.31	\$5,146.31
12. NUMBER OF PUBLIC S.A.C. GENERATED BY THE BUILD-OUT:	820 (.743 SAC Multiplier)	268 (.743 SAC Multiplier)	1,184 (.743/.29 SAC Multiplier)	646 (.743/.29 SAC Multiplier)
13. INCREASE IN SCHOOL COSTS DUE TO THE BUILD-OUT:	\$4,219,977.86	\$1,379,212.28	\$6,093,236.33	\$3,324,519.14

TABLE II - 13

INCREASE IN REVENUES DUE TO THE BUILD-OUT	EXT. ZONING BUILDOUT 1994 DEPT. REV. FIGS. .743 SAC - 175K ASSD. VALUE ** (1,103 sf units)	2-ACRE ZONING BUILDOUT .743 SAC - 175K ASSD. VALUE ** (361 sf units)	1985 LAND-USE PLAN BUILDOUT .743/.29 SAC - MIXED ASSD. VALUES ** (1,355 sf units, 611 Townh units)	NEW FUTURE LAND-USE PLAN - APRIL 96 .743/.18 SAC - MIXED ASSD. VALUES (860 sf units, 50 Townh units, 50 Elderly units)
14. ASSESSED VALUE OF DEVT. DUE TO THE BUILD-OUT:	\$176,480,000.00 (\$160,000 Assd. Value)	\$63,175,000.00 (175K Assd. Value)	\$285,735,000.00 (Mixed Assd. Values)	\$148,600,000.00 (Mixed Assd. Values - SF Homes at \$160,000)
15. TAX RATE PER \$1,000 ASSESSED VALUE:	\$27.35	\$27.35	\$27.35	\$27.35
16. INCREASE IN TAX REVENUES DUE TO DEVT.:	\$4,826,728.00	\$1,727,836.25	\$7,814,852.25	\$4,064,210.00
17. CURRENT TAX REVENUES:	\$478,054.09	\$478,054.09	\$478,054.09	\$478,054.09
18. NET INCREASE IN TAX REVENUES:	\$4,348,673.91	\$1,249,782.16	\$7,336,798.16	\$3,586,155.91
19. TAX REVENUES FROM COMM. CENTER: (based on a 75K sq.ft. center)	\$0.00 (no existing commercial zone)	\$0.00 (no existing commercial zone)	\$95,000.00 (based on a 75K sq.ft. center)	\$95,000.00 (based on a 75K sq.ft. center)
20. LOCAL FEES AND CHARGES:	\$13,242,065.00	\$13,242,065.00	\$13,242,065.00	\$13,242,065.00
21. CITY POPULATION:	80,912	80,912	80,912	80,912
22. LOCAL FEES AND CHARGES PER CAPITA:	\$163.66	\$163.66	\$163.66	\$163.66
23. ADDITIONAL POPULATION DUE TO BUILD-OUT:	3,353	1,097	5,631	2,838
24. LOCAL FEES AND CHARGES DUE TO BUILD-OUT:	\$548,752.27	\$179,535.12	\$921,569.95	\$464,467.33
25. TOTAL REVENUES DUE TO BUILD-OUT: (lines 18, 19 and 24)	\$4,897,426.18	\$1,429,317.28	\$8,353,368.11	\$4,145,623.24
NET FISCAL IMPACT OF THE BUILD-OUT				
26. TOTAL REVENUES:	\$4,897,426.18	\$1,429,317.28	\$8,353,368.11	\$4,145,623.24
27. TOTAL COSTS (Govt., Capital and Schools) (lines 7, 8 and 13)	\$6,248,338.61	\$1,926,381.79	\$9,184,246.95	\$5,078,443.53
28. NET IMPACT:	(\$1,350,912.43)	(\$497,064.51)	(\$830,878.83)	(\$932,820.29)

IMPORTANT NOTES: This analysis is an "end point" fiscal analysis in the same manner as the operating cost only model. The capital cost used here is the 20 year AVERAGE payment over the term of a 20 year bond at 5.5% interest. The method used to derive the capital costs is explained in the capital cost section of the text and in Table II - 11. The ave. assessed value for homes in the 2-acre scenario is somewhat higher because of the greater ave. lot size. The budget for the City's sewer system is not reflected in this analysis because it is currently paid for through an Enterprise Fund, which is not funded directly through property taxes. The net impact shown here is the ANNUAL net impact based on the assumptions used and the number of units and public school children generated at the time of total build-out for each scenario.

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### III. FUTURE LAND-USE PLAN

#### A. The Southwest Corner

This Plan is primarily concerned with the southwest corner, which comprises about one-quarter of the area of the entire southwest quadrant and most of the quadrant's subdividable land (about 1,900 acres). Consequently, the Future Land Use Plan for this area is discussed first, followed by a discussion of the Plan for the wider southwest quadrant. There are two Future Land Use Maps that accompany this discussion, and the maps, together with the text, make up the Future Land Use Plan for the southwest quadrant. Map III-1, on page 85, focuses on the southwest corner, and Map III-4, on page 109, shows the entire southwest quadrant.

##### 1. Residential areas

An important aspect of this Future Land Use Plan is the orderly progression from higher density residential areas in the north - northeast sections of the quadrant to lower density residential areas in the south - southwest. This gradation of densities makes sense from a land use perspective, from an infrastructure perspective and from an economic - social perspective in that it provides for a variety of living options.

Most of the northern and eastern southwest quadrant is zoned for medium density residential, at approximately 1.5 units per acre average density. There are two zoning districts that correspond to this density range, the R-9 (9,000 sq.ft minimum lot size) and R-18 (18,000 sq.ft. minimum lot size) districts. This discussion will begin with a description of the land uses and residential densities bordering the southwest corner area as shown on Map III-1.

In the developed parts of the southwest corner, near the limit of the presently sewered area, are medium density residential areas in both the R-9 and R-18 zoning districts. East of Salmon Brook and south of New Searles Road is an area of low - medium density residential (one half to one unit per acre average density, here represented by the R-40 district), which has been developed with Planned Residential Developments (PRDs) at a density greater than allowed by underlying zoning. The area is thus actually medium density residential in effect. In moving west - southwest from the presently sewered area (the heavy dashed line), the first areas "reclassified" through the Future Land Use Plan are medium density residential. It is expected that these areas will become sewered in the future.

In the western part of the southwest corner, south of the existing mobile home - trailer parks, but north of Gilson Road, is an area of low -medium density residential (one half to one unit per acre average density), most of which is presently zoned R - 30. This area serves as a transition between the area of medium density residential to the north and the low density residential area to the south. Another area of low -medium density residential is found in the area south of Cold Brook and west of Salmon Brook, which extends westerly to Buck Meadow Road and the area south of Ridge Road. This area should remain unsewered for several reasons. First, this area has many extensive wetlands, and crossing the wetlands with sewer lines exacts both a heavy economic and environmental cost. Secondly, the number and distribution of possible units in this area, even if it were more intensively zoned, do not justify extending the sewer lines.

The largest area shown on the southwest corner Future Land Use Map is for low density residential, which equates to an average density of .5 (one-half) units per acre. This area is an integral part of this Master Plan for several reasons. First, a major goal of this Plan is to preserve the rural character and environmental integrity of the southwest corner, Nashua's last extensive, relatively undeveloped area. Lower overall densities allow greater amounts of land to remain open and help to preserve natural areas. Secondly, by designating an area for low density residential, the total number of possible units in the area is reduced from what it would be otherwise, and this helps to reduce the overall negative fiscal impact resulting from most residential development.

This density recommendation can likely be accomplished with the existing R-40 zoning designation, both because of large expanses of unbuildable area, and the requirement that lots without sewer and water require a 60,000 sq.ft. minimum lot size. If the recommendations of this Plan are not followed, and the area is developed at a higher density, the greater number of residential units will both contribute to the area's suburbanization and loss of rural character, and result in a greater negative fiscal impact to the City, other factors being equal. Leaving this area unsewered would help to ensure the rural densities recommended in this Plan.

This Plan is a policy document, not a zoning ordinance, so it does not specify future zoning district boundaries, but rather recommends that the area be rezoned consistent with the overall densities and goals of the Plan. For example, an average density of .5 units per acre does not mean that the minimum lot size throughout the area must be two acres, but that the overall density of units on the land be .5 units per acre. This could be accomplished through techniques such as cluster development, soil based lot size development, limited use of a 2 - acre minimum zoning district, or by other methods. What matters is that the area be managed for the recommended overall density. Within that geographic area, there may be pockets of higher density housing, and other areas that remain totally undeveloped and open.

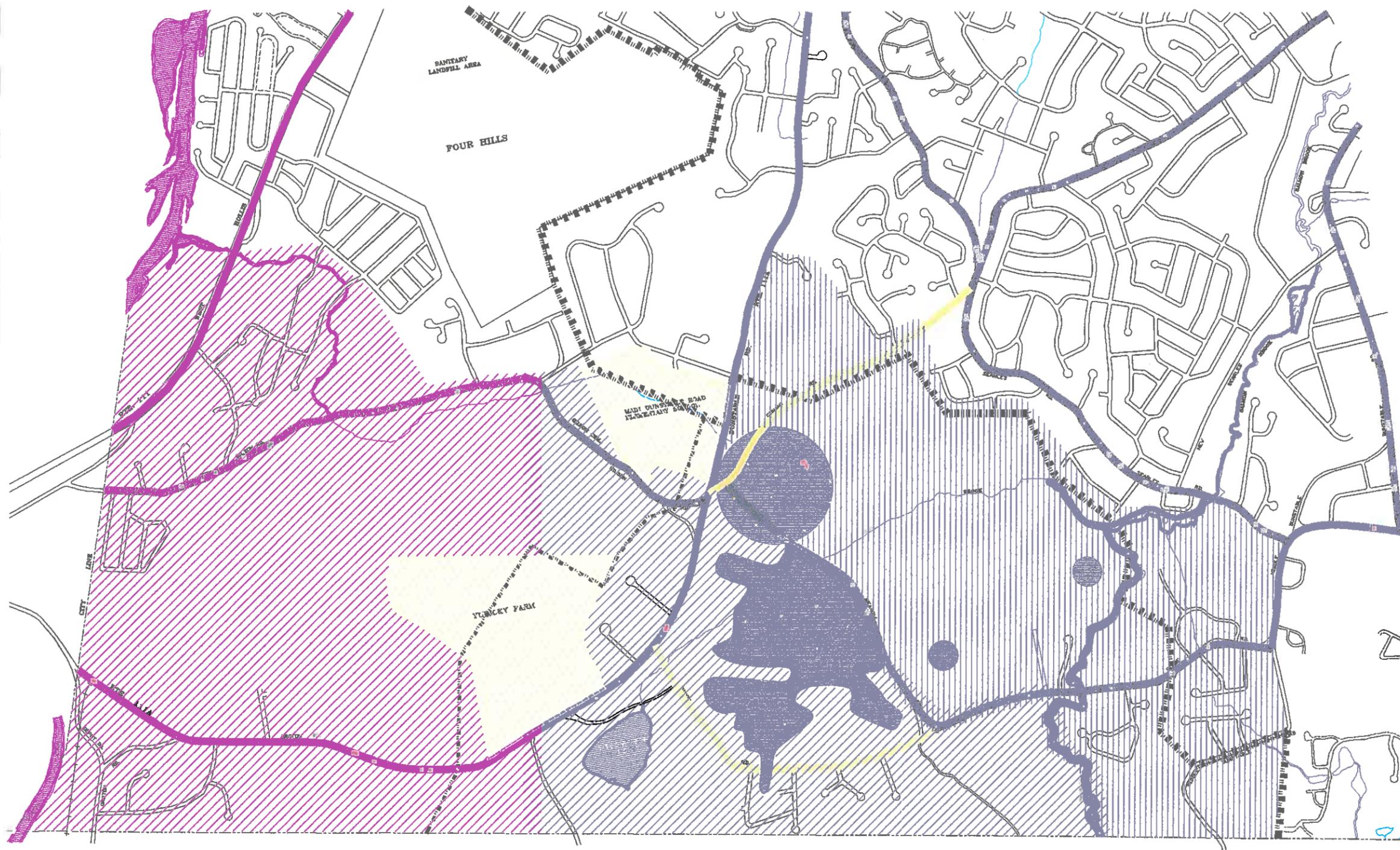
It should also be noted that the Future Land Use Map for the most part does not specify the exact boundaries of these density areas, but rather provides an indication of their general outlines. The setting of boundaries should take place as part of any rezoning effort.

There is one other residential style not mentioned here, which is discussed in the next section; a "village residential" area that is part of a possible Mixed- Use Village District.

To summarize this discussion of residential density areas:

- \* **Low-Density (or Rural) Residential:** .5 units per acre, average density: unsewered
- \* **Medium-Density Residential:** 1.5 units per acre, average density: sewerred

Please refer to Map III-1 on the following page for a graphic presentation of these areas.



LEGEND:

-  Low Density Residential  
.5 units/acre, ave density
-  Med Density Residential  
1.5 units/acre, ave density
-  Municipal Property
-  Mixed-Use Village Center  
4 unit/1 acre, ave density
-  Env. Sensitive Areas  
Prime Wetland
-  New School Site
-  Major Collector Road
-  Collector Road
-  Minor Collector Road
-  Limit of Sewered Area-1995
-  Sewer Basin Divide

Nashua, S.W. Quadrant Master Plan  
 New Hampshire City of Nashua Planning Department 1995

MAP III - 1  
 S.W. Corner  
 Future Land  
 Use Plan

## 2. Neighborhood Retail / Business Center and/or a Mixed-Use Village District

### a. Neighborhood Retail / Business Center

The southwest corner of Nashua is presently without a neighborhood retail / business center that could serve the needs of the area's residents. Residents of the southwest corner must currently go elsewhere for all of their shopping needs. Neighborhood-oriented shopping opportunities presently exist at the intersections of Main Dunstable Road and Northeastern Boulevard, Harris Road and Northeastern Boulevard, and on West Hollis Street in the northernmost sections of the southwest quadrant. These areas are approximately two (2) miles from the "crossroads" of Main Dunstable, Conant, Buck Meadow and Gilson Roads. In addition, there is an approved convenience center at the intersection of East Dunstable and Spit Brook Road, also about two (2) miles from the crossroads. Other convenience shops, as well as full scale grocery stores, exist along the Daniel Webster Highway (3.8 miles from the crossroads), Broad Street (5 miles " ") and Amherst Street- Route 101A (6.5 - 7 miles " "). To reach the Broad Street and Amherst Street areas from the crossroads, one must enter and exit from the F.E. Everett Turnpike, which can be time consuming during periods of peak traffic and which can add to traffic congestion. Without addressing the neighborhood center needs of the southwest corner's residents, traffic impacts elsewhere in the city are likely to be exacerbated.

