



## **Chapter Four: Wastewater and Comprehensive Sewer Plan**

## WASTEWATER AND COMPREHENSIVE SEWER PLAN

The Metropolitan Urban Service Area (MUSA) boundary in general bisects Andover into a northern and southern portion. The southern portion of the City is served by municipal sewer. The northern portion of the City has individual sewage treatment systems (ISTS). Sewer flow from the City of Andover is treated by the Metropolitan Council through the Metropolitan Disposal System (MDS), specifically by the Metropolitan Waste Water Treatment Plant (WWTP) in St. Paul.

### A. CURRENT AND PROJECTED POPULATION / SEWERED RESIDENCES

The City data as of May 1, 2007 shows that the current population of Andover is 32,597. Approximately 21,576 persons (66.2%) are currently served by municipal sewer. The remaining 11,021 persons (33.8%) reside in the rural areas of the City or reside within the MUSA and are still served by septic systems. It is anticipated that residences within the MUSA served by private systems will connect to the municipal sewer system as utilities are extended.

The projected population of Andover in 2030 is 44,578. It is expected that 34,442 persons (77.3%) will be served by municipal sewer at that time. The remaining 10,136 persons (22.7%) will reside outside of the MUSA boundary, or may still be living within the MUSA and will not yet be connected to municipal sewer.

Figure 4.1 below presents the population, household, and employment forecasts for the City for 2007 (current), 2010, 2020, and 2030.

**Figure 4.1  
Population, Household and Employment Forecasts**

	2007	2010	2020	2030
<b>Total Population</b>	32,597	37,392	42,024	44,578
Sewered	21,576	26,306	31,524	34,442
Unsewered	11,021	11,086	10,500	10,136
<b>Total Households</b>	9,938	11,400	14,008	15,921
Sewered	6,578	8,020	10,508	12,301
Unsewered	3,360	3,380	3,500	3,620
<b>Total Employment</b>	4,040	4,494	5,039	5,530
Sewered	3,574	3,989	4,471	4,910
Unsewered	466	505	568	620

**B. CAPACITY AND DESIGN OF THE EXISTING SYSTEM**

All properties serviced by municipal sewer in Andover flow into the Council Interceptor MSB 7035 (Coon Rapids Interceptor), a 36” trunk line that is part of the regional system maintained by the Metropolitan Council. All served properties in Andover except for approximately 110 connections in the southeast corner of the City discharge into the Coon Rapids Interceptor at Crooked Lake Boulevard. These 110 additional connections flow south into lateral systems in Coon Rapids, ultimately flowing into the Coon Rapids Interceptor. These 110 connections are depicted in Figure 4.2 in the Appendix.

The existing sewer system in Andover is operating within the design capacity of the lines (no surcharging) and lift stations. Currently there are nine lift stations in the City. A detailed analysis of the existing system was completed in 2007. The City has divided the existing sanitary sewer system into eight major trunk systems. Each trunk system was analyzed based upon current and ultimate anticipated connections, and existing slope and size. A map of the existing sewer system with tributary areas is included in the Appendix as Figure 4.2. Figure 4.3 provides a summary of each trunk line and lift station along with existing sewer flows and capacities.

**Figure 4.3  
Existing Trunk Line Sewer Flows and Capacities (Dec. 2008)**

Trunk Line	Size	Slope	Peak Capacity (MGD)	Exist. Peak Flow (MGD)	% of Peak Capacity
Bluebird Trunk-North	12” PVC	0.22%	1.40	0.75	53.2%
Bluebird Trunk-South	18” RCP	0.12%	2.52	1.30	51.5%
Pinewood Trunk	18” PVC	0.12%	3.06	0.97	31.7%
Coon Creek Trunk	24” PVC	0.06%	4.66	3.13	67.2%
Crosstown Blvd Trunk	24” RCP	0.08%	4.48	3.70	82.6%
Bunker Lake Trunk-West	24” RCP	0.08%	4.48	1.31	29.3%
Bunker Lake Trunk-East	30” RCP	0.20%	12.85	4.14	32.2%
Crooked Lake Blvd Trunk	36” RCP	0.05%	10.45	5.15	49.3%
Lift Station #1	387 GPM	4” DIP	0.52	0.14	26.0%
Lift Station #2	180 GPM	6” DIP	0.26	0.09	33.7%
Lift Station #3	470 GPM	6” DIP	0.68	0.40	59.4%
Lift Station #4	486 GPM	6” PVC	0.70	0.50	71.5%
Lift Station #5	181 GPM	6” DIP	0.26	0.04	15.2%
Lift Station #6	106 GPM	4” PVC	0.15	0.06	41.5%
Lift Station #7	90 GPM	4” DIP	0.13	0.01	7.6%
Lift Station #8	105 GPM	4” DIP	0.15	0.08	54.2%
Lift Station #9	100 GPM	4” DIP	0.14	0.02	16.9%

### **C. CAPACITY AND PLANS FOR FUTURE SYSTEM**

Currently the MCES has allocated 4.0 MGD of sewer flow in the Coon Rapids Interceptor for the City of Andover. The average projected sewer flow for the City in 2030 is 2.94 million gallons per day (MGD), with a peak of 7.64 MGD. The ultimate average projected sewer flow for the City is 3.12 MGD, with a peak of 8.11 MGD. This ultimate flow would include 100% build out within the MUSA boundary, including connection of all parcels within the current MUSA with septic systems, potential redevelopment within the MUSA, and the potential for some fringe areas adjacent to the MUSA being served at a future date. The City currently does not have plans to extend municipal sewer to the area designated in the Metropolitan Council Environmental Services (MCES) System Statement as “Potential Service” that is north of 161<sup>st</sup> Avenue and east of Verdin Street.

Figure 4.4 provides a summary of the anticipated average and peak sewer flow rates generated by the City of Andover in 5-year increments up to the year 2030. These flow rates are consistent with population, household, and employment projections from the Traffic Analysis Zone’s (TAZ). Projected flow rates were calculated by multiplying the projected households by 225 gallons per unit per day. Based upon actual sewer flow rates from the Metropolitan Council at meter M218 for June 2006 – June 2007, and the actual number of sewer connections during that timeframe, the average flow per connection for Andover was 207 gallons per unit per day. Staff discussions with MCES personnel indicated that the average flow per unit for the metro area is approximately 218 gallons per unit per day. City staff chose to use a value of 225 gallons per unit per day for these calculations to be somewhat conservative and to allow for variation in flow. For commercial / industrial / institutional flows, the number of employees in the sewered portion of the City was multiplied by an assumed flow rate of 35 gallons per employee per day. This rate would include flow from restaurants, schools, businesses, car washes, etc. This flow rate would include flow from employees as well as students, patrons, and customers of these establishments.

**Figure 4.4  
Projected Sewer Flow in 5-Year Increments**

	2007			2010			2015			2020			2025			2030		
	Pop.	Avg. Flow	Peak Flow															
		MGD	MGD															
<b>Total Population</b>	32,597			37,392			39,708			42,024			43,301			44,578		
Sewered	21,576			26,306			28,915			31,524			32,983			34,442		
Unsewered	11,021			11,086			10,793			10,500			10,318			10,136		
<b>Total Households</b>	9,938			11,400			12,704			14,008			14,965			15,921		
Sewered	6,578	1.48	4.29	8,020	1.80	5.05	9,264	2.08	5.84	10,508	2.36	6.38	11,405	2.57	6.93	12,301	2.77	7.20
Unsewered	3,360			3,380			3,440			3,500			3,560			3,620		
<b>Total Employment</b>	4,040			4,494			4,767			5,039			5,285			5,530		
Sewered	3,574	0.13	0.36	3,989	0.14	0.39	4,230	0.15	0.41	4,471	0.16	0.42	4,691	0.16	0.44	4,910	0.17	0.45
Unsewered	466			505			537			568			594			620		
<b>Total Sewer Flow (MGD)</b>		1.61	4.65		1.94	5.44		2.23	6.25		2.52	6.80		2.73	7.37		2.94	7.65

To accommodate the projected sewer flows in the City, there are improvements that will need to be made to the existing system. Three major improvements have been identified that will be necessary to handle the anticipated growth in the City. Each improvement is discussed in further detail in the following sections. No additional connections directly to the Metropolitan Disposal System are planned in the City.