Recognizing the lack of a nearby neighborhood retail / business center, and the traffic-related impacts that result, this Plan recommends that the need for such a center be fully evaluated as residential build-out occurs in the southwest corner. The location, scale and features of such a center would be determined by the City. The scale of the center should be designed to meet the needs of the residents of the southwest corner. Such a center should be planned using a site specific planning approach, which would examine such factors as traffic circulation and road improvements, market justification, design features of the building(s) and site layout, pedestrian access and circulation, landscaping and aesthetics, and other factors that would be deemed important when a center is proposed.

One possible location for such a center is in the vicinity of the "crossroads" of Main Dunstable, Conant, Buck Meadow and Gilson Roads. It may be possible for such a neighborhood retail / business center to be incorporated into a Mixed-Use Village District (see the discussion on page 89) that could include park land, attached housing units, pedestrian and bicycle paths and one or several municipal uses, such as a new school, fire station or branch library. Alternately, the center could be developed without any of the other uses just cited.

The 1985 Master Plan indicated a small commercial area located off Conant Road. In the mid 1980's an area near the crossroads was rezoned to General Business (GB) and Residential C (RC) as part of a large-scale residential project. It is recommended that this zoning be reviewed and modified, as needed, for consistency with the recommendations of this Master Plan Update.

As to standards that could be applied to uses in such a neighborhood retail / business center, the Urban Land Institute's (ULI) Shopping Center Handbook, lists standards for various types of shopping centers, from the Neighborhood Center contemplated here to Super Regional Centers, such as the Pheasant Lane Mall. The Handbook states that "*Numbers shown in the table must be regarded only as convenient indicators to define the various types of centers....*,

*The number of people needed to support a shopping center of any type, for example, cannot be fixed, because income levels, disposable income, competition, and changing methods of merchandising as well as changing store sizes all enter into the calculations.*

*Obviously, no rigid standard for size would be realistic. Local conditions within a trade area are more important than any standard population data in estimating the purchasing power needed to support a center."*

The issues raised above by the Urban Land Institute underscore the need for locally sensitive, site specific planning for any potential neighborhood center, whether or not it is incorporated into a larger "Mixed-Use Village District".

The City's existing zoning scheme may not be the best way to control a possible neighborhood retail / business center. There are several available zoning and land use control options. It is possible to create a new zoning district with its own use and dimensional requirements, one more suited to rural areas than the Local Business (LB) district that currently exists in the zoning ordinance. Alternately, an overlay district may be written and applied to the area. Or, the existing Local Business (LB) zoning district and its standards, if deemed appropriate, could be applied. This, or a new "rural business zone", might make the most sense if the center is not part of a larger Mixed-Use Village District. In any event, the manner in which a neighborhood retail / business center is created is extremely important. In order to create an attractive, vibrant and thriving center that fits in with the character of the area and contributes to the well being of the area's residents, it is vital that a site specific plan be developed.

Several alternative areas for additional neighborhood-scale retail space have been suggested in the process of preparing this Plan. The first such area is a seven (7) acre site located along West Hollis Street west of Riverside Street and the Police Station. This site was once a city landfill. It has been determined that leachate from buried refuse has contaminated the groundwater under this site. The New Hampshire Department of Environmental Services has ruled that the site must be cleaned up and the groundwater restored before any buildings could be sited on this land. This poses a serious and expensive obstacle to commercial use of this site. In any event, this site, once developed, would serve a different population and purpose than a center located in the southwest corner. Being situated as it is on the periphery of the Quadrant, at slightly over two (2) miles from the crossroads, it is not conveniently located to residents of the southwest corner.

The same can be said for an area along Main Dunstable Road (111A) near its intersection with Northeastern Boulevard. There is sufficient vacant area here for a small retail / business site, but it is located in an area that already has several retail establishments, and one that already experiences significant traffic congestion. This traffic congestion is likely to worsen before it improves due to reconstruction of the Exit 5 interchanges on the F.E. Everett Turnpike. Development of a neighborhood retail / business center at this location would need to be very carefully undertaken, due to the traffic problems of this area.

#### b. Mixed - Use Village District

As for the crossroads area, this Plan envisions a possible Mixed-Use Village District, one which would include several land uses besides the neighborhood retail / business center previously discussed. It is suggested that any site specific development plan for the area address provisions for open space and/or park land, a municipal building(s), pedestrian and bicycle paths and possibly a modest number of higher density housing units, all of which could be part of a Mixed-Use Village District. The municipal building could be used for several purposes, such as to house a branch library, a public health outreach center, or perhaps a public safety (police/fire) use. Open space and recreational areas should be an important part of this District. They can serve as a buffer between different land uses, and as a means to help retain rural character.

Map III-1 on page 85 shows a Mixed-Use Village District as a red circle, with its western edge just touching Main Dunstable Road. This circle is meant to suggest the general location of a possible village center. It is proposed that the specific location and features of this area be "site specifically planned" as a cooperative effort between the landowner/applicant(s) and the City of Nashua through its Planning Department, Planning Board, School Board and Board of Aldermen. A professional consulting firm should assist in the development of any such plan for this area. Such a plan could consider the possible location of a new elementary school, elderly and/or multi-family housing, and any other agreed upon factors that arise in the development planning process. A concurrent site plan review / rezoning application is recommended as part of any such review and approval process.

This Plan recommends that elderly housing be given serious thought in this location for several reasons. The first is that demographic trends indicate that Nashua's population is aging, and demand for elderly housing should increase as time goes by. The second is that elderly housing demands less in City services than conventional multi-family or attached housing. Certainly, the lack of school-aged children in an elderly housing complex means a substantial savings for the City over conventional housing. As is the case for the retail / business uses, it is important that standards for the density, scale, site requirements and appearance of the housing units be developed as part of a locally sensitive / site specific planning effort. It is recommended that the number of such housing units be modest, perhaps in the 75 - 100 range. A larger residential component may not be consistent with the rural nature of the surroundings.

### 3. Schools

The need for a new southwest quadrant elementary school has been thoroughly documented both by the School Department and earlier in this Plan. Therefore, this section will not reiterate the rationale for a new school, but rather address some of the features of the school itself, as described in the latest (FY 96') Capital Improvements Plan, and examine some of the options concerning *where* the school should be sited. The School Department received funding in FY 96' to undertake an architectural and engineering study that will also consider siting options. As described in the FY 96' Capital Improvements Plan, the new southwest quadrant elementary school would have an estimated student capacity of 750.

The School Facility Alternatives report by architect Frank Marinace states that "*the Junior High Schools would be at a maximum capacity by the year 1998. To meet projected enrollments in the year 2000, these schools would need an increased capacity of 100 students beyond (current) expansion proposed. Only Fairgrounds is shown as receiving additions due to the proposed work in progress*". The situation at the Junior High Schools is largely a result of the "baby-boom echo" bulge moving through the grade levels, and is not directly attributable to new residential growth. The School Department believes that a flexible school design would be best, one that would allow the new school to be convertible to a middle school, should the proportion of school aged children warrant such in the future. This Plan will not focus on this issue, but focuses on the situation at the elementary school level, which is more sensitive to growth trends in the southwest quadrant. Nonetheless, this Plan supports providing for the expansion needs at all levels of the Nashua School system.

There are two options in siting a new school in the southwest corner. The first is to site it on land presently owned by the City. By using City-owned property, land acquisition costs could be eliminated, thereby saving substantial dollars. An other option is that land could be purchased (or traded) for a school site. The discussion below starts with City-owned property and then considers other sites.

There are two prime City-owned sites in the southwest quadrant that could be suitable for the new elementary school. Developing the school on City-owned property would definitely minimize land acquisition costs, and other associated costs as well. The first possible school site is Yudicky Farm. The second possible site is land on the southern half of the 58-acre Main Dunstable School property. The Yudicky Farm Master Plan envisioned that part of the site would be devoted to recreational uses and a portion devoted to a new school or schools. The recreation uses were to be concentrated in the southern part of the parcel and the educational uses towards the northern edge.

The Yudicky Farm site is crisscrossed by an extensive wetland system, which would require additional care in site planning. The northern edge, however, appears to be free of large wetland bodies, at least as indicated by the United States Soil Conservation Service Soil Maps. There are several other factors, besides wetlands, which should be considered when weighing the Yudicky site versus the Main Dunstable site. The first is that development of the northern part of Yudicky Farm would require that a lengthy access road be constructed, which would have to cross wetlands at one or more locations. The second reason is that, according to the City Engineer, the cost of extending City sewer lines to the Yudicky site is approximately \$500,000 more than extending them to the Main Dunstable site. This is because the Main Dunstable / Buck Meadow road intersection is 1.4 miles from the nearest adequate interceptor (est. cost \$1.5 million to extend), while the Yudicky property is 1.9 miles away from its nearest adequate interceptor (est. cost \$2 million to extend). The third reason is that the portion of Main Dunstable (or Groton) road from which the access road would need to enter the property is within an area of delayed response (5 minutes or more) for fire emergencies, as identified in the 1986 *FirePro* Study. Placement of an elementary school in an area of delayed response could increase citizen demand that a new, full size Fire Station be developed in the southwest corner. The capital cost of this new Fire Station would then need to be added to that of the school when considering the total cost of developing at the Yudicky Farm site.

All these reasons justify taking a closer look at the Main Dunstable School site. There are several positive aspects to this site. The first is that it is closer to the rest of the City, and this would reduce the distance that school buses (especially those from neighborhoods to the north) would need to travel. Second, this school is closer to the center of gravity of the growth projected to occur in the southwest quadrant over the next ten years. Though this study did not attempt to determine the likely timing of development for certain parcels, conceptual plans for development received by the Planning Department indicate that within the next 5 years the area to the east-southeast of Conant and Buck Meadow Roads could be developed with several hundred housing units (verified by the build-out studies). The area to the west is expected to grow more slowly, both because it is more remote and because it is further away from the existing sewer lines, and the cost of providing sewer there would be higher than to the east, as explained in the sewer system discussion.

The Main Dunstable School site also has several areas that would be suitable as recreational fields for the new school. The students would be within walking distance of these. Another possibility is the creation of an integrated elementary school "campus" comprising the existing school and the new school. It may be possible to have one school serve one grade level of students (say, K - 3) and the other the higher levels (4 - 6). In this way, the administrative operating costs could be reduced, as both "schools" (or sub-schools) could be served by one principal and administrative staff. It may also be possible to share teachers. In these ways, an "economy of scale" may be realized through the campus approach.

The one major drawback to siting a school at the Main Dunstable School site is that it would be close to the "crossroads" area, with its confusing intersections and likely future traffic increases. However, there may be creative ways to redesign the intersections to alleviate traffic conflicts. However, just as the cost of an additional Fire Station may have to be figured into the Yudicky site, the cost of road improvements at the crossroads may have to be figured into the Main Dunstable School site. Another consideration that would come into play if the sewer interceptor is *not* extended across SW-2 in time would be the need to provide a pump station to pump sewerage from the school northward along Main Dunstable Road. The existing pump station serving the existing school and several area neighborhoods is inadequate to serve an additional school and a possible future commercial area. If these uses were to come on line before residential growth extended the interceptor from its present terminus, the pump station option might have to be exercised.

As part of this study, a "center of gravity analysis" calculated the approximate center of distribution of school aged children resulting from new development according to the Future Land Use Plan. The circle labeled "New School Site" on the Future Land Use Maps is close to this center of gravity, and is an area identified as a desirable, potential site by the City and the School Department. This site could be accessed by extending existing City streets located off of Ridge and Searles Roads. The greatest amount of future residential development is estimated to be in this area bounded by Conant Road, Buck Meadow Road, Ridge Road and the subdivisions to the west of Searles Road. Therefore, it is in this general area that a new school site makes the most sense, should it be sited on land that is presently not owned by the City. Locating the school in this area would maximize the number of students who could walk to school, minimize the number that would need to be bussed, and possibly allow the school to be integrated into the Village Center. The need for a new school site should be considered as part of the planning context when subdivision and site plans proposing development in this area are submitted for approval.

If the new school is developed on what is now private property, it should be developed in coordination with any residential subdivision plans proposed in the vicinity. For example, to facilitate students' ability to walk to school, sidewalks should be provided along subdivision and public streets leading to the school. Section 16-116. Public sites and open spaces, of the Nashua Subdivision Regulations, mentions the requirement to address public sites and recreation / playground areas in the subdivision planning and review process.

#### 4. Public facilities and infrastructure

##### a. Sewer line extensions

As shown earlier, there are two major sewer service basins in the presently unsewered areas: SW-1 and SW-2. It has been shown that extending sewer lines into SW-2 would be less expensive, both for the City and on a per unit basis, than extending them into SW-1. Therefore, this plan recommends that sewer be provided in SW-2 up to, but not over, the approximately 1,000 residential units worth of capacity that can be provided without needing relief sewer lines.

The City may want to reconsider the usefulness of requiring dry sewers in subdivisions proposed for the low density (one unit per two acres) residential area of SW - 1. If this Plan is followed, and the area is built-out at low densities, residential wastewater treatment systems should be sufficient. Of course, if all or part of the area is built-out at a higher density than recommended in this Plan, then the dry sewer requirement may be necessary to ensure that future units can be tied into the City's sewer system.

School siting factors also impinge on the sewer question. As explained in the school section, it would cost approximately \$500,000 more to extend the lines to Yudicky Farm than to the Main Dunstable site. Another consideration that would come into play if the sewer interceptor is *not* extended across SW-2 in time for the new school would be the need to provide a pump station. The pump station serving the existing school and several area neighborhoods is inadequate to serve an additional school and a nearby commercial area. If these uses were to come on line *before* residential growth extended the interceptor from its present terminus, the pump station option may have to be exercised.

While the actual sewerage treatment plant has more than enough capacity to service the additional residential development foreseen in the Future Land Use Plan, this situation could change somewhat when the Environmental Protection Agency promulgates new rules for combined sewer overflows. Some existing capacity may need to be used to separate the storm and wastewater flows currently combined in many sewer lines.

##### b. Pennichuck Water

Pennichuck Water Works fully anticipates extending water lines throughout the presently unserved part of the southwest corner. A map of their tentative plans for extensions in the southwest quadrant is found in the Technical Reference to this Plan.

Pennichuck has indicated that details of this plan are subject to change, but that it should be accurate in its general form. A more detailed discussion of water issues is found in part B of the previous chapter and in Chapter IV of the Technical Reference.

c. Road classifications and improvements

The issue of road classifications and improvements for the southwest corner will be taken up in the discussion of the wider southwest quadrant, as the road network goes beyond the borders of this area. Please refer to page 111 for that discussion.

d. Recreation land and open space

As the population of the southwest corner (and the wider quadrant) grows, demand for additional recreation facilities and publicly accessible open space will increase. This will occur simultaneously with the conversion of many open areas to residential use. Careful planning is essential to strike a balance between development and conservation, and to ensure adequate recreation and open space opportunities for the quadrant's present and future population. A general goal of the City should be to purchase or otherwise protect additional open space and recreational areas. However, to do so efficiently, careful planning is necessary. Therefore, perhaps the strongest recommendation that this Future Land Use Plan can make is that the City update its 1977 Park and Recreation Plan. The Park and Recreation Plan should also incorporate the findings and recommendations of the Nashua Trails Plan, prepared by the Nashua Urban Trails Alliance, *which is also part of this Nashua Master Plan Update*. The Nashua Trails Plan map appears on page 105 following the greenway map and table.

**The goals and objectives of this Southwest Quadrant Master Plan pertaining to open space and recreation are:**

**Goal:** Residents of the quadrant enjoy adequate and accessible recreational space at a variety of levels, from citywide and district parks to neighborhood parks.

**Objectives:**

- Improve and expand park facilities at the district, community and neighborhood levels in relation to the distribution and composition of the population.
- Continue to improve and maintain existing city-owned parks and recreational areas, such as Yudicky Farm and Roby Park.
- Encourage developers to set aside adequate amounts of usable recreational land within subdivisions and on large non-residential tracts, where advisable, through the subdivision and site plan review processes for the use of local residents and the general public. The land dedication requirement found in the zoning ordinance should be reviewed for effectiveness and amended if needed.
- Amend the Cluster and PRD sections of the Nashua Zoning Ordinance to require that a higher percentage of dry, usable land, suitable for recreation, be set aside whenever these development options are exercised.
- Link open spaces and recreational areas, whenever feasible, to produce a trail network or greenway throughout the quadrant. (This will be further discussed below.)

- Identify and protect prime wildlife habitats.
- Implement the Nashua Urban Trails Network and the Nashua Trails Plan (October 1993).
- Update the 1977 Nashua Parks and Recreation Plan.
- Improve access, where advisable and needed, to existing city-owned parks and recreational areas.
- Plan and set aside money for the acquisition of additional parks and conservation areas. This acquisition could perhaps be funded through a land bank charge on new development. Emphasis should be placed on linking already existing parks, conservation areas and common open land into a network of open areas that could be incorporated into a greenway or similar network of open space.
- Amend the site plan and subdivision regulations to address the protection of existing vegetation (especially large trees) in development sites. Clearcutting or near clearcutting of vegetation should be prohibited.
- Encourage the use of the Cluster and PRD styles of development, to be able to set aside greater open space in subdivisions. These sections of the Zoning Ordinance may need to be amended in order to increase their effectiveness in protecting adequate open space.

In addition, the City should attempt to provide a wide range of recreational opportunities in the southwest quadrant, and focus particularly on activities that are not currently available. A detailed discussion of active recreational facilities follows the greenway description.

#### Southwest Quadrant Greenway:

One way to protect open spaces and retain rural character is through the creation of a greenway (also often referred to as a greenbelt). A greenway is a more or less linear network of open spaces and natural land protected either through fee simple ownership, conservation restrictions or zoning. Greenways are often used to connect large parcels of park or conservation land. They are often planned to allow for public access and trails, but this need not always be the case. These linear expanses of open space can also connect valuable wildlife habitats in areas undergoing suburbanization, and can provide visual relief from the man-made environment.

In Nashua's southwest corner, an opportunity exists to create a greenway connecting the Nashua River with city-owned lands and Salmon Brook. (Map III - 2) Much of this corridor follows streams and wetlands. Map III-2 shows a possible greenway as a 200 foot wide corridor (100 feet on each side from a defined centerline) that runs from the Nashua River, down to Yudicky Farm, along Lyle Reed's Brook and down to Lovewells Pond, and then out along Cold Brook to Salmon Brook. This is but one way in which a greenway could be designated. The actual route, width and features of the greenway can differ from that shown here.

The greenway shown on Map III-2 can serve as a starting point for discussion on the issue, and again is not intended as a definitive route. Table III-2 on page 103 lists some of the parcels along this greenway which the City may consider for purchase or conservation restrictions. Of these, lots C13 and D27 are perhaps the most important. Lot C13 is the land north of Lovewells Pond bordering Old Ridge Road, and Lot D27 is the land along Gilson Road near the cemetery. These parcels are relatively small, but developing them for housing would have great impact on the area's rural character, as they border an undeveloped pond and a scenic rural road, respectively. At the very least, acquisition or protection of these two parcels should be seriously considered. Table III-1 provides details on sheet and lot number, ownership and acreage. Please refer to Map III-2 for the location of each parcel.

In addition to the greenway, there are two large areas that the City may want to start with in an open space acquisition or protection program. Though the path of the greenway does traverse these areas, their special nature may warrant the protection of more land than that suggested for a greenway. The first area is centered on Lovewells Pond. This pond is one of the few in the southern part of New Hampshire that has a pristine, undeveloped shoreline. The pond is bordered by extensive wetlands and a variety of forest types. The previous (mid-1980's) Hall's Corner Plan contemplated development along the eastern shoreline of the pond. To protect water quality and provide adequate buffer zones for wildlife, protection of the upland areas in the immediate watershed should be further explored. The City could consider purchasing land along the entire shoreline.

\* The second area worth considering is the large tract between Main Dunstable Road, Ridge Road and Buck Meadow Road. Much of this area consists of wetlands, and consequently the development potential of this area is not as high as other parts of the southwest corner. Purchasing or protecting this area may thus be more cost effective for the City when compared to other large tracts in the area. The suggested greenway traverses through the center of this area. If the surrounding upland were purchased out to the roadways, a large natural buffer between the western and central parts of the quadrant would be created. This could do much for preserving rural character.

Another area of special concern is a vernal pool (or pools) identified by the New Hampshire Natural Heritage Inventory program in the area east of Buck Meadow Road. The general location of this habitat is shown on the Future Land Use Plan Maps. Vernal pools are generally upland areas that fill with water for a short period in the spring following snowmelt and spring rains. They serve as breeding habitat for a variety of amphibian species, some of which are declining in the region. This Plan recommends that when any development is proposed in the vicinity of the vernal pools, that the pools be flagged and given adequate protection in the form of a wide enough buffer zone to ensure the survival of the amphibian species in the area.

The Natural Resource Conservation Service (NRCS, formerly the Soils Conservation Service) performed a preliminary wildlife habitat assessment for the southwest corner. This assessment is based on a review of existing maps and data, and did not involve field research. Nonetheless, it is valuable as a planning document, and as such is incorporated into this Master Plan Update by reference. The methodology and rationale for the approach taken by the NRCS is described in their words below:

*"This habitat assessment was conducted by compiling data from the NRCS soil survey, National Wetlands Inventory, Aerial Photography, USGS Topographic Maps and Technical Report NE-108 (New England Wildlife: Habitat, Natural History and Distribution; Northeastern Forestry Experiment Station, 1986). This report is intended to highlight the most significant or prime wildlife habitats as determined from the above references.*

*The areas were ranked according to the following factors: presence of wetland soils, wetland vegetation, forest cover type, open areas and perennial streams and ponds. The hydric soils and National Wetlands Inventory data were compared to designate wetland areas. These areas provide habitats for a wider variety of animals than non-wetlands because the hydric soils support a more diverse plant community. They are also important feeding stations for many birds and mammals. In addition, they serve as reproduction sites for reptiles and amphibians. Forest cover types determine the species which inhabit the area. Some species are specific to certain forest types but in general, the greatest diversity of wildlife can be found in mixed stands of hardwoods and pines.*

*Perennial streams and ponds are critical habitat components because they provide water, act as travel corridors and are important breeding sites. Neotropical migrants (songbirds) rely on stream corridors heavily during their migrating season. The areas directly adjacent to the streams (riparian buffer zones) support a diverse plant community. The riparian buffer zones also act as filters by trapping sediment and pollutants before they enter the stream. In order to be effective as filters and nesting areas, riparian buffer zones should be at least 150 feet wide.*

*...Fragmentation poses a serious threat to wildlife habitat. A single, large tract of land is more beneficial as a habitat than several smaller tracts. In addition, areas that serve as corridors from one habitat to another are extremely important during breeding, migration and feeding. In addition, large contiguous areas can also provide aesthetic, recreational and educational opportunities for the surrounding residents."*

The report then identifies areas on a map that qualify as "prime wildlife habitat" according to the criteria described above. Again, it must be mentioned that no field surveys were conducted, a step which would be necessary in definitely determining the wildlife habitat potential of specific areas. This preliminary survey indicates areas which have the highest potential of serving as a habitat for the greatest variety of species.

The preliminary "prime wildlife habitats" tend to follow the stream corridors and most of the wetlands in the area. They also are found in the transition areas between wetland and upland landscapes and around Lovewell's Pond. For the most part, these areas closely correspond to the route of the preliminary greenway and prime parcels found on Map III - 2. The original map prepared by the NRCS is found in their report, which by reference forms part of the Appendix to the Technical Reference of this Plan.

It is recommended that future site specific planning in the southwest corner give special attention to the findings of this wildlife study, and that the route of a greenway be considered whenever development proposals are put forth. With careful planning, it is possible to accommodate both additional growth (housing primarily) and the indigenous wildlife species.

Active Recreation and Park Areas:

In addition to setting aside land for such "passive" open space uses as conservation areas, nature parks and greenways, it is important to address the need for active recreational spaces and facilities. These are generally known as "neighborhood parks, playgrounds or playlots". The 1977 Parks and Recreation Plan lists service standards for the various levels of park that a City should have available to its citizens. Table III - 1 below summarizes these standards:

**TABLE III - 1**

**Active Recreational Area Standards from the 1977 Parks and Recreation Plan**

Type of Rec. Area	Size (Acres)	Primary age group served	Ideal Service Radius (miles)	Max. Service Radius (miles)	Population Served (x 1,000)
Neighborhood Park	.5 to 6	All	1/4	1/2	1 - 6
Playlot	1/8 to 1/4	Pre-school	1/8	1/4	.5 - 1
Playground	2 to 7	6 - 15 years old	1/2	3/4	1 - 6
District Park	15 - 30	All	1.0	2.0	12 - 15
City-wide Park	100 +	All	City-wide	City-wide	50 +

In the southwest quadrant, Yudicky Farm and Roby Park are large enough to qualify as "District Parks". Both Roby Park and Yudicky Farm are used for active recreation and sporting events (softball, soccer, lacrosse...) It is important to note that the hierarchy of park levels can function in a pyramidal fashion, i.e., a District Park can include the facilities and amenities of a neighborhood park, and include playgrounds and playlots as well. Multi-purpose active recreational fields are currently under construction at Yudicky Farm, so this facility will soon be able to provide for a wider range of active recreational uses. Thus, for the foreseeable future, there is adequate District level park land available in the southwest quadrant. The 1977 Plan states that "A district park should provide active recreational facilities which cannot be economically justified, or would be underutilized at the neighborhood level, such as swimming pools". Currently there are no public swimming pools in the southwest quadrant. As the population of the southwest quadrant grows, it will be important to plan for swimming pools and other active recreational uses, which should be examined as part of future recreational planning efforts. Both Yudicky Farm and Roby Park can serve as possible locations for such additional recreational facilities, as determined through the recommended updating of the 1977 Parks and Recreation Plan.

The population projected for this area is well within the guidelines recommended in the 1977 Parks and Recreation Plan. At the City-wide level, there are Mine Falls Park and Greeley Park; large parks which provide for both active and passive recreation. Therefore, the most important parks to plan for will be at the Playground to Neighborhood Park levels.

These parks are generally small, and can range from one-quarter of an acre for a playlot to seven acres for a neighborhood park or large playground. These parks are also best planned as an area is developing, since the layout of homes, roadways and the density of housing will determine where active recreational areas are most needed. This Future Land Use Plan will thus not identify *specific* locations for such parks, but does recommend that such parks be planned for and developed as the area grows. In general, it makes sense to locate these smaller parks in those areas undergoing suburbanization that are somewhat removed from the District Parks. General areas where playgrounds and neighborhood parks should be incorporated are:

- ◆ The area south of Gilson Road and north of Groton Road, west of Yudicky Farm. The build-out scenarios indicate that several residential subdivisions are possible in this area.
- ◆ The area south of Conant Road, east of Buck Meadow Road and north of Ridge Road. This is the part of the quadrant that will likely experience the highest density and number of housing units in the near future. It will be especially important to provide playgrounds and/or neighborhood parks in this area.
- ◆ If all or part of the land currently zoned *Park Industrial* north of Spit Brook Road and west of the F.E. Everett Turnpike is ever rezoned to residential, it will be important to provide playgrounds and/or neighborhood parks in this area as well.

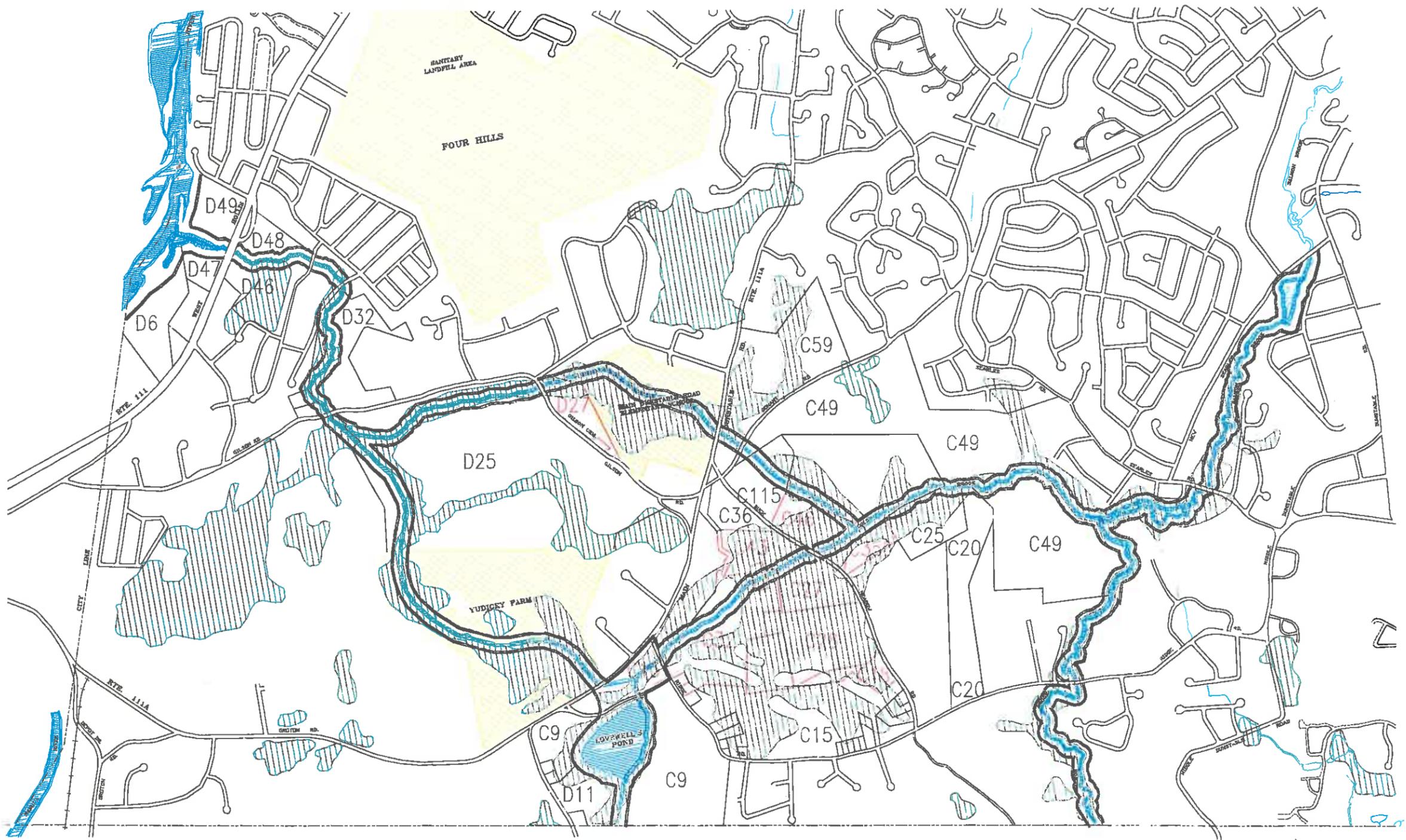
- ◆ Where possible, consideration should be given to locating these local parks near or adjacent to schools or future school sites so services are not duplicated.