#### Yellow Pine Lift Station

Improvements to the Yellow Pine Lift Station would include construction of a bypass lift station for the Bluebird North Trunk Line located at Yellow Pine Street NW and Crosstown Boulevard. This improvement would divert all of the existing flow in the Bluebird Trunk north of Crosstown Boulevard west to the Pinewood Trunk Line. This improvement will allow increased capacity for development in the Bluebird South Trunk Line, specifically for the areas east of Yellow Pine Street, south of Crosstown Boulevard, north of Andover Boulevard, and extending to the eastern City limits. The manhole and wet well for the Yellow Pine lift station were constructed in 2005. The pumps, controls, and force main necessary to complete the improvements will be constructed in sequence with development east of the Bluebird South Trunk Line. Funding for this improvement would come from the City's Trunk Sewer Fund.

#### Coon Creek Trunk Sewer Line Diversion

The second major improvement project would include diverting a portion of the flow in the Coon Creek Trunk Line into the Bunker Lake East Trunk Line. A flow diverter would be constructed along the Coon Creek Trunk Line at Hanson Boulevard, diverting a portion of the flow south along Hanson Boulevard to Jay Street (Andover Station North) and ultimately into the Bunker Lake East Trunk Line. This improvement would eliminate potential surcharging of the Crosstown Boulevard Trunk Line as development progresses. This improvement will be completed once upstream development increases flows to near capacity in the Crosstown Trunk Line. Funding for this improvement would come from the City's Trunk Sewer Fund.

#### Rural Reserve Trunk Sewer Line

Development of the area referred to as the Rural Reserve will require extension of a new sewer trunk line. This trunk line would connect to the existing Crooked Lake Boulevard Trunk system at Bunker Lake Boulevard and Crooked Lake Boulevard. The trunk line will generally extend north from Bunker Lake Boulevard, following Coon Creek up to South Coon Creek Drive, then extend north through the center of the Rural Reserve up to 161<sup>st</sup> Avenue. There is sufficient grade for this system to be a gravity system, however, a lift station may be constructed to minimize impacts of construction through existing neighborhoods between South Coon Creek Drive and Bunker Lake Boulevard. The trunk line will be designed and constructed once development of the Rural Reserve is imminent. Funding for this trunk line improvement would be paid for through area and connection fees for all parcels within the Rural Reserve.

A map of the proposed sewer system with the aforementioned trunk improvements and tributary areas is included in the Appendix as Figure 4.5.

#### **D. PRIVATELY OWNED TREATMENT FACILITIES**

The northern portion of the City of Andover is located outside of the MUSA boundary. In 2007, there were 3,360 residences in the City that had Individual Sewage Treatment Systems (ISTS). By 2030 it is expected that approximately 3,620 homes will be served by ISTS's. While growth outside of the MUSA is expected to add residences with new ISTS's, it is also anticipated that existing areas within the MUSA currently without municipal sewer service will be added to the system.

Title 10, Chapter 4 of the Andover City Code regulates Individual Sewage Treatment Systems and adopts Minnesota Rules Chapter 7080. The City Code also has adopted the Anoka County Sewage Treatment Ordinance, with modifications that are more restrictive. A copy of this City Code and the Anoka County Sewage Treatment Ordinance are included in the Appendix.

The City Code requires the following items be completed by owners of ISTS's:

- Inspect system and submit a maintenance report to the City every two years.
- Pump systems as often as needed, but at a minimum, every three years.
- Owners must upgrade, replace, or discontinue use of system within six months if the system is found to be non-compliant.
- Systems deemed to be a public nuisance (effluent leaking, noxious odors, etc). must be abated within 30 days.
- Those persons within the City designing, evaluating, installing, maintaining, or pumping individual sewage treatment systems must be certified by the Minnesota Pollution Control Agency (MPCA) as an Individual Sewage Treatment (ISTS) Professional.

The City's Building Official is responsible for ensuring that all systems are in compliance with City Code. The City of Andover Building Department maintains construction, installation, inspection and pumping records for all individual sewage treatment systems in the City. Per City Code, if owner's fail to make necessary repairs or complete pumping and inspections as required, the City has the right to contract out such work and assess the costs to the property.

The City does not currently allow use of communal, or shared treatment system, or experimental or alternate systems. However, the City may consider and allow them on a case-by-case basis in the future.

A copy of the City's National Pollutant Discharge Elimination System (NPDES) permit and State Disposal System (SDS) permit are included in the appendix.

#### **E. INFLOW AND INFILTRATION**

The City of Andover recognizes that inflow and infiltration (I/I) is a problem on a metro-wide scale that could limit the sewer capacity available for growth. Excessive amounts

of I/I also increase fees billed to the cities by the MCES for treatment of wastewater. It is in the best interest of the City to minimize the I/I entering the sanitary sewer system to reduce costs and maintain capacity in the system for future growth.

In general, the City of Andover does not have a significant I/I problem. In conversations with MCES personnel and in correlating the average flow and peak flow metering data from Meter 218 with large rainfall events, it is evident that the I/I in Andover is minor. This can be attributed to a relatively new sanitary sewer system, the presence of sand deposits throughout the City, and the implementation of standard construction and inspection practices for the system.

The following Objectives, Policies and Strategies shall be followed by the City of Andover to ensure that the City maintains the integrity of the sewer system and limit potential sources of I/I.

**Objective:** Maintain the integrity of the Andover sanitary sewer system and minimize potential sources of I/I.

**Policies:** The City of Andover has implemented the following policies to minimize I/I in new and existing sewer systems:

- City inspection of all publicly installed sewer systems to verify compliance with City Standards.
- Adoption of Construction Engineer Association of America (CEAM) Standard Utility Specifications for pressure testing of lines between manholes.
- Video inspection of all newly constructed sewer lines before project acceptance.
- Jet clean and vacuum 20% of existing sewer lines annually.
- Video inspection of existing sewer lines on an annual basis to the extents practicable.
- Require solid manholes covers with concealed pick holes.
- Periodic visual inspection of manholes. Make repairs as necessary.
- Do not allow discharge of residential drainage systems (sump pumps, drain tiles, roof drains, etc.) into the sanitary sewer system.
- Require disconnection of any potential existing residential drainage systems that are connected to the sanitary sewer system.

**Strategies:** The following strategies are used by the City of Andover to achieve the aforementioned objective and policies:

- Ensure inspectors for utility projects have adequate knowledge and training to enforce City Standards for construction.
- Require developer's of newly constructed sewer lines to submit video inspection tapes for review by City staff prior to project acceptance.
- Provide funding to Public Works to annually televise and inspect existing sanitary sewer lines and make necessary repairs.

- Enforce the International Residential Code (IRC), which prohibits discharge of drainage systems (sumps, roof drains, etc.) directly into the sanitary sewer system. A copy of the IRC is included in the Appendix.
- Enforce Chapter 10-2-4F of the City Code stating “No person shall make connection of roof downspouts, foundation drains, areaway drains, or other sources of surface runoff or ground water to a building sewer or building drain which in turn is connected directly or indirectly to a public sanitary sewer unless such connection is approved by the City Engineer for purposes of disposal of polluted surface drainage.”