The City's Zoning Ordinance references the Master Plan and the need for recreational areas in **Section 16 - 116. Public sites and open spaces**, where it states in part:

- a) Where the master plan or other city plan proposes a park, playground or school site, the (planning) board shall require the reservation of such area within the subdivision in those cases in which the board considers such requirements to be reasonable.
- b) In addition to the reservation of land in a proposed development for parks, playgrounds or school sites shown on the master plan, the board, where it is deemed essential upon consideration of the particular type of development proposed, and especially in large-scale neighborhood unit developments, shall require the dedication of such areas or sites suitable to meet the need created by such development for park and recreational open space. In no instance shall this dedication of land be required to amount to more than three (3) percent of the total tract area to be subdivided.

As part of any effort to revise or amend the Nashua Zoning Ordinances, it is encouraged that the above cited standards be re-examined for their effectiveness in providing for the active recreational needs of both the residents of subdivisions where such parks may be sited, and the general public.

In any event, the provision of open and recreational land through the subdivision review and approval process will have to be considered on a case by case basis, in accordance with the ordinance requirements in place at the time. Alternative methods and arrangements to provide for open space and recreational land, such as a park development or land dedication fee, for example, should be further explored as part of any effort to revise or amend Nashua's zoning ordinances and subdivision regulations.



- LEGEND:**
- Existing Roads
  - Existing Development
  - Nashua City Line
  - City Owned Property
  - Wetland Soils
  - Path of Greenway
  - Key Parcels

# Nashua, S.W. Quadrant Master Plan

New Hampshire City of Nashua Planning Department 1995

MAP III - 2  
Greenway

## TABLE III - 2

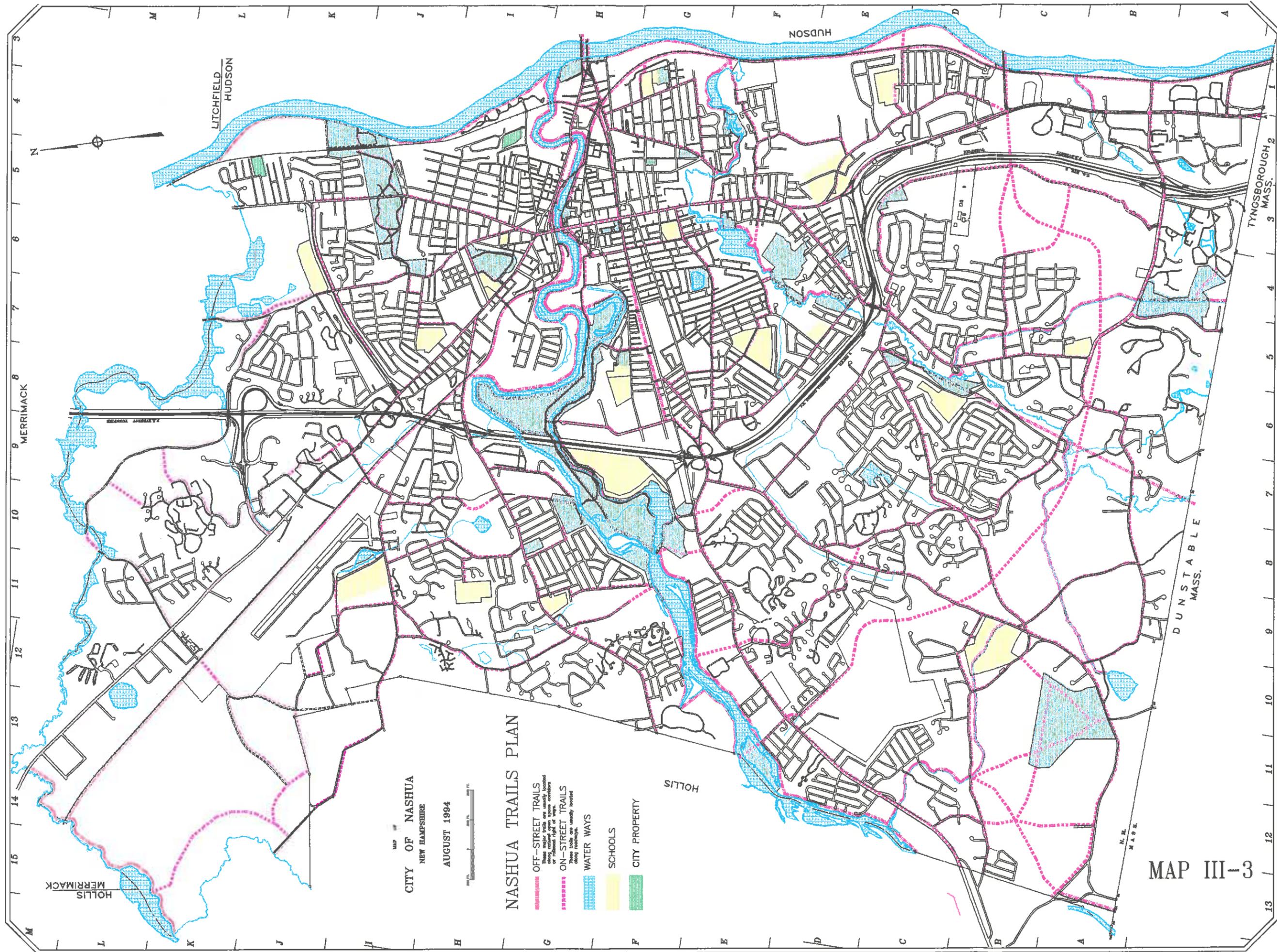
### SOUTHWEST QUADRANT GREENWAY

#### LOTS AND LANDOWNERS ALONG A GREENWAY CORRIDOR

SHEET AND LOT #	LANDOWNER	PARCEL SIZE (Acres)	NON-WET AREA (Acres)
D6	CMI Leasing	9.7	8
D47	J. Dobens	6	6
D49	N.H. Savings Bank	13.8	13.8
D46	M. Morey	12.6	5
D48	M. Morey	7.44	7.44
D32	Lee Thompson	19.7	17
D25	Terra Verde	163	118
C13	Terra Verde	9	5
C9	Terra Verde	70.25	68
C32	Terra Verde	45.5	26
C43	Terra Verde	10	1
C27	Terra Verde	12.6	0
C46	Terra Verde	56	31
C115	Terra Verde	15.4	13
C25	Paul Gagnon	27	21
C20	Rachel Gagnon	18.7	18.7
C49	Terra Verde	155.7	132
C29	Roman Catholic Bishop	13	4
C28	Paul Gagnon	17	0
C18	Ernest Gagnon	6.6	3
C350	Anthony Diantonio	5	2
D27	Terra Verde	20.2	18
C59	Terra Verde	42	25

<b>TOTAL ACREAGE:</b>	<b>756.19</b>
<b>TERRA VERDE ACREAGE:</b>	<b>599.65</b>
<b>PRIME PARCELS TOTAL:</b>	<b>194.9</b>
<b>PRIME PARCELS</b>	
<b>NON-WETLAND AREA:</b>	<b>90</b>

NOTES: The greenway is not intended to be comprised of the total area of any lot or combination of lots, but is rather a more or less linear corridor of a certain width (to be determined) that will go through all or some of the lots in the table. The possible mechanisms to create a greenway are discussed in the text of the Southwest Quadrant Master Plan. Prime parcels are those located along the greenway corridor which afford a great opportunity to preserve large, contiguous areas of open space and habitat. Much of the area of most of these parcels is wetlands. The non-wetland area of the key parcels has been calculated as a first step in determining what land area may lie outside of that protected by the wetlands ordinance. This total is very much as estimate, because the area of wetlands, to begin with, is derived from SCS Wetland SOIL MAPS.



MAP #  
**CITY OF NASHUA**  
 NEW HAMPSHIRE  
 AUGUST 1994



**NASHUA TRAILS PLAN**

- **OFF-STREET TRAILS**  
 These trails are located along railroad open space corridors or railroad right of way.
- - - - - **ON-STREET TRAILS**  
 These trails are usually located along roadways.
- ~~~~~ **WATER WAYS**
- SCHOOLS**
- CITY PROPERTY**

**MAP III-3**

Map grid labels: M, L, K, J, I, H, G, F, E, D, C, B, A (top); 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 (left); MERRIMACK, LITCHFIELD HUDSON, HUDSON, TYNGSBOROUGH 2 MASS., DUNSTABLE MASS., HOLLIS (right); M, L, K, J, I, H, G, F, E, D, C, B, A (bottom); MERRIMACK, HOLLIS, MERRIMACK (left).

## B. The Wider Southwest Quadrant

### 1. Land use

This plan has focused primarily on the southwest corner, because it is where the vast majority of land use change in the quadrant will occur over the next 10 - 15 years. For the most part, the rest of the southwest quadrant has been built out, except for scattered infill sites and a few areas discussed here.

There are two major areas outside the southwest corner where a large degree of land use change is possible in the near future. The first is the large area presently zoned Park Industrial and R-30 north of Spit Brook Road and west of the F.E. Everett Turnpike. This area could serve as one as Nashua's prime park industrial areas if the issues of adequate access and traffic concerns can be resolved. With impending completion of Exit 1 and a northbound connection at Exit 36 in Massachusetts and Nashua, the traffic situation will improve noticeably. An area-specific plan should be prepared to recommend ways of providing access and circulation into and out of the area. The City should continue its dialogue with the State and adjacent property owners to secure additional access from the industrial land to the F.E. Everett Turnpike and other access onto Spit Brook Road west of Tara Boulevard. A future component of Nashua's Master Plan Update anticipates a comprehensive treatment of all of Nashua's industrial zones. For now, it is recommended that the area be retained for park industrial use, as shown on Map III - 4 on the following page.

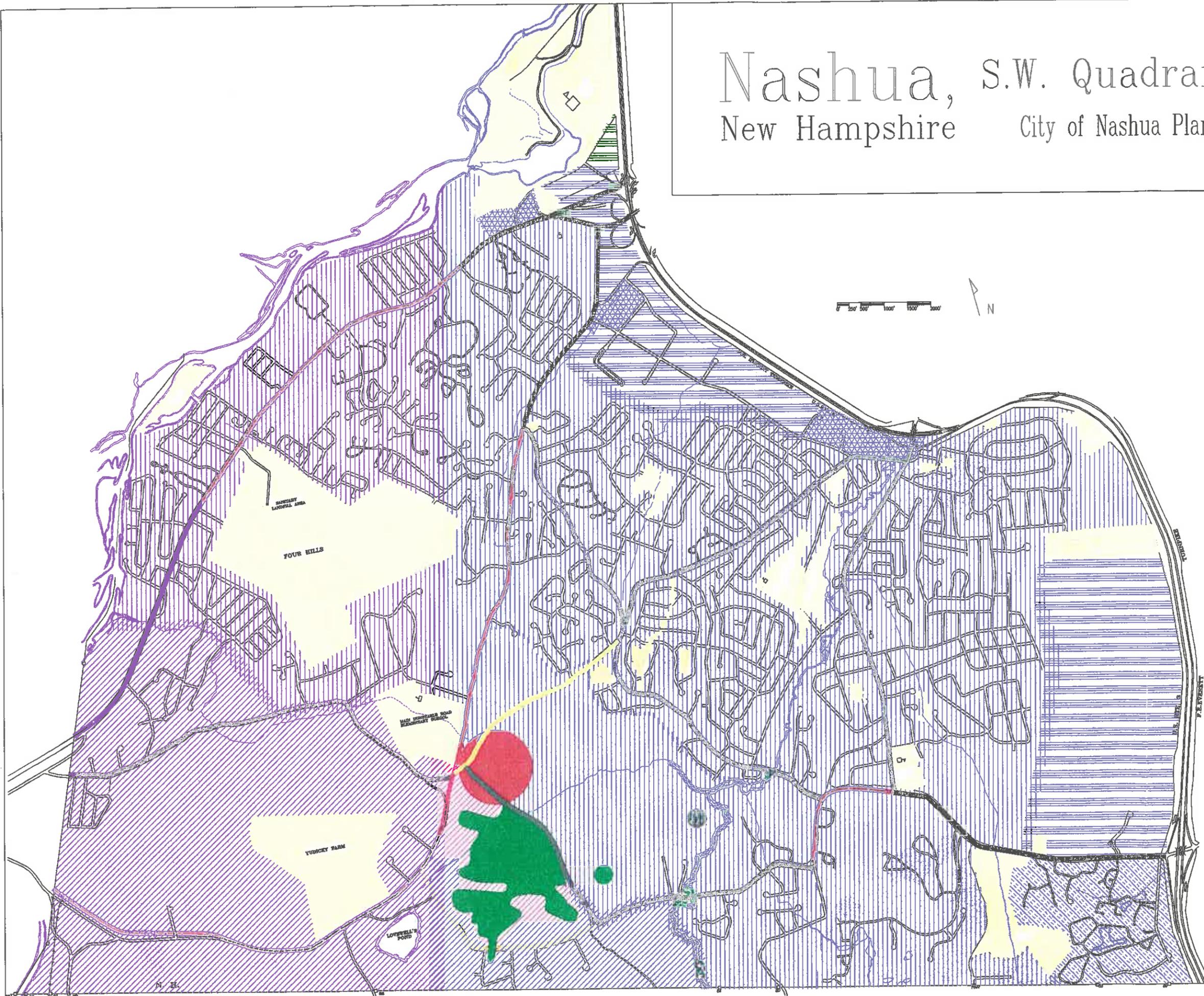
The second major focus of concern is the interchanges of the F.E. Everett Turnpike, specifically the Exit 4 and Exit 5 areas. The 1985 Master Plan designates commercial and industrial land uses in much of the area parallel to the turnpike along Northeastern Boulevard and nearby streets. For now, this Future Land Use Plan recommends that these areas keep their current designation. This Plan does, however, make some minor changes to the 1985 Future Land Use Map in the area near Exit 5, where areas shown as industrial are now identified as commercial land for consistency and accuracy. The area around the interchanges, like the industrial areas, will be studied in depth as a component of the city-wide Master Plan Update. It is important that the City assess the impacts on its roads and other infrastructure completions and anticipate the costs of upgrading its infrastructure in the interchange areas.

# Nashua, S.W. Quadrant Master Plan

New Hampshire City of Nashua Planning Department 1995

MAP III - 4

## S.W. Quadrant Future Land Use Plan



**LEGEND:**

-  Low Density Residential  
0.5 units per acre, ave density
-  Med Density Residential  
1.5 units per acre ave density
-  High Density Residential  
over 5 units per acre, ave density
-  Park Industrial
-  Commercial
-  Municipal Property
-  Mixed-Use Village Center  
4 unit/1 acre, ave density
-  Env. Sensitive Areas  
Prime Wetland
-  New School Site
-  Arterial Road
-  Major Collector Road
-  Collector Road
-  Minor Collector Road

## 2. Road classifications and improvements

One of the most important recommendations that can be made here is that the City adopt a consistent functional classification scheme for its roads. This classification scheme should specify dimensional, construction and maintenance standards for roads based on their traffic volumes and relationship to the entire road network. The Nashua Regional Planning Commission has developed such a scheme for the entire Nashua region, but without modification, this scheme is not entirely suitable for Nashua. Development of a hierarchical classification system should be an interdepartmental function, involving a broad spectrum of concerned parties. This issue will be addressed in more depth in a forthcoming section of the Nashua Master Plan Update for the entire City. The transportation goals and objectives listed at the beginning of this document are also part of the Future Land Use Plan.

This Plan will now address the road improvement recommendations that have been identified in the City's Capital Improvements Plan, by the City's Division of Public Works, and by the Nashua Regional Planning Commission (NRPC). The NRPC completed a detailed Southwest Quadrant Transportation Study for the Nashua City Planning Board and Planning Department in April 1996. Recommendations found in that report are based on this Future Land Use Plan, updated traffic counts and traffic projections, and updated information on State of New Hampshire highway improvement projects. That report is an appendix to the Technical Reference of this Plan.

### a. Existing Conditions

The NRPC report documents the baseline conditions of existing traffic volumes and peak intersection counts, and then proceeds to a future conditions analysis with projected traffic volumes and intersection levels of service. Following the projections, the report discusses "road improvements to consider" from the first draft of this Plan, followed by their own recommendations. The discussion that follows below begins with a brief overview of the baseline conditions and projected future conditions as presented in their report. Then, the recommendations found in the first draft of this Plan are presented as the context for a wider discussion of recommended road improvements.

Where appropriate, sections of the NRPC report are reproduced in this Plan. Those sections are in a different font and block indented or in quotations.

NRPC's first task was to establish baseline traffic volumes and conditions in the study area. NRPC has been undertaking traffic counts for many of the major roadways in southwest Nashua for several years, which allows for comparisons over time. However, three of the roadways of concern (Buck Meadow, Gilson and Middle Dunstable Roads) were not counted in the past, and as part of this study NRPC conducted first time traffic counts for these roads. For most of the roadways, the average yearly growth in traffic has been modest, with the main exceptions being Lamb Road and Ridge Road. Table III-3, below, gives the existing weekday traffic volumes, lists the trend analysis period and notes the average yearly change for roadways with a history of traffic counts.

TABLE III - 3

**EXISTING WEEKDAY TRAFFIC VOLUMES**

<i>Highway</i>	<i>Location</i>	<i>Existing Count</i>	<i>Trend Analysis Period</i>	<i>Average Yearly Change</i>
<i>NH 111A Main Dunstable</i>	<i>W. of NE Blvd.</i>	<i>13,800</i>	<i>1980-1995</i>	<i>2.4%</i>
<i>NH 111A Main Dunstable</i>	<i>W. of Acacia St.</i>	<i>4,500</i>	<i>1988-1995</i>	<i>-2.6%</i>
<i>NH 111A Groton Rd</i>	<i>Nashua/Hollis Line</i>	<i>3,500</i>	<i>1990-1995</i>	<i>1.4%</i>
<i>NH 111 W. Hollis St.</i>	<i>Nashua/Hollis Line</i>	<i>9,500</i>	<i>1984-1995</i>	<i>2.3%</i>
<i>East Dunstable Rd.</i>	<i>S. of Timberline Dr.</i>	<i>12,300</i>	<i>NA</i>	<i>NA</i>
<i>East Dunstable Rd.</i>	<i>S. of New Searles Rd.</i>	<i>8,600</i>	<i>1980-1995</i>	<i>3.9%</i>
<i>East Dunstable Rd.</i>	<i>N. of Lamb Rd.</i>	<i>7,500</i>	<i>NA</i>	<i>NA</i>
<i>East Dunstable Rd.</i>	<i>E. of Lamb Rd.</i>	<i>11,600</i>	<i>1980-1995</i>	<i>4.6%</i>
<i>Spit Brook Rd.</i>	<i>E. of E. Dunstable Rd.</i>	<i>13,400</i>	<i>1989-1995</i>	<i>4.4%</i>
<i>Lamb Rd.</i>	<i>W. of E. Dunstable Rd.</i>	<i>6,500</i>	<i>1984-1995</i>	<i>6.9%</i>
<i>New Searles Rd.</i>	<i>W. of E. Dunstable Rd.</i>	<i>3,800</i>	<i>NA</i>	<i>NA</i>
<i>Harris Rd.</i>	<i>W. of Friar Tuck Ln.</i>	<i>3,400</i>	<i>1988-1995</i>	<i>1.6%</i>
<i>Conant Rd.</i>	<i>E. of NH 111A</i>	<i>4,550</i>	<i>1981-1995</i>	<i>2.0%</i>
<i>Conant Rd.</i>	<i>W. of Searles Rd.</i>	<i>1,650</i>	<i>1982-1995</i>	<i>7.6%</i>
<i>Searles Rd.</i>	<i>W. of Mill Pond Dr.</i>	<i>2,100</i>	<i>1989-1995</i>	<i>-2.9%</i>
<i>Searles Rd.</i>	<i>at Salmon Brook</i>	<i>3,000</i>	<i>NA</i>	<i>NA</i>
<i>Ridge Rd.</i>	<i>W. of Middle Dunstable</i>	<i>3,800</i>	<i>1985-1995</i>	<i>12.0%</i>
<i>Middle Dunstable Rd.</i>	<i>W. of E. Dunstable Rd.</i>	<i>1,050</i>	<i>NA</i>	<i>NA</i>
<i>Buck Meadow Rd.</i>	<i>S. of Conant Rd.</i>	<i>800</i>	<i>NA</i>	<i>NA</i>
<i>Gilson Rd.</i>	<i>S. of Musket Rd.</i>	<i>800</i>	<i>NA</i>	<i>NA</i>

Source: Nashua Regional Planning Commission traffic counting program

NRPC's findings summarized in the above table are as follows:

Table III - 3 presents current weekday traffic counts and trend analysis at twenty locations throughout the study area. For most locations, previous data exist which enable growth trends to be established. It should be noted that growth rates for corridors are not necessarily directly comparable.

For example, one roadway may show a growth rate for the 1980-1995 period, which is truly representative of a long-term trend during periods of growth and economic slowdown. Another roadway which has a growth rate only for the 1989-1995 period would be expected to have a much lower, and in some cases negative, rate of growth, since the data were collected during a period of economic recession, followed by much slower growth than prevailed throughout most of the 1980's.

The high rates of growth in traffic along East Dunstable Road, Spit Brook Road and Lamb Road reflect the rate of development that has occurred in the southeastern portion of Nashua. These three roads provide an east-west corridor linking the Southwest Quadrant and points west with south Nashua and the F.E.E. Turnpike. East Dunstable Road east of Lamb Road has risen from 5,900 in 1980 to 11,600 at present, representing an average annual growth rate of 4.6%. Spit Brook Road east of East Dunstable Road has increased from a level of 10,150 daily vehicles in 1989 to 13,400. This not only produces a robust yearly growth rate of 4.4%, but the analysis time frame represents a period of much lower economic activity regionally than had previously occurred. This trend indicates the degree to which the Spit Brook Road/Daniel Webster Highway industrial/commercial area continued to develop while the remainder of the region was experiencing recession. Lamb Road, serving as a link between East Dunstable Road and Spit Brook Road, has risen from 3,125 in 1984 to 6,500, resulting in a very high growth rate of 6.9% per year. Continuation of these growth trends would seriously impact the ability of these roadways to accommodate daily traffic at acceptable levels of service.

Further to the east in the area of Exit 1, of course, the road system has reached extreme levels of congestion and delay. Roads to the west of East Dunstable Road experience much lighter traffic volumes, although some have experienced high rates of increase. Ridge Road, which provides a link between Route 111A and the Exit 1 area, has a weekday volume of only 3,800 but has grown at an average annual rate of 12% over the past decade.

#### b. Future Traffic Conditions and Projections

NRPC projected future traffic volumes to the year 2015, using their regional model as modified for this study. They added new roadway links to incorporate local streets not in the regional model and broke up the large traffic analysis zones (TAZs) into smaller zones, allowing a more precise assessment of baseline conditions and more accurate projections. Projections of vehicle trips, turning movements and future roadway conditions are all based on the future number of housing units estimated for the TAZs. The existing and projected traffic model land use inputs are found in Table III - 4 on the next page. A map of the TAZs is found on page 115.

TABLE III - 4

EXISTING AND 2015 PROJECTED TRAFFIC MODEL LAND USE INPUTS

TAZ	Housing Units				Total Employment			
	1995	2015 Additional	2015 Total	Pct. Change	1995	2015 Additional	2015 Total	Pct. Change
45	95	90	185		2533	1759	4292	
49	1899	20	1919		29	0	29	
50	350	130	480		25	0	25	
78	1642	60	1702		335	18	353	
79	38	75	113		30	0	30	
80	158	220	378		17	3	20	
331	115	50	165		0	0	0	
332	160	75	235		0	0	0	
333	52	70	122		24	6	30	
334	28	160	188		29	86	115	
335	25	40	65		0	0	0	
336	1	20	21		0	225	225	
337	132	15	147		119	0	119	
338	7	100	107		24	0	24	
339	50	90	140		13	0	13	
340	73	0	73		2	0	2	
341	250	40	290		13	0	13	
342	189	35	224		23	0	23	
343	138	0	138		44	0	44	
<b>TOTAL</b>	<b>5402</b>	<b>1290</b>	<b>6692</b>	<b>23.9%</b>	<b>3260</b>	<b>2097</b>	<b>5357</b>	<b>64.3%</b>

Source: Nashua Regional Planning Commission projections

NRPC states that: "A total of 1,290 additional housing units is estimated for the area, representing a substantial decline from the projections of several years ago, when full-build of the former Hall's Corner residential development was under consideration. That project would have added about 3,400 units within just a few of these zones. The total projected housing unit growth for the study area at the time was about 7,600. The present estimate represents about a 24% increase from the present number of housing units in the area."

The 1,290 additional housing units is somewhat higher than the 1,169 new and approved but not built units estimated in this Future Land Use Plan, because the area modeled in the traffic study includes areas beyond the southwest corner modeled in the build-out analysis. Most of the additional units are "infill" units to the north and east of the southwest corner build-out area. Several non-residential land uses are also included in the future conditions analysis. These include approximately 500,000 sq. ft. of park industrial / office space north of Spit Brook Road and 75,000 sq. ft. of village commercial space at the crossroads area. For non-residential land uses, traffic projections are based on projected employment, using the standards and multipliers found in the Institute of Transportation Engineers Trip Generation Manual.

# MAP III - 5

## SOUTHWEST QUADRANT STUDY TRAFFIC ANALYSIS ZONES



Overall, by the year 2015, employment in the study area is projected to increase by 2,097, a 64% increase over existing employment.

Projected 2015 Weekday Traffic Volumes

TABLE III - 5

**SOUTH NASHUA TRAFFIC STUDY - PROJECTED 2015 TRAFFIC VOLUMES**

<i>Highway</i>	<i>Location</i>	<i>1995 Count</i>	<i>2015 Estimate</i>	<i>Percent Change</i>
<i>NH 111A Main Dunstable Rd</i>	<i>W. of NE Blvd.</i>	<i>13,800</i>	<i>20,000</i>	<i>44.9%</i>
<i>NH 111A Main Dunstable Rd</i>	<i>W. of Acacia St.</i>	<i>4,500</i>	<i>8,400</i>	<i>86.7%</i>
<i>NH 111A Groton Rd</i>	<i>Nashua/Hollis Line</i>	<i>3,500</i>	<i>7,000</i>	<i>100.0%</i>
<i>NH 111 W. Hollis St.</i>	<i>Nashua/Hollis Line</i>	<i>9,500</i>	<i>13,800</i>	<i>45.3%</i>
<i>East Dunstable Rd.</i>	<i>S. of Timberline Dr.</i>	<i>12,300</i>	<i>17,900</i>	<i>45.5%</i>
<i>East Dunstable Rd.</i>	<i>S. of New Searles Rd.</i>	<i>8,600</i>	<i>12,600</i>	<i>46.5%</i>
<i>East Dunstable Rd.</i>	<i>N. of Lamb Rd.</i>	<i>7,500</i>	<i>10,000</i>	<i>33.3%</i>
<i>East Dunstable Rd.</i>	<i>E. of Lamb Rd.</i>	<i>11,600</i>	<i>17,700</i>	<i>52.6%</i>
<i>Spit Brook Rd.</i>	<i>E. of E. Dunstable Rd.</i>	<i>13,400</i>	<i>18,600</i>	<i>38.8%</i>
<i>Lamb Rd.</i>	<i>W. of E. Dunstable Rd.</i>	<i>6,500</i>	<i>10,150</i>	<i>56.2%</i>
<i>New Searles Rd.</i>	<i>W. of E. Dunstable Rd.</i>	<i>3,800</i>	<i>5,900</i>	<i>55.3%</i>
<i>Harris Rd.</i>	<i>W. of Friar Tuck Ln.</i>	<i>3,400</i>	<i>6,950</i>	<i>104.4%</i>