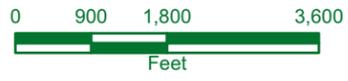
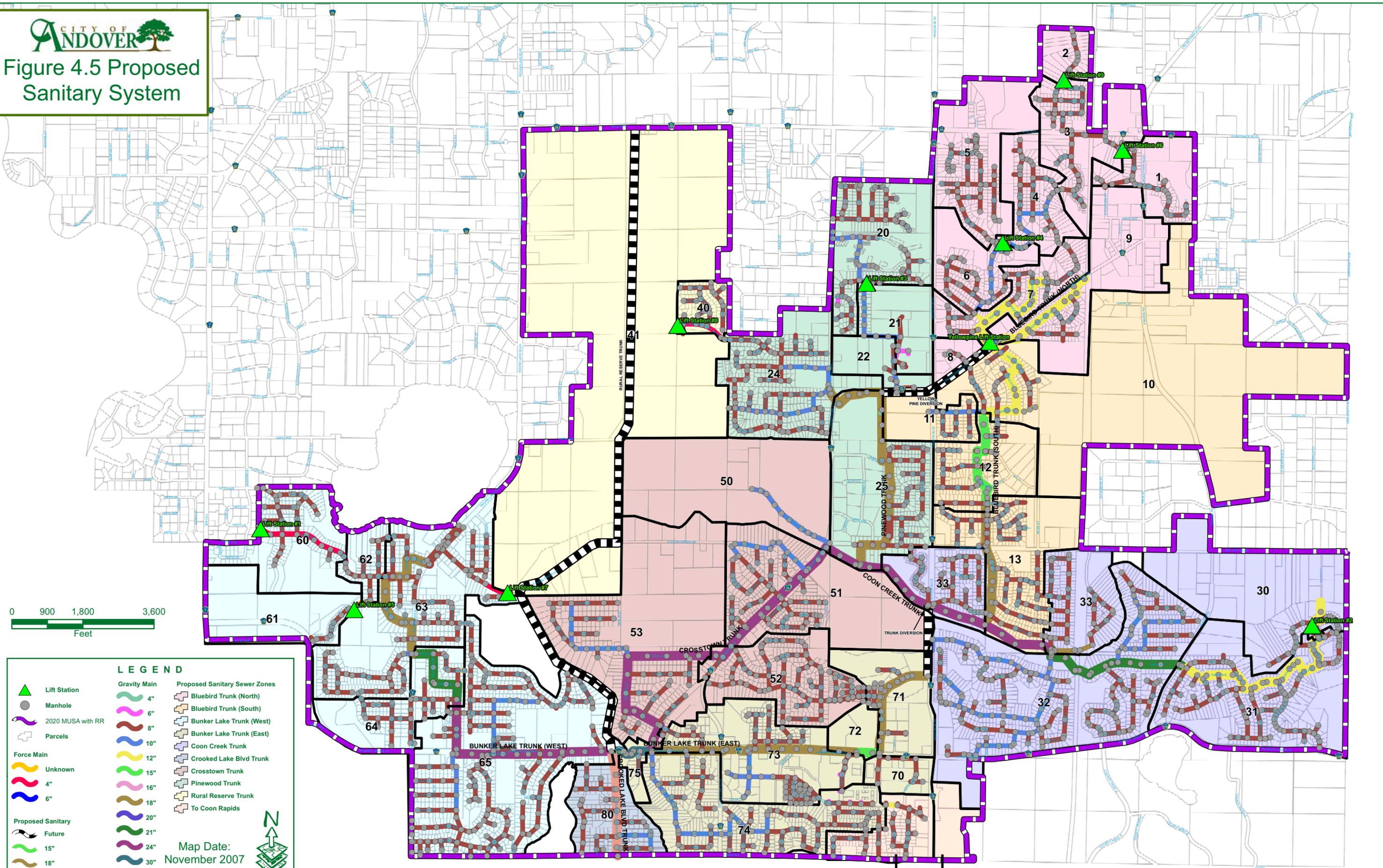
**Implementation Plan:** As previously discussed, the City of Andover does not have a problem with I/I. To ensure that problems do not occur in the future the following measures will be taken:

- The City will maintain the current plan, policies and objectives to maintain the integrity of the sewer system.
- Periodic and routine maintenance of the system will identify areas needing repair to limit potential I/I. Financing will come from the Trunk Sewer Fund.
- The City will enforce the City Code requiring disconnection of illegal sewer connections on a complaint basis, or as identified by other means.
- The City Building Inspectors will inspect newly constructed sewer service connections to verify that they comply with the IRC.





Figure 4.5 Proposed Sanitary System



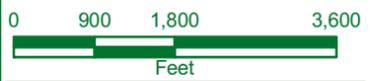
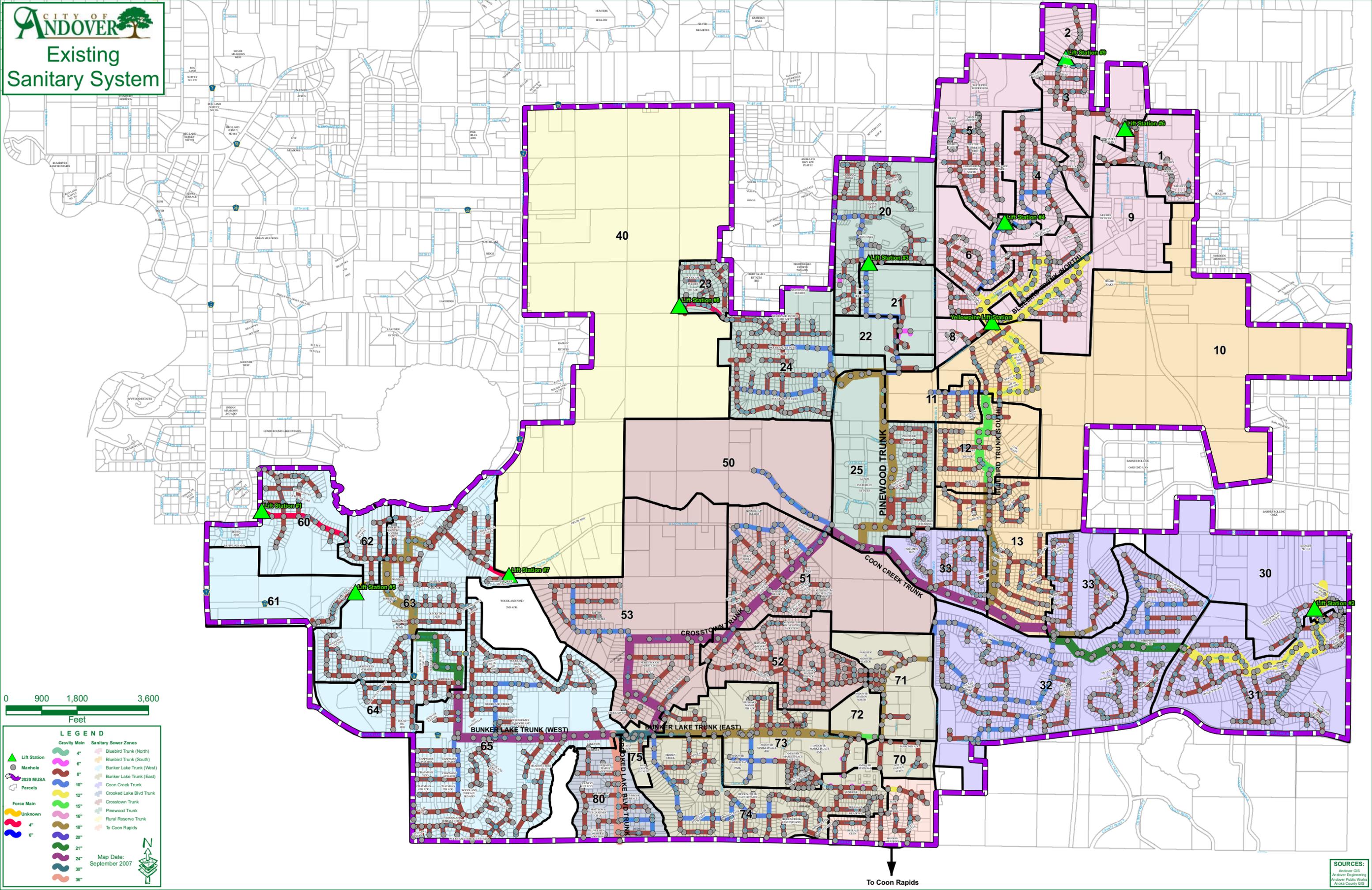
**LEGEND**

Lift Station	Gravity Main	Proposed Sanitary Sewer Zones
Manhole	4"	Bluebird Trunk (North)
2020 MUSA with RR	6"	Bluebird Trunk (South)
Parcels	8"	Bunker Lake Trunk (West)
Force Main	10"	Bunker Lake Trunk (East)
Unknown	12"	Coon Creek Trunk
4"	15"	Crooked Lake Blvd Trunk
6"	16"	Crosstown Trunk
Proposed Sanitary	18"	Pinewood Trunk
Future	20"	Rural Reserve Trunk
15"	21"	To Coon Rapids
18"	24"	
30"	30"	
36"	36"	

Map Date: November 2007

To Coon Rapids

SOURCES:  
Andover GIS  
Andover Engineering  
Andover Public Works  
Anoka County GIS



**LEGEND**

Lift Station	Gravity Main	Sanitary Sewer Zones
Manhole	4"	Bluebird Trunk (North)
2020 MUSA	6"	Bluebird Trunk (South)
Force Main	8"	Bunker Lake Trunk (West)
Unknown	10"	Bunker Lake Trunk (East)
4"	12"	Coon Creek Trunk
6"	15"	Crooked Lake Blvd Trunk
	16"	Crosstown Trunk
	18"	Pinewood Trunk
	20"	Rural Reserve Trunk
	21"	To Coon Rapids
	24"	
	30"	
	36"	

Map Date: September 2007