<i>Conant Rd.</i>	<i>E. of NH 111A</i>	<i>4,550</i>	<i>5,300</i>	<i>16.5%</i>
<i>Conant Rd.</i>	<i>W. of Searles Rd.</i>	<i>1,650</i>	<i>5,000</i>	<i>203.0%</i>
<i>Searles Rd.</i>	<i>W. of Mill Pond Dr.</i>	<i>2,100</i>	<i>2,950</i>	<i>40.5%</i>
<i>Searles Rd.</i>	<i>at Salmon Brook</i>	<i>3,000</i>	<i>3,350</i>	<i>11.7%</i>
<i>Ridge Rd.</i>	<i>W. of Middle Dunst Rd</i>	<i>3,800</i>	<i>8,050</i>	<i>111.8%</i>
<i>Middle Dunstable Rd.</i>	<i>W. of E. Dunstable Rd.</i>	<i>1,050</i>	<i>1,900</i>	<i>81.0%</i>
<i>Buck Meadow Rd.</i>	<i>S. of Conant Rd.</i>	<i>800</i>	<i>2,200</i>	<i>175.0%</i>
<i>Gilson Rd.</i>	<i>S. of Musket Rd.</i>	<i>800</i>	<i>1,100</i>	<i>37.5%</i>

Source: Nashua Regional Planning Commission

Table III - 5 presents the twenty-year traffic projections for the study area. The data indicate that long-range traffic growth is not projected to be uniform throughout the study area, but rather what is expected are large percentage increases along some roadways but only modest increases on others. In addition to the pattern of projected future land use growth, the opening of Exit 2 to traffic in 1997 and the widening of the Sagamore Bridge are expected to alter existing travel patterns.

While the major impacts of the new interchange are expected to be on traffic originating from the north via the Turnpike and Daniel Webster Highway, there are likely to be some changes in the travel paths of persons traveling from the southwest quadrant area of Nashua. Overall, traffic growth in south Nashua is projected to be somewhat higher than average for the region. Daily volumes along south Nashua roadways is projected to increase by 54% by 2015, representing an average annual rate of growth of 2.2%. The regional growth rate for Nashua area roadways is 1.5% per year.

NRPC then goes on to discuss the projections in light of previously planned highway projects, such as the Southwest Parkway, and qualifies their projections by noting that forecasts like this one can be rendered obsolete by changes in the rate and amount of growth and other factors:

Previous estimates of high levels of residential, commercial and industrial development resulted in projections of a number of south Nashua's roadways operating at, or greater than, full capacity by the end of the twenty-year planning period. The conclusion was reached that a Southwest Parkway, running from Route 101A in the northwestern area of Nashua to the new Turnpike Exit 2 in south Nashua, was required in order to alleviate future congestion on the Turnpike, secondary and local roads in Nashua. The Parkway was estimated to carry about 47,000 vehicles per day at its intersection with Spit Brook Road by 2015.

The scaling back of future estimated land use growth by the Nashua Planning Department during the 1992-1995 period resulted in the purpose and need for a Southwest Parkway project not being established. While the data presented in Table III-4 represents the most recent estimates by Nashua, based upon a comprehensive buildout analysis which incorporates the latest assumptions regarding future zoning, environmental constraints and market demand for developable land, it must be noted that changes to land use estimates can and do change significantly. Any future revisions to the 2015 estimates could result in significant changes to future projected traffic volumes in the area. Consequently, such revisions could substantially alter the conclusions regarded needed improvements to the roadway system in south Nashua.

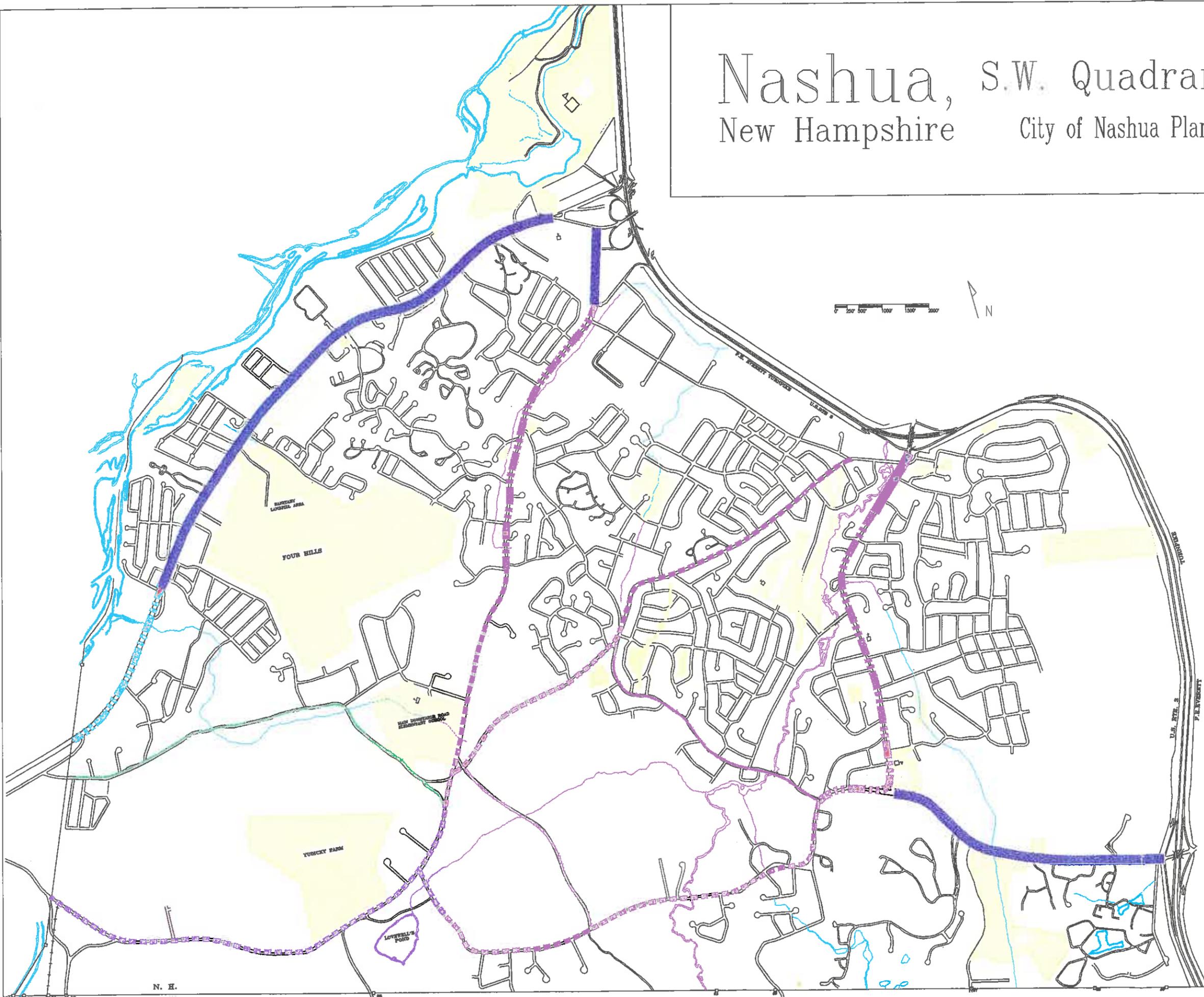
Map III - 6 on the next page illustrates projected future traffic volumes. This graphic presentation highlights those roadways which are expected to carry the most traffic, and which may most warrant improvements in the future.

# Nashua, S.W. Quadrant Master Plan

New Hampshire City of Nashua Planning Department 1995

MAP III - 6

## S.W. Quadrant Future Ave. Daily Traffic Volumes



**LEGEND:**

-  1,000 - 5,000 ADT
-  5,000 - 10,000 ADT
-  10,000 - 15,000 ADT
-  15,000 - 20,000 ADT

 Municipal Property

NOTE: ADT means "average daily trips" and is the average of Monday through Friday traffic volumes.

Source of data:  
Nashua Regional Planning  
Commission

## Intersection Capacity Analysis

In addition to projecting traffic volumes, another analysis often used by transportation planners is Intersection Capacity Analysis. This analysis measures the level of ease (or difficulty) encountered by a motorist in navigating through an intersection. A key factor in capacity analysis is the effect of traffic volumes and flow on the Level of Service (LOS). NRPC's report defines the different levels of service, and how the LOS at key intersections will likely be effected by the increased traffic volumes (at build-out or in the year 2015) discussed above. As NRPC's report is very thorough in discussing this matter, key sections of it are reproduced below:

Intersection level of service analyses (LOS) were performed for the intersections in south Nashua where peak hour traffic counts were conducted in order to determine the level of traffic operations. Level of service (LOS) is a term which denotes the type of operating conditions that occur along a roadway or intersection for a given period of time, generally a one hour peak period. It is a qualitative measure of the effect of a number of operational factors including roadway geometrics, travel delay, freedom to maneuver, and safety.

Level of service categories for two-way stop-controlled (TWSC) intersections are described as follows:

- ◇ LOS A represents a condition with little or no delay to minor street traffic.
- ◇ LOS B represents a condition with short delays to minor street traffic.
- ◇ LOS C represents a condition with average delays to minor street traffic.
- ◇ LOS D represents a condition with long delays to minor street traffic.
- ◇ LOS E represents operating conditions at or near the capacity level, with very long delays to minor street traffic.
- ◇ LOS F represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme delays resulting.

**LEVEL OF SERVICE CRITERIA**

Level of Service	Stopped Delay per Vehicle (Seconds)	
	TWSC Intersection	Signalized Intersection
<i>A</i>	$\leq 5.0$	$\leq 5.0$
<i>B</i>	5.1 to 10.0	5.1 to 15.0
<i>C</i>	10.1 to 20.0	15.1 to 25.0
<i>D</i>	20.1 to 30.0	25.1 to 40.0
<i>E</i>	30.1 to 45.0	40.1 to 60.0
<i>F</i>	> 45.0	> 60.0

Source: *Highway Capacity Manual*

The above table summarized the levels of delay for each level of service at unsignalized and signalized intersections. Please see the Appendices in the Technical Reference for a more detailed discussion.

The key findings of the capacity analysis for the **unsignalized** intersections are found below and summarized in Table III - 6 on the next page.

- ◇ Route 111A/Gregg Road - Large projected increases in through traffic along Route 111A (Groton Road) are responsible for the current intersection LOS B falling to F, with a 73 second delay, for minor street movements by 2015. The shared lane configuration on Gregg Road is a contributing factor to the high level of delay, along with the substantial growth projected in through traffic on Route 111A, thereby reducing available gaps for vehicles turning from Gregg Road. At LOS F, the intersection would be a candidate for improvements.
- ◇ Route 111A/Old Ridge Road - LOS for shared lane left and right turns from Old Ridge Road is projected to drop from B to D over the next twenty years. While this represents a significant decrease in convenience for minor street movements, the intersection would still operate at an acceptable standard.
- ◇ Route 111A/Ridge Road - LOS is projected to drop from B to F over the next twenty years for minor street movements, as a substantial increase in left turns from Ridge Road is projected, in addition to a more than doubling of traffic along Route 111A.
- ◇ New Searles Road/East Dunstable Road - The minor shared lane approach from New Searles now operates at LOS C. Traffic from New Searles is presently light, but faces relatively high volumes in the northbound direction on East Dunstable Road. In twenty years about a 50% projected increase in traffic from both approaches is expected to reduce LOS for New Searles traffic to F. This intersection should also be considered for improvements for the long-run.
- ◇ Lamb Road/East Dunstable Road - The intersection at present operates at LOS D, with a 25 second delay. Although some Nashua officials have expressed the desire to signalize the intersection at the present time, this does not appear to be warranted, based on the existing LOS and hourly volumes on the main and minor streets that are used to establish a signal warrant. However, over the twenty-year period LOS is projected to drop to F, with delays being incalculable (but greater than 120 seconds). Clearly, major improvements to the intersection, including signalization, should be considered for the twenty-year planning period.

For the **signalized intersections**, no major future deficiencies are projected. It should be noted that the future analysis was conducted under the assumption of signal optimization, i.e., allocating the proper amount of green time to each signal phase in order to achieve the lowest possible delay for the intersection overall. Because future traffic growth will not be uniform for all approaches, it will be necessary to implement signal timing modifications in order to achieve this. Specific changes that are anticipated will be necessary are detailed in the recommendations section.

**TABLE III - 6**

**SUMMARY  
UNSIGNALIZED INTERSECTION LEVEL OF SERVICE**

<b>INTERSECTION</b>	<b>PRESENT LEVEL OF SERVICE (L.O.S.)</b>	<b>PROJECTED L.O.S. YEAR 2015</b>
Route 111A / Gregg Road	B	F
Route 111A / Old Ridge Road	B	D
Route 111A / Ridge Road	B	F
New Searles Road / East Dunstable Road	C	F
Lamb Road / East Dunstable Road	D	F

NOTES: The Level of Service Projections were performed by the Nashua Regional Planning Commission and indicate what the L.O.S. could fall to if no improvements are made to the intersections. Please see the text on the previous page for a more detailed discussion.

## Key Roadway Improvements

Note: Large face bold letters refer to the key on Map III - 7 on page 131.

- ◇ **Ridge Road** - Ridge Road is projected to increase from 3,800 vehicles per day (vpd) to 8,050 in 2015. To the east of the narrow bridge, there exists a 30-foot paved cross-section, with several feet of unpaved shoulders. The cross-section narrows to 24-feet of paved pavement west of the bridge, with little to no shoulders. The road is generally in poor shape and in need of reconstruction and drainage improvements. The drainage system for Ridge Road in the vicinity of Salmon Brook and the intersection of Buck Meadow Road is in need of improvement. A short section of the road just west of this intersection becomes flooded and the drainage ditches fail to keep storm water from the road surface as Ridge Road approaches Salmon Brook. Instead of running off into the ditches, the storm water runs downhill on the road surface. Furthermore, Ridge Road needs resurfacing throughout its entire length due to pot holes and extensive surface raveling and cracking. At present, the road does not have a proper tapered crown to allow for rain water to enter ditches at the site of the road. NRPC recommends that the road be reconstructed and maintained as a two-lane cross-section, but that it be widened to provide four-foot paved shoulders. This will improve safety and drainage and will facilitate bicycle travel. Along the narrow segments, there may be some encroachment on property resulting from roadway upgrade.
- ◆ **Route 111A, Main Dunstable Road / Groton Road** - Route 111A (Groton Road) at the Nashua-Hollis line is projected to rise from 3,500 vpd in 1995 to 7,000 by 2015, as it takes on a greater function as an east-west collector in conjunction with Ridge Road. Route 111A is currently in need of surface improvements due to extensive edge cracking in the vicinity of Ridge Road and also lacks adequate shoulders. Further to the north, Main Dunstable Road at Acacia Street is projected to rise by 87% to 8,400 vpd. NRPC recommends the same level of future upgrade as is identified for Ridge Road, entailing reconstruction and widening to provide for a 32-foot pavement section that includes four foot shoulders.
- ◇ **Conant Road** - Conant Road is projected to rise from 1,650 vpd at present to 3,750 west of Searles Road, but only moderate growth from 4,550 to 5,550 east of Route 111A is projected. Extensive longitudinal and transverse cracking, potholes and drainage deficiencies are evident along the road. Roadway reconstruction will be needed at some point during the long-range planning horizon, due to the deficiencies noted. Widening of the roadway to provide additional travel lanes is not warranted, however. Since the road has been identified as a bicycle route in the regional bicycle plan, construction of four-foot paved shoulders at the time of reconstruction is desirable. There may be some problems in terms of property impacts between McKenna Drive and Searles Road, however. This may mean that construction of bicycle paths less than the desired four-foot width might be constructed along this segment.

- ◇ Lamb Road - Lamb Road west of East Dunstable Road is projected to rise from 6,500 vpd to 10,050 over the next twenty years, a higher than average rate of growth. The road is somewhat below the design standard for a collector, providing 11-foot lanes and little to no shoulder. Upgrading the roadway to proper design standards for a two-lane cross-section by providing 12-foot lanes and a 4-foot pedestrian/bicycle path would impact private property. Yet, this road provides the only link between the southwest quadrant and the turnpike and south Nashua commercial areas. Consequently, higher than projected growth rates in land use for the southwest quadrant or Exit 1 area could mean traffic volumes well in excess of the current estimate of 10,000. As higher traffic volumes impact the roadway pavement over future years, requiring reconstruction at some point, the City will need to develop a widening policy for this difficult roadway segment.
- ◇ Spit Brook Road - Spit Brook Road east of East Dunstable Road is projected to rise 39% from 13,400 to 18,600 by 2015. Although Spit Brook Road tapers to one lane in each direction west of Tara Boulevard, eight-foot breakdown lanes are provided. This effectively provides a separate lane for right-turning vehicles and permits through vehicles to bypass stopped left-turning vehicles. If 20,000 vpd is accepted as a minimum level for providing two-through lanes per direction, then it would appear that this threshold will not be met by the end of the twenty-year planning time frame. The City may want to consider narrowing the breakdown lanes to four-foot bicycle lanes and providing a center turn lane. This would require about a four-foot addition to the paved cross-section.
- ◇ Village / Commercial Access Road Connecting Conant and Buck Meadow Roads (A) - The Master Plan identifies a new road connecting Conant Road to Buck Meadow Road through the Village-Commercial area, and the reconfiguration of the intersection of Buck Meadow and Main Dunstable Road into a four-way intersection opposite Gilson Road. The project concept should be used as a starting basis for consideration of the proposed development during the site plan review process.

- ◇ Searles Road / Conant Road / Harris Road Intersection (B) - The draft Master Plan states that this “unsymmetrical four-way intersection is presently not signalized and the City is concerned that as the buildout of the southwest corner proceeds it may become dangerous if no improvements are made”. It actually includes two separate intersections - Searles Road/Conant Road and Conant Road/Harris Road with an additional intersection in between at Conant Road/Newburg Road. Hence, the focus should be on improvements that can be made separately to the two intersections.

At the intersection of Conant Road and Searles Road, there exists an acute angle for turns from Conant to Searles, as well as some limitation of sight distance for vehicles from Searles. The sight distance limitation is not severe, however, as the Searles intersection flares out for right turns, thus facilitating these movements. The left turn volume is only about one-third that of the right turns, but require more caution on the part of drivers. Reducing the acuteness of the right angle turn would likely result in impacts to a property at the corner of Conant/Searles and would probable further reduce sight distance for left-turning vehicles. The intersection can continue functioning into the future under its present configuration, since low growth is projected for this area.

At the Conant/Harris intersection, action was taken a number of years ago to form a T-intersection with traffic from Harris being the minor street approach. No longer can vehicles proceed directly from Conant to Harris merely by bearing right; they must take a hard right turn. However, a full reconstruction of the intersection was not undertaken. It would be an aesthetic improvement to remove the excess pavement on Conant Road, replace it with a green area and re-define Conant Road using edge striping. Removing the barriers would also provide better visibility to the intersection with Harris Road.

- ◇ Searles Road - Searles Road, from Conant Road to Salmon Brook, is recommended in the Master Plan Update for upgrading to provide wider travel lanes and shoulders, while remaining a two-lane cross-section. This is another corridor where properties will be impacted by this action, making implementation a difficult proposition.

- ◇ Construct Access / Egress Roads to the Flatley-Digital Area (C) - A condition when the property was rezoned to Park Industrial was that "No development within the area of this rezoning may take place unless sufficient vehicular capacity exists at Exit 1 and/or Exit 2 (when constructed) as determined through acceptable traffic engineering studies." The NRPC forecasts that the year 2015 afternoon peak hour left turn movement from the Turnpike northbound off-ramp to Spit Brook Road westbound will exceed full capacity conditions at a volume-to-capacity ratio of 1.10. Average delay is estimated at 91 seconds, a level of service F condition. However, the entire intersection is projected to operate at LOS D, which is still an acceptable service level for an urban area intersection. An improvement in LOS from the off-ramp left turn movement could be achieved by adjusting signal timing. Based on the projected traffic growth, it does not appear that the Flatley development in the amount of 500,000 square feet would violate the 1983 conditional approval.

For emergency response reasons and for improved circulation, it would still be desirable to construct additional access/egress roads to the developable area in order to improve access from the west and lessen congestion at the Lamb Road/East Dunstable Road intersection, projected to reach failure level by 2015 if left unsignalized. One potential alternative would make use of an existing gravel right of way in the vicinity of the new day care center on Spit Brook Road. If improved to a public road, the access could be extended to the north to the Digital and Flatley properties.

- ◇ Buck Meadow Road - Buck Meadow Road is projected to increase from 800 vpd in 1995 to 2,200 in 2015. The roadway width is 22-feet, which is appropriate for its current traffic level, but the pavement is in very poor condition. Given the plans to locate commercial development in the vicinity of the Main Dunstable/Conant/Buck Meadow junction, which will play a large role in the projected future traffic level of 2,200, an upgrade program is recommended. The entire stretch of Buck Meadow is rural; thus, adequate setbacks exist, allowing an upgrade to be undertaken without encroaching upon structures. Reconstruction of the entire roadway should be done prior to opening of the commercial development, and should entail upgrade to 12-foot lanes with 4-foot paved shoulders. It is likely that the reconstruction project would result in somewhat higher levels of traffic than projected, since the traffic model was calibrated to reflect the fact that Buck Meadow is a somewhat undesirable roadway at present. This would be desirable, since it may divert some traffic away from Ridge Road, Conant Road and Searles Road. The future need to improve these roads, where property impacts are likely to be substantial, may then be lessened.

Realignment at the intersection with Ridge Road (D) should be evaluated at the time the area is proposed for development, before options are foreclosed.

## Key Intersection Signalization Improvements

Implement signalization timing changes as needed in the future as traffic volumes increase and changes occur in traffic distributional patterns. These changes are projected to result in a number of existing signal phases operating at overcapacity in the future, while others will have remaining capacity available for transfer to other phases. Based on the long-range traffic growth projections and the signal plans currently in effect, as provided by the New Hampshire Department of Transportation, changes in signal timing at the following locations will be needed in order to produce optimized capacity conditions.

- ◆ Spit Brook Road/Turnpike Northbound Ramps - Under existing signal plans, left turns from the Turnpike off-ramp to Spit Brook Road would operate at a v/c ratio of 1.10, delay of 91 seconds and LOS F by 2015. The entire intersection would be at LOS D. By transferring green time from the through phase on Spit Brook Road, the off-ramp phase can be improved to LOS D and the intersection overall would improve to LOS C.
- ◆ Spit Brook Road/Tara Boulevard - Without any changes to signal timing, the through/left turn movement from Tara Boulevard is projected to operate at a v/c ratio of 0.99, delay of 46 seconds and LOS E. The intersection overall is projected to operate at LOS D. Reallocating green time from the northbound movement from Black Oak Drive to the Tara Boulevard left/through movement would improve LOS to D for that approach and from D to C for the intersection overall.
- ◆ East Dunstable Road/Harris Road - With the current signal timing, left turns from East Dunstable Road to Harris Road would be at a v/c ratio of 0.97, with delay at 65 seconds, resulting in LOS F. A significant improvement can be achieved by reallocating green time from the East Dunstable Road southbound phase. Overall intersection delay and LOS would not be measurably impacted by this action.
- ◆ East Dunstable Road/Turnpike Northbound Ramps - Left turns from the Turnpike off-ramp are projected to be at a v/c ratio of 1.02, delay of 47 seconds and LOS E, under the existing signal phasing. Left turns from East Dunstable Road to the Turnpike on-ramp are projected at LOS D, with a 25 second delay. These two movements would improve to C with a reallocation of green time from the East Dunstable Road through phase. The intersection overall would improve from LOS C to B.

- ◆ Improve and Signalize the East Dunstable Road/Lamb Road Intersection (E) - The intersection is projected to operate at LOS F by 2015, indicating that mitigation measures will be needed. Providing a slip right turn lane from East Dunstable Road westbound to East Dunstable Road northbound may partially alleviate the problem, if it can significantly lengthen gaps for drivers stopped at the intersection. To do this would require a fairly lengthy slip lane in order to provide the stopped drivers with sufficient time to differentiate between right-turning and through vehicles. It is recommended that this improvement be undertaken as a first measure, in order to delay the need for signalization. The need for intersection widening is likely to occur at the time of the planned 500,000 square foot commercial development on the Flatley property. Signalization should be proposed as a state project when signal warrants are met and congestion levels are such that there exists a consensus for the project. Meeting signal warrants alone does not mandate signalization; it merely establishes a minimum requirement for implementing the action.

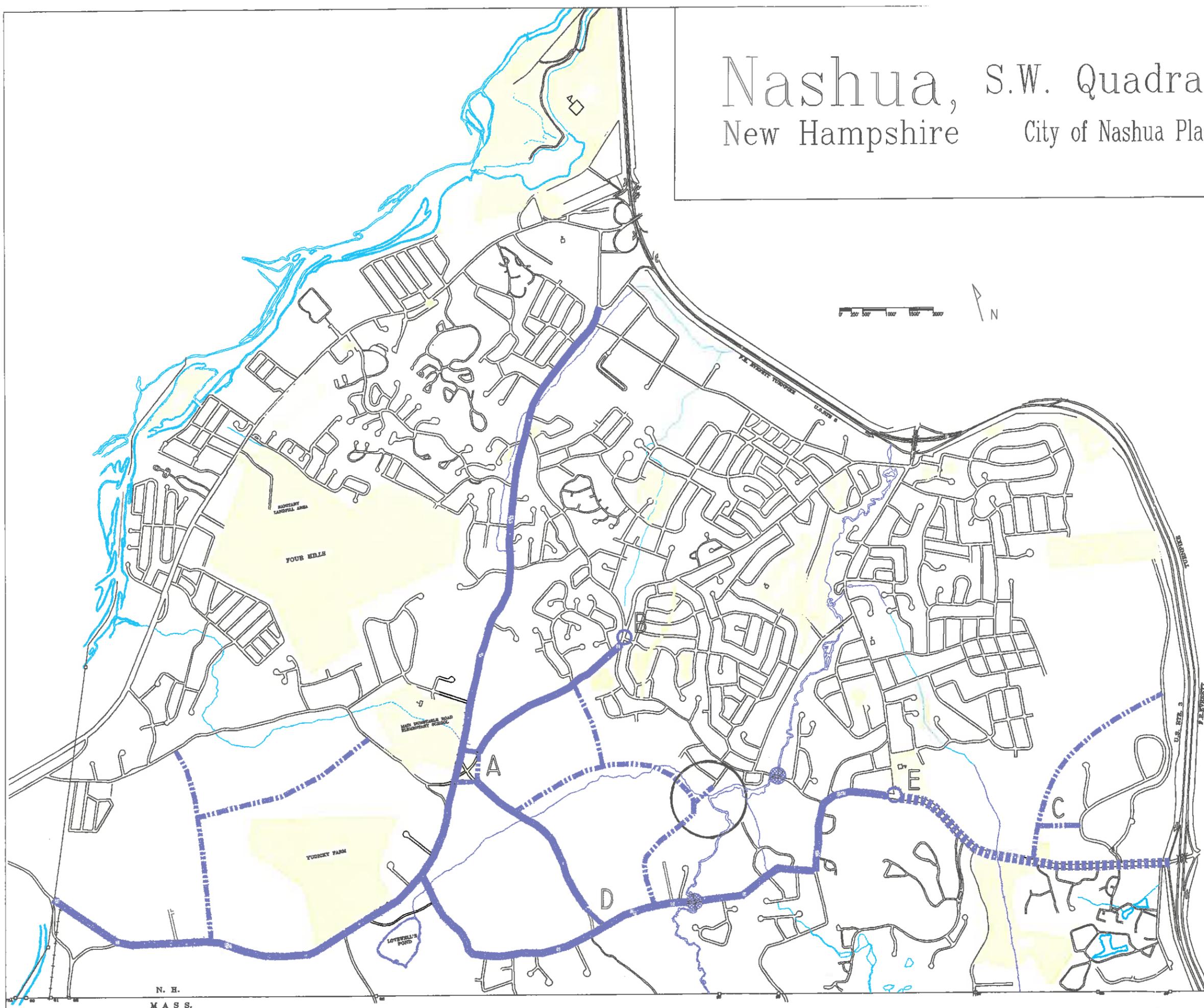
The following unsignalized intersections should be upgraded to provide separate left and right turn lanes: Route 111A/Gregg Road, Route 111A/Ridge Road and New Searles Road/East Dunstable Road. These intersections are projected to operate at LOS F for the shared lane minor street approach. Providing separate left and right turn storage lanes would improve LOS for left turns to E and right turns to A in the year 2015.

# Nashua, S.W. Quadrant Master Plan

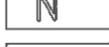
New Hampshire City of Nashua Planning Department 1995

MAP III - 7

## S.W. Quadrant Recommended Road Improvements



**LEGEND:**

-  Widened Two-Lane Section
-  Widened to Three-Lane Section
-  Roadway Realignment
-  Approximate Location of New Collector/Access Roads
-  Municipal Property
-  Road Improvement Keyed to Text, Pages 124-129
-  Repair and Reconstruct Bridges

NOTE: The actual location of new collector roads would be determined as part of the subdivision or development review process.

## Summary of Road Improvement Recommendations

As a result of the reduced plans for development in Nashua's Southwest Quadrant (as compared to the mid-late 1980's), a plan for widening the subarea's roadways to provide additional travel lanes is not anticipated to be needed during the twenty-year time frame of this study. Upgrading of roadways where significant traffic increases are projected, however, to 12-foot lanes and up to 4-foot paved shoulders for bike lanes, is recommended as a long-range improvement program. These upgrades should be conducted as development warrants or as existing roadway pavements reach the end of their useful life cycle.

It needs to be recognized, however, that just as current land use growth estimates for the Southwest Quadrant have changed significantly over the past few years, the ultimate degree of development for the area may be higher or lower than now anticipated. Actual growth for areas outside of the Southwest Quadrant may also differ from present projections, and any deviance from previous growth estimates could also impact future traffic volumes in the area. These recommendations are based on projected land use development patterns and the ability of the NRPC regional traffic model to correctly distribute future trips that are generated by new development. Future improvements to the roadway network and changes to traffic signal control should only be implemented based on actual traffic need, not expectations of future growth. The City should closely monitor the rate of actual growth in the Southwest Quadrant and its impact on traffic volumes, through use of the NRPC's automatic traffic count program. The City should also inform NRPC whenever significant changes to land use growth are anticipated, so that updated traffic forecasts can be generated for the area as part of NRPC's assistance to its member communities.

## Traffic Study and Road Improvement Conclusions

As seen in the preceding section, NRPC does not believe that providing additional travel lanes will be necessary given the level of development estimated in this Plan. For the most part, upgrading the area's well traveled roadways to provide two - twelve foot travel lanes, plus four foot paved shoulders, for a total paved cross section of thirty-two feet, is enough to facilitate the flow of traffic to accommodate anticipated growth.

Perhaps the most important road improvement to address is the widening of Lamb Road. As NRPC's report indicates, this road provides the only direct link between the developing southwest corner and the turnpike and south Nashua commercial areas. As such, it serves as a narrow bottleneck through which large volumes of traffic must flow. However, the narrowness of the road and its shoulders, coupled with the properties directly abutting, will make any road widening project a difficult undertaking. A plan for approaching this project would therefore be a wise undertaking for the near future. In addition, those roadways exhibiting severe degradation, such as Buck Meadow Road, should be reconstructed in the near future before they pose a serious travel hazard.

Providing four foot paved shoulders will also provide for bicycle travel and allow cars to pass on the right when encountering cars waiting for left turns. This will also help traffic to flow smoothly. Both the Nashua Trails Plan and the Regional Bicycle Plan recommend bike lanes as a way of encouraging non-motorized travel and increasing the safety of bicyclists. Most of the existing roads in the southwest quadrant are recommended as "on-street trails" in the Nashua Trails Plan, reproduced as Map III - 3 on page 105 of this Plan.

In addition to providing for bicyclists, providing for pedestrian circulation along southwest Nashua's existing and future road network is an important element of any comprehensive transportation strategy. Sidewalks should therefore be provided along any new subdivision streets and along existing roads, where advisable and feasible. A good time to create or improve bicycle and pedestrian routes along existing roads is when work such as road widening, resurfacing or reconstruction is proposed. Therefore, whenever possible, provisions should be made for pedestrian and bicycle use when any major road work is undertaken.

Two projects that should be considered "bare minimum" road improvements for the southwest quadrant are to widen and reconstruct the bridges over Salmon Brook on Ridge Road and Searles Road. Both bridges are narrow, in a bad state of repair and inadequate for today's traffic, let alone for any increases anticipated for the future. The latest estimate by the Public Works Division for this work is \$1 million for both bridges.

It may be possible to have some of this work funded through development exactions on those new subdivisions that can be shown to have a significant impact on them. The same can be said for many of the road improvements described in this Master Plan Update. In reviewing any major subdivision plan in the area covered by this Plan, the Planning Board may want to consider that a detailed traffic study be prepared to determine the level of impact that the development would have on the local road network. It may be possible to determine, in many cases, the "fair-share" proportion of road improvements that should be borne by the City and what should be borne by the applicant / developer.

This Plan cannot anticipate where new subdivision streets will be located in anticipation of plans being submitted. However, the orderly arrangement of new subdivision streets, and their suitable connection to the existing road network, should be ensured. In particular, providing a connection between Gilson Road and Groton Road in the area just west of Yudicky Farm would help to both facilitate the flow of traffic in the area, and reduce emergency vehicle response times (Fire, Police, Ambulance) for residents in the southwest corner. A similar connection between Conant Road and Ridge Road, east of Buck Meadow Road, could have similar benefits.

Therefore, whenever a major residential subdivision is proposed, provision for a through collector street or realignment of the existing road so as to facilitate traffic flow in the area should be considered by the Planning Board in the subdivision review process. When the provision of a new through road or road connection between subdivisions is not possible or desirable, it may be possible to provide emergency only egress or fire lanes. These would be gated ways through which emergency vehicles could pass, but which would not be used for normal traffic. Fire lanes and emergency access roads have previously been used in Nashua and in surrounding communities to reduce response times and provide access to remote areas.

## IV. IMPLEMENTATION STRATEGY

### A. Recommended Action Steps

To realize this Future Land Use Plan for the Southwest Quadrant, certain implementation measures will be necessary. Any sections of Nashua's zoning ordinance, subdivision regulations and other regulatory tools that are guiding the City toward a future counter to that recommended in this Plan should be changed. The Nashua City Planning Board and Board of Alderman are responsible for reviewing and implementing these recommendations. At the end of this section, a recommended timeline for implementation will be given. The following actions are offered as suggestions for implementation.

#### 1. Amendments to the Nashua Zoning Ordinance and Other Land-Use Policy Initiatives

The following amendments and changes to Nashua's zoning ordinance would contribute to the realization of this Plan.

##### a. To help preserve rural character:

- increase the frontage requirements for lots on existing through roads and reduce or keep the existing frontage requirements for lots off new subdivision roads.

(For example, the current frontage requirement in the R-40 district is 120 feet. Using this method, the frontage for lots using a new subdivision road could be 100 feet, while the frontage for lots on an existing road, such as Groton Road, could be 140 feet. A similar provision is now in place in the abutting Town of Hollis' Hollis Open Space Planned Development (HOSPD) ordinance. This would help to preserve a more open appearance along the existing roads and encourage development on the interior of large parcels, where it could be screened from view with buffer strips of vegetation. )

- Examine whether the current minimum open space ratios are sufficient to achieve the objectives of the Nashua Zoning Ordinance and this Plan.

(The minimum open space requirements of both the Cluster and PRD sections of the Nashua Zoning Ordinance are minor in comparison to similar standards in use throughout New Hampshire and New England. Presently, in PRDs, only 20% of the total tract area must be set aside as open space, and up to 75% of that can be wetlands. For Cluster developments, only 10% of the total tract must be set aside as open space, and up to 50% of that can be wetlands. Most similar ordinances from other communities require that at least 30% of the tract be set aside as open space, with no more than 25% - 50% as wetlands. In Nashua's case, where the ability to connect to the sewer system is possible for most areas, a 50% open space requirement would be excessive, but is 10% or 20% even adequate, especially when so much of it can be wetlands?)

- Evaluate cluster zoning and incentives to encourage its use.

(To make the cluster option more attractive to landowners and developers, it might make sense to provide a modest density bonus, perhaps 10% of the total number of units. The extremely high density bonuses possible in PRD's, on the other hand, may need to be reduced, if some of the undesirable elements of the PRD scenarios (high capital costs) are to be precluded. These large bonuses may have made sense in the 70's and 80's, when developments such as Sky Meadow, Meadowview and Ledgewood were being developed, but they make less sense now from both an economic and land-use perspective.)

- Consider creating a "Rural Protection District".

(Such a district could be modeled on the Historic District, as a way to review projects over a certain size (or types of uses) for consistency with rural design standards. These standards should not be as rigorous as for a historic district, but it may be possible to adopt standards that would go beyond the present ordinance in protecting rural character.)

b. To help protect open space and wildlife habitat:

- Identify areas that would be suitable for inclusion in a greenway or greenbelt.

(A greenway is a relatively linear expanse of open space that connects larger areas of protected land, and can provide a means for hikers and other passive recreational users to move through an area without using the road system. Some greenways are designated as wildlife habitat, and are thus off limits to recreational users, while others are developed primarily for recreation and off-road transportation. Greenways have been developed in many parts of New Hampshire. The neighboring Town of Hollis is presently developing a town-wide greenway system. A greenway in Nashua's southwest corner could possibly connect to the Hollis greenway.)

The Appalachian Mountain Club and The Society for the Protection of New Hampshire Forests may be able to assist the City, perhaps through its Conservation Commission, in developing a greenway plan. Land for a greenway does not necessarily need to be purchased outright, but can be protected through conservation easements over private property. Some side benefits of a greenway are that it can help to retain rural character and provide habitat and link green spaces.)

- Evaluate the effectiveness of Nashua's Wetlands Ordinance in protecting this resource, and amend if necessary.

(The recently adopted Nashua Wetlands Ordinance is definitely more protective of wetlands and wildlife habitats than earlier ordinance provisions aimed at wetlands protection. However, in comparison to similar ordinances found elsewhere in New England, it could be stronger. The buffer zone standards and setbacks, in particular, are much less strict than those found elsewhere. For example, in Massachusetts, the statewide wetland law requires a 100-foot buffer zone from all wetlands bordering a major water body or stream. Work can proceed within the buffer zone, but only after Conservation Commission review and approval. There are many municipal wetland ordinances in New Hampshire that could serve as a model for Nashua.)

- The vernal pool identified by the State of New Hampshire's Natural Heritage Inventory Program in the area east of Buck Meadow Road and north of Ridge Road should be mapped and safeguarded from alteration and development.

(Vernal pools, which can be thought of as temporary wetlands, result from snow melt and spring rains, and are critical breeding habitat for many frog and other amphibian species. There is recent scientific evidence of a dramatic drop in amphibian populations in New England and throughout the world. Protection of this habitat could help to ensure the survival of local amphibian populations. With the cooperation of the landowner, it should be possible to locate and map the exact location of the pool in order to protect it should a subdivision ever be proposed in the area. The New Hampshire Audubon Society or a similar group could recommend the proper size buffer area around the vernal pool.)

## 2. Planning Board and Development Review Process

- The City should consider streamlining several elements of the development review process.

(For example, combining ZBA and Planning Board hearings for certain types of uses would shorten the review and approval process. The policy changes to be discussed here, however, are those aimed at bringing about the Future Land Use Plan for the southwest quadrant, rather than being applicable citywide.)

- Evaluate the efficacy of creating a "point system" as a requirement for subdivision approval.

(A Point System is a checklist of quantitative and qualitative design elements, each with a point score assigned to it. To qualify for subdivision approval, the subdivision must earn a certain number of points. Extra bonus points can be given for cluster development, the setting aside of more than the minimum amount of open space, innovative layout, and other desirable elements. The applicant / developer can choose a combination of features in meeting the necessary point total. This is one method of encouraging good design using a positive approach, rather than through prohibitions.)

## 3. Zoning amendment policy

This Future Land Use Plan is intended as a general guide for future development of the southwest quadrant, and is not to be considered an ordinance in its own right. Nevertheless, to bring about the Future Land Use Plan described in these pages, some zoning amendments will be necessary. It is strongly recommended that any proposed zoning amendments be reviewed for consistency with this Plan. Likewise, the existing zoning in the quadrant needs to be assessed as well. The discussion of density ranges and land uses found earlier in this section can serve as a guide for the development of zoning amendments and the review of any rezoning requests. To realize the most positive fiscal, economic, social and environmental future, the recommended densities and land use hierarchy found in this Plan should be followed. There is no one way in which zoning can be written to accomplish the goals and objectives of this Plan. At the same time however, there are just as many ways in which zoning could be written that would be inconsistent with this Plan.

Implementation of this Plan through zoning amendments, careful development review and other initiatives is as important as the Plan itself. Therefore, whenever land use issues for the southwest quadrant are considered, one of the most important questions that can be asked is... "Is this consistent with the Southwest Quadrant Master Plan Update?"

#### 4. Growth Management Techniques and Innovative Controls

Beyond adopting consistent zoning ordinances and other regulations, the City needs to monitor the level and effects of growth on a continuous basis. To reduce capital expenditures, it will be necessary to ensure that the number of dwelling units and commercial uses that connect to the Salmon Brook interceptor (in SW-2), for example, does not exceed 1,000 residential units worth of wastewater volume. If the capacity of the interceptor is exceeded, relief sewer lines may be required, perhaps at great expense.

The City may wish to consider a Sewer Improvement District (SID) for all or part of the presently unsewered areas of the Southwest Quadrant. With a SID, the cost of extending the sewer lines would be divided among the residents of the district, and not among the entire body of City taxpayers. It is a similar idea to a school or solid waste district. In fact, the City may wish to consider establishing a Southwest Quadrant (or Corner) Improvement District (SCID) that would cover all of the capital expenditures necessary to develop this part of the City. Under a SCID, the cost of new schools and additions, portable classrooms, sewer extensions and road improvements would be paid for by the residents of the district. Of course, a "fair-share" approach should be taken, so that the costs attributable to development are separated from the costs attributable to existing land uses. The legal mechanisms and requirements of the various types of special districts should be researched before a move is made to create such a district(s).

One reason that special districts should be explored is that the City is under a spending cap which limits increases in City spending. Under the spending cap, growth in the City budget is tied to the average growth in the Consumer Price Index (CPI) over the last three years. If the most recent average CPI is 2.7%, for example, the City budget can only increase by that amount for the current fiscal year. The spending cap may limit the City's ability to cover the costs of additional growth (primarily residential) because increases in operating budget expenditures for such items as schools, teacher salaries, road improvements etc... would need to be kept under the cap.

Given inflation, worker and teacher contracts, and increases in the costs of materials and labor, it may be difficult for the City to provide the same level of service as it could before a spending cap was in place. Cuts in personnel and spending may be required in several or possibly all City divisions and departments. The spending cap has been in place now (as of early 1996) for only a little over two years, and it is difficult to predict with any accuracy just how it may affect City operations. Capital projects appearing in the Capital Improvements Plan (CIP) and funded as capital expenditures may be exempt from the spending cap. Even so, only a small percentage of the recommended capital projects receive funding in any given fiscal year. For these reasons, the City should carefully monitor the effects of growth on its fiscal condition. If the fiscal impacts of growth should ever become very detrimental, some sort of growth control measure may be needed to slow the pace of growth to one that the City can accommodate.

Growth controls in the form of Timing Incentives and Phased Development come under the guidelines of New Hampshire RSA 674:21, Innovative Land Use Controls. As for Growth Management; Timing of Development, RSA 674:22 states that:

"The local legislative body may further exercise the powers granted under this subdivision (Innovative Land Use Controls) to regulate and control the timing of development. Any ordinance imposing such a control may be adopted only after preparation and adoption by the planning board of a master plan and a capital improvement program and shall be based upon a growth management process intended to assess and balance community needs and consider regional development needs."

If, after analysis, it should prove advisable for the City to draft growth management legislation, it is advised that the Planning Board, Planning Department Staff, Board of Alderman and Corporate Counsel work together in developing such an ordinance. There should be good solid data backing up the rationale for the ordinance, and the conditions under which the growth control measures would be relaxed or abandoned should be made clear.

## B. Recommended Timeline for Implementation

It is recommended that the Planning Board, with the assistance of Planning Department staff, develop a schedule for implementation of the recommendations appearing in and agreed upon in this Master Plan Update for the Southwest Quadrant. The following schedule is given on a semiannual basis, though it should be possible to assign more discrete tasks to shorter time intervals for the final version of this Plan.

### Fall 1995 - Spring 1996:

- Public Hearing on this Southwest Quadrant Master Plan Update was held in September, 1995.
- The Planning Board and Board of Alderman review this Southwest Quadrant Master Plan Update, review the public comments, and, if necessary, make changes and corrections.
- A revised version of this Southwest Quadrant Master Plan Update is prepared.
- Final review and adoption of the Plan by the Planning Board, followed by Aldermanic adoption by ordinance. The Plan is then officially in effect. The implementation stage begins.

### Summer - early Fall 1996:

- Explore possible changes to the zoning districts and permitted uses in accordance with the adopted Future Land-Use Plan.
- Set the parameters under which commercial development near the crossroads or elsewhere in the quadrant can occur. Consider zoning and/or site plan amendments what would address these parameters.

### Late Fall - Winter 1996 / 97:

- Prepare zoning amendments for consideration by the Aldermen.
- The Planning Board and/or Alderman hold public hearing(s) on the proposed amendments.
- The Board of Aldermen vote on the proposed zoning amendments.